The Department of Agriculture and Food

Plan to Support

Horticulture Industry Development

2009–2012
Disclaimer

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Minister’s foreword

The State Government recognises the vital contribution the agriculture and food sector makes to the economy of Western Australia. Ensuring the state remains highly competitive in both domestic and international markets is critical.

Public funds must be well spent, so it is imperative that the activities of the Department of Agriculture and Food are efficient and effective.

Last year I outlined the government’s key strategies for agriculture and food. These include improving the long-term profitability of the sectors, developing effective natural resource management policies, building industry capacity to develop and grow, improving market access for WA product and promoting a positive profile of the WA food and agriculture sectors.

The Plans to Support Industry Development provide a mechanism for the department to improve its focus in areas that make the biggest difference. The plans are the cornerstone for the department to help industry maximise the opportunities to prosper.

This three year plan has been developed in consultation with industry and aims to grow horticultural industries from a current estimated farm gate value of $898 million to over a billion.

The development of tropical and sub-tropical horticulture in the Kimberly and Gascoyne regions is a priority, with emphasis on fast-tracking new opportunities in the Ord River Irrigation Area. This includes development of new production districts and crop opportunities.

The plan will be reviewed and updated regularly. Industry participants and stakeholders are encouraged to continue to contribute their views to help drive the sector forward.

Terry Redman MLA
MINISTER FOR AGRICULTURE AND FOOD
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Executive summary

The Plan to Support Horticulture Industry Development (‘the Plan’) recognises that healthy and profitable Western Australian agricultural industries are integral to the economic wellbeing of regional and rural communities. The Plan promotes a progressive and productive horticultural industry through efficient use of natural resources, high standards of biosecurity, modern marketing, value-adding and research to enhance continuous improvement throughout the supply chain from producer to consumer.

Investment Initiative 1

Western Australian horticultural producers need to be able to access new technologies, advanced production methods and new crops as well as exploit regional climatic advantages to maintain profitability. The state government’s strategy to improve long-term profitability of the agriculture and food sectors is a reflection of these needs.

The Department of Agriculture and Food, Western Australia will have a lead role in developing high efficiency production systems and a regionally diverse and secure production base that will ensure WA is a reliable supplier of sustainably produced horticultural products.

As well as developing systems for WA conditions, the department will introduce and adapt technologies and information from overseas to ensure that WA producers are well informed, skilled in new technologies and capable of operating at ‘world best practice’.

To remain competitive and retain market acceptance, horticultural industries will need to meet community expectations of light production footprints, maximising the return from the physical resources with minimal adverse environmental impacts.

Industry will need to be involved in the development of projects that facilitate these improvements, working in partnership with the department and other service providers. Private investment in new and emerging opportunities and technologies will be critical for continued industry growth.

Investment Initiative 2

Intensive plant industries in WA are based on irrigated production systems and need access to suitable water and land for industry expansion and development.

The state government recognises the need for effective policies to manage land and water assets, adapt to a changing climate and ensure biosecurity.

The WA environment is free of many key pest and diseases found overseas, enabling produce to be grown with fewer inputs. For some sectors this freedom from pests and diseases delivers a competitive advantage in the marketplace that needs to be retained.

The department will ensure ongoing access to suitable land and water resources for industry growth by developing strong networks in policy development for water allocation and land use planning.

The department will also provide cost-effective biosecurity services and expertise to respond to incursions of high-risk pests and diseases. Industry will be required to support the management and eradication campaigns for incursions.
Plan to Support Horticulture Industry Development 2009–2012

Investment Initiative 3
WA’s horticulture sector is relatively labour intensive and needs access to a reliable supply of skilled labour and the development of labour-saving production and handling technologies.

The department will work in partnership with industry to identify labour and cost-saving techniques/technologies throughout the supply chain that will keep WA industries globally competitive.

Investment Initiative 4
WA’s intensive plant industries are high-cost producers for most sectors and therefore must target high-end markets where premiums are possible.

To achieve this, these industries need access to new crops, new varieties and new value-added processes. Access to these will be the key to profitability and growth in many horticultural industries.

The department will undertake this role where appropriate and will also provide the linkages to national and international networks to enable successful breeding and evaluation programs while coordinating the delivery of these products to the industry through the development of partnerships.

Industry must develop and support systems that ensure funding, and individual growers will need to risk venture capital in new products to capture advantages for the WA industry.

Investment Initiative 5
Access to premium markets in Australia and overseas is critical to many horticultural industries to enable ongoing growth. New high-value markets for WA products will need to be identified and captured.

The highest quality standards must be maintained to differentiate WA products in premium markets and food safety will increasingly be the point of difference with overseas competitors in domestic and export markets. This is consistent with the state government’s initiative to improve market access for WA product.

The department will coordinate, analyse and communicate market intelligence to ensure WA horticultural industries can capture and retain market opportunities. It will identify and evaluate new industry opportunities. This will enable the continued profitable expansion of the state’s intensive plant industries.

The growth forecasts and assumptions used to develop targets for industry growth outlined in this Plan are based on the best available information at the time of writing. The full support of the industry and its sectors as described in the Plan will be needed for the targets to be met as well as the assumptions being realised.
**Industry status**

WA horticultural industries are highly diverse. The industries:

- include fruit, vegetable, wine, viticulture and floriculture sectors, as well as new crops and other irrigated crops
- cover a wide geographic area of WA from Kununurra in the north to Albany in the south
- supply fresh and processed products to WA, interstate and overseas markets
- represent three distinct phases of development, from new industries, to those undergoing very rapid expansion, to mature industries.

Horticulture makes a very significant contribution to the state economy because most of its products command a high percentage share of the domestic market. The majority of the value added to products through packing, supply-chain distribution and product transformation is captured in the local economy. The retail sector contributes 39 per cent to added value of horticultural products and for some industries there is a considerable processing component, for example, the production of French fries and crisps, winemaking, packaged salads, prepared meals and catering by WA-based companies.

Sourcing reliable production, export and price data for these highly disparate industries has proven a challenge. Unlike other rural industries that have more centralised marketing arrangements and data collection systems, the large number of marketing options for horticultural products has made accurate data collection difficult. Despite this, analyses estimate the real worth of horticultural industries to the state’s economy by including the economic activity created in the labour-intensive supply chain from the farm to consumers in domestic, interstate and export markets.

Industry value chain models have been developed for 10 horticulture industries to estimate their real value by measuring the value-added contribution to the WA economy. The gross value of agricultural production (GVAP) of these 10 modelled industries, based on ABS data, represents 47 per cent of the total GVAP of all horticulture in WA. Using data from a range of sources, these models have calculated the farm-gate value, value-added (at farm and post-farm level) and the value of the industry at the point of final sale. With a farm-gate value of $422 million (ABS) per annum for the 10 modelled industries, the estimated total farm-gate value for WA horticultural industries is $898 million. The total ‘value-added’ contribution made by these 10 industries is $1206 million and the total value-added contribution of horticulture as a whole is estimated to be $2565 million. These models have also been used to estimate the projected value to the state of the outcomes outlined in this plan.

Horticultural industries are dynamic with many having market elements that have characteristics closer to the fashion industry than high-volume agricultural sectors. Consequently, consumers in WA have seen significant and rapid changes in the range and quality of horticultural products as well as market options available to them over the last decade.

Planning for industry growth must be market-led. This plan addresses this by proposing strategies that link up through the supply chain from market identification to production technology.
Key trends set to accelerate over the next three to five years include:

**On the farm**

- Increasing vertical integration of horticultural businesses, including production, packing, direct marketing and in some cases retailing and export.
- More competition for the domestic labour force from a rapidly expanding mining sector. The increased competition is expected to cause labour shortages in horticulture sectors. The response by industry will need to be an increased focus on mechanisation and guest worker schemes. This will include development of mechanisation-friendly plant architecture systems that support more efficient machine management.
- New investment in WA by national businesses seeking to diversify their supply bases after the drought in the Murray-Darling Basin.
- Increasing grower concern for management of competition for water resources and demonstration of efficient and responsible water and land use.
- Increasing volumes of new horticultural products marketed domestically and exported as a consequence of past management investment scheme (MIS) funds into horticulture.

The sector will continue to experience competition for land and water resources for production from other industries and urbanisation.

**Western Australian market**

- Healthy eating and fruit and vegetables for niche markets (including some with new attributes and claims of health benefits) will become more important in retail outlets. This is reinforced by national and international health policies to minimise obesity, diabetes and heart disease.
- The introduction of new varieties to meet consumer needs will become more important and be tied to exclusive supply arrangements.
- Supermarkets have lost market share to specialist retailers at the high socio-economic end in Europe and the US. This is likely to occur in Australia as well with a complementary trend towards retail farmers’ markets.
- More products in supermarkets will be pre-packed and value-added for convenience, food safety and security.

WA has the largest population and wealth growth of all Australian states and this will increase the size of the domestic market and the demand for premium products.

**Interstate and export markets**

- The supermarket share of fresh food sales will rise in developing economies and this will create new supply chains and product pathways to Asian and Middle Eastern consumers, particularly at the premium end of the market.
- There will be increased demand by importing countries for demonstration of sustainable production systems.
• The ‘green miles’ debate is resulting in heightened consumer interest in local production in Australian and overseas markets. Contrary to popular belief, studies have shown sea freight for off-season supplies can produce lower carbon emissions than heated greenhouse production in destination markets (for example, New Zealand vegetables sea freighted to Europe have a lower carbon footprint than European vegetables).

• Food safety scares emanating from some of our competitor countries are likely to continue despite the best efforts of their regulators to contain them, leading to further erosion of confidence in their products in more sophisticated markets in our region. Examples of Australian fresh products commanding 100 per cent price premiums or more against product of similar appearance from China in ‘high-end’ Asian markets are already evident.

• Free-trade agreements and changes to quarantine and market access arrangements between Australia and other countries will continue to expand.

• Southern hemisphere competitors such as Chile and Brazil are facing labour availability issues and cost increases. This will create changes to supply and price arrangements in key European markets.

• Interstate sales of horticultural products are set to increase with projected supply shortages of a range of products caused by water shortages in eastern Australia. Volumes of fresh horticultural products transported from Perth to eastern states’ markets doubled from 2006–07 to 2007–08 to more than 58 000 tonnes. Carrots and tomatoes were significant contributors to this total by weight. Data on volumes delivered direct from Kununurra to eastern states’ markets were not available or included in this total but are known to be large.

• There will be increased interest internationally in novel products from WA-based breeding programs for apples and native plants based on exclusive supply arrangements that will generate revenue streams for the department and partner investors.
Industry potential

The estimated current value of horticulture at the farm-gate level of $898 million is expected to increase to $1085 million in real dollars by 2012 based upon the projected program outcomes. As a consequence of these outcomes, the total value-added contribution of the WA horticultural industries will increase to $2917 million. Meeting this target is the objective of this industry development plan.

Figures 1 and 2 show the current value of some horticultural industries. Figure 3 shows the projected growth in the value resulting from implementation of this industry development plan.

It is critically important that WA horticultural producers retain a dominant position in the domestic market into the future to be able to capture opportunities that will emerge over the next decade. These are the opportunities that will arise from global food shortages and the growing sophistication of buyers at the elite end of markets.

The value-added growth target set for the entire horticulture sector will be met by DAFWA and industry jointly enacting the priority initiatives and strategies identified in the needs analysis that underpins this plan. The following tables describe Horticulture’s ‘Needs critical for success’, including priority initiatives, rationale, DAFWA outputs, strategies and measures of success.

1. Farm-gate value of 10 modelled industries – $422 million

Farm-gate value is the value at the point of production. This is the gross value of production to the grower.

![Pie chart showing farm-gate value of 10 modelled horticultural commodities]
2. **Value-added by modelled industries – $1206 million**

Value-adding is the sum of wages, profits, rents and interest generated in the WA economy by the farms, processors, distributors and retailers in the supply chain to domestic, interstate and export markets. It is the contribution of the industry to the state economy. The value added by different sectors as the product flows through the chain is identified and summed to calculate the total value added by the industry. These 10 modelled commodities are adding $1206 million to the economy as they make their way from the farm to the consumer.

![Figure 2: Value adding to WA economy by 10 horticultural industries ($ million)](chart)

**Figure 2** Value adding to WA economy by 10 horticultural industries ($ million)

![Figure 3: Predicted increase in value added by different industries ($ million) from implementation of the industry plan (2009–2012)](chart)

**Figure 3** Predicted increase in value added by different industries ($ million) from implementation of the industry plan (2009–2012)
Industry needs

The department has identified industry needs and strategies to address these priorities. They are summarised in the tables below. The plan is underpinned by statistical analyses and strategic industry reports, as well as workshops and consultations with key stakeholders which identified the issues and needs of the WA horticulture industry.
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<th>Priority responses</th>
<th>Rationale</th>
<th>DAFWA outputs</th>
<th>DAFWA strategies</th>
<th>Measures of success</th>
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<tr>
<td>High</td>
<td>Profitability Tactics 1.3, 1.4, 1.5, 1.10</td>
<td>DAFWA</td>
<td>To remain competitive and retain market acceptance for its products, horticultural industries will need to be innovative as well as globally price and quality competitive.</td>
<td>DAFWA has a lead role to assist in the development of high-efficiency production systems and a regionally diverse and secure production base.</td>
<td>Develop new crops and horticultural opportunities including irrigated biofuels for the Ord and Gascoyne initiatives</td>
<td>Domestic, interstate and export sales growth</td>
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<td>Resource base Tactics 2.1, 2.3, 2.8, 2.9</td>
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<td>New products and new regional development</td>
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<td>Numbers of growers adopting new technologies</td>
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<td></td>
<td>• Maximise industry access to, and uptake of, new technologies, advanced production methods and new crops</td>
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<td></td>
<td>• Exploit regional climatic advantage to drive profitability</td>
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<td>Industry</td>
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<td>• Develop representative structures for sectors which recognise the need for steady improvement in 'industry-wide' competitiveness, regional development and adoption of new technologies.</td>
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<td></td>
<td>• Develop projects that facilitate these improvements, working in partnership with DAFWA and other service providers</td>
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<td>• Increased private investment in new and emerging opportunities and new technology.</td>
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<td></td>
<td>• Industry representative bodies to develop and support systems that promote sustainable resource use in partnership with agencies and experts in the field.</td>
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<td>• Promote systems to individual growers who need to be seen by the wider community to be implementing environmental management and sustainable production</td>
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<td>• Build consumer confidence in the industry by highlighting the industry’s good environmental stewardship</td>
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<td></td>
<td>• Develop new and emerging opportunities including irrigated biofuels for the Ord and Gascoyne initiatives</td>
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<td>• Prepare investment packages for new horticultural and intensive crop opportunities that will support the release of water and land resources in the Ord and Gascoyne</td>
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<td></td>
<td>• Implement innovative ‘water harvesting’ techniques to support industry expansion</td>
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<td></td>
<td>• Introduce world-best-practice production systems adapted for local production conditions, e.g. high-density pomefruit planting systems</td>
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<td></td>
<td>• Manage key external and emerging issues for industry to support and maintain competitiveness, e.g. smoke taint in wine</td>
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<td></td>
<td>• Undertake appropriate research, development and change management to ensure key industries have access to light footprint production systems using technologies which allow for low chemical input and carbon footprint, and sustainable and efficient water and fertiliser use.</td>
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<td></td>
<td>• Focus on water-use efficiency, water quality and minimal nutrient runoff to the environment</td>
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<td>• Develop and enhance innovative systems to increase water-use efficiency for irrigation, e.g. ‘web-based expert system for efficient irrigation of vegetables on sand’</td>
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<td></td>
<td>• Develop and adopt strategies that minimise nutrient leaching into groundwater on sandy soils of the coastal plain</td>
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<td>• Adapt and/or promote nationally developed R&amp;D outputs to support key industry growth</td>
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<td>• Develop new intensive/protected cultivation systems to increase productivity and the quality of horticulture products</td>
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<td></td>
<td>• Identify and analyse new industry opportunities such as macadamia, almond, pistachio and pomegranate in existing and new production regions</td>
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<td>• Further investigate fledgling industry opportunities—green tea and export seed potato.</td>
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## Industry need 2: Access to water and land for industry expansion and development, with risks of biosecurity threats minimised

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<th>Priority</th>
<th>Government strategy and tactic reference</th>
<th>Priority responses</th>
<th>Rationale</th>
<th>DAFWA outputs</th>
<th>DAFWA strategies</th>
<th>Measures of success</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Resource base Tactics 2.1, 2.4, 2.6, 2.7, 3.4</td>
<td>DAFWA Develop effective policy to manage land and water assets, climate variability and biosecurity</td>
<td>Horticulture and intensive plant industries are based on an irrigated production system which requires access to suitable land and water resources. As the state population grows, there will be increasing competition for these resources and, in some regions, they are already beginning to limit industry growth. The WA environment is free of a number of key pest and diseases that enable produce to be grown with a limited requirement for control. In the case of some sectors this freedom from pest and diseases delivers a competitive advantage in the marketplace</td>
<td>Strong networks in policy development for water allocation and land-use planning developed with other government agencies and industry stakeholders</td>
<td>Streamline approval processes for new horticultural and irrigated crop developments</td>
<td>• Growth in irrigated area under crop development&lt;br&gt;• Growth in industry value&lt;br&gt;• Number of new pest and disease incursions</td>
</tr>
<tr>
<td>Profitability</td>
<td>Tactics 1.7, 1.10</td>
<td></td>
<td>Industry promote horticulture’s claim for a share of publicly owned resources to facilitate industry growth&lt;br&gt;Set policy in the best interests of the industry as a whole&lt;br&gt;Develop funding mechanisms to underpin management and eradication campaigns for identified threats&lt;br&gt;Develop a set of transparent criteria that trigger the deployment of such funds</td>
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<tr>
<td>Industry capacity</td>
<td>Tactics 3.1, 3.2, 3.4, 3.9</td>
<td>DAFWA Investigate labour-efficient production and handling systems</td>
<td>The horticulture sector is relatively labour intensive. A number of industries would expand investment if suitable labour resources were available. There also significant opportunities to introduce new technologies and mechanisms to reduce labour cost and requirements. Untapped opportunities exist to reduce supply-chain costs through techniques such as bulk handling transport and product differentiation in supply chains.</td>
<td>Identification of labour and cost-saving techniques and technologies throughout the supply chain that keep WA industries globally competitive&lt;br&gt;Make knowledge available to producers and agribusiness in forms that enable effective risk management</td>
<td>Enhance efforts with proactive policy advice to government for an overseas guest labour scheme in WA&lt;br&gt;Strengthen industry networks at state and national level to ensure any opportunities for pilot guest labour programs are available to WA&lt;br&gt;Promote production systems that reduce labour inputs and cost&lt;br&gt;Facilitate mechanised production, harvest and packing systems for a range of crops&lt;br&gt;Introduce and/or promote innovative supply chain handling systems that improve out-turn quality and reduce costs developed, e.g. bulk shipping for sea freight and cool chain systems for road freight for perishable products&lt;br&gt;Develop an understanding of the impact of climate change on state horticultural industries</td>
<td>• Labour efficiency of production&lt;br&gt;• Number of NRM and biosecurity risk management plans in place with industry ownership</td>
</tr>
</tbody>
</table>
### Industry need 4: Competitive advantage from having first market access to unique or proprietary varieties, new crops and value-added processes

<table>
<thead>
<tr>
<th>Priority</th>
<th>Government strategy and tactic reference</th>
<th>Priority responses</th>
<th>Rationale</th>
<th>DAFWA outputs</th>
<th>DAFWA strategies</th>
<th>Measures of success</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Market access Tactics 4.1, 4.3</td>
<td>DAFWA</td>
<td>WA and Australia are high-cost producers for most sectors and must target high-end markets where premiums are possible. The commercial marketplace is moving towards an environment where crop varieties are managed through closed loops and produce is treated like a fast-moving consumer good backed by marketing, exclusive supply arrangements, etc. Access to these varieties is a key to profitability and growth in many sectors. There are also opportunities to develop new varieties with enhanced health benefits into a new category in retail outlets</td>
<td>Provide science know-how and national/international science networks to industry to enable successful breeding and evaluation programs</td>
<td>Deliver improved products to the WA industry by developing partnerships</td>
<td>Derive competitive advantage from the release of, and access to, new premium fruit, floriculture and viticulture clones and varieties, e.g. Western Dawn (non-browning apples (some of which are marketed as Enchanted®)), Gain access to new horticulture products with enhanced health benefits and positioning in the new functional food sector, e.g. Vegetables from Vital Vegetables project, Support national programs to improve horticultural crops through innovative breeding methods, Develop access strategies for new products from national breeding programs, e.g. Mango varieties with similar eating quality but better yielding characteristics than Kensington Pride from the National Mango Breeding program, Tissue culture and rapid propagation techniques (IVS) used for ‘fast tracking’ commercial plantings to create competitive advantage and new industry opportunities, e.g. Hoodia, wine grape introductions from ‘Post-Entry Quarantine’ facility, capers, sandalwood, avocados and other new crops.</td>
</tr>
</tbody>
</table>

### Industry need 5: New high value markets for WA products identified and captured

<table>
<thead>
<tr>
<th>Priority</th>
<th>Government strategy and tactic reference</th>
<th>Priority responses</th>
<th>Rationale</th>
<th>DAFWA</th>
<th>Measures of success</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Market access Tactics 4.2, 4.3, 4.4, 4.5, 4.7, 4.8, 4.9</td>
<td>DAFWA</td>
<td>Identification and support for development of premium markets and new industries for WA</td>
<td>The need for access to premium markets in Australia and overseas is critical for many sectors to enable industry growth. This is particularly so where large-scale production growth in the past five years has been driven by managed investment schemes including wine, mangoes and red-fleshed grapefruit</td>
<td>Export development strategies focused on premium markets developed with industry, Support industries with an export focus and requiring marketing initiatives to develop self-funding approaches, e.g. New market development and marketing planning for the wine industry, Develop industry strategies to increase product differentiation in export markets and capture premium market opportunities, Achieve and sustain market access for a range of horticulture crops in target markets, e.g. Export market access gain for mangoes and grapefruit into China, Taiwan and Japan.</td>
</tr>
</tbody>
</table>

**Plan to Support Horticulture Industry Development 2009–2012**
## Appendix 1. Government priorities, strategies and tactics

### Government priority

To make decisions that lead to progressive and profitable agriculture and food sectors driving value for the WA economy

### Strategies

<table>
<thead>
<tr>
<th>1. Improve long-term profitability of the agriculture and food sectors</th>
<th>2. Develop effective natural resource management policy to manage land assets, climate variability and biosecurity</th>
<th>3. Build industry capacity to adapt and grow</th>
<th>4. Improve market access for WA product</th>
<th>5. Promote a positive profile of WA food and agriculture sectors</th>
</tr>
</thead>
</table>

### Tactics

<table>
<thead>
<tr>
<th>1. Ensure DAFWA and other agencies efficiently deliver appropriate services through modern, best practice models</th>
<th>2. Deliver a WA Food Strategy project</th>
<th>3. Play a leading role in the Ord Irrigation Area expansion project</th>
<th>4. Lead the Gascoyne Irrigation area enhancement</th>
<th>5. Target public good R&amp;D aimed at lifting productivity by focusing on the real drivers of productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Develop a whole-of-government natural resource plan for better management of the natural resource base including land, water, atmosphere and biodiversity that encompasses biosecurity and climate variability</td>
<td>2. Lead development of a new approach to resilience and preparedness to seasonal variability, e.g. the North East Agricultural Region project</td>
<td>3. Climate change response—identify research priorities for localised and relevant data; develop clear policy for both emissions mitigation in the agricultural sector and climate adaptation; lead carbon management options</td>
<td>4. Deliver new and appropriate risk management tools</td>
<td>5. Identify outcomes to implement from industry sector projects—for example, meat marketing, Gascoyne Value Added Project</td>
</tr>
<tr>
<td>4. Better government—streamline planning and regulatory processes; work with decision-making authorities to remove constraints to industry development; develop a new whole-of-government approach.</td>
<td>5. Climate adaptation—improve adaptability and resilience of WA producers with training and tools</td>
<td>6. Invest in skills development to raise ability to adopt, adapt, invest and change. Decision-making, business/financial management are priorities</td>
<td>7. Understand client needs and provide tailored services that build capacity</td>
<td>8. Identify positive industry advocates and promote to the media</td>
</tr>
<tr>
<td>6. Improve links between industries to enhance productivity</td>
<td>7. Identify and promote positive food, agriculture and forestry stories to the media</td>
<td>8. Progress DAFWA headquarters development project. Encourage productivity lifts on high rainfall, small area farms</td>
<td>8. Identify and remove barriers to trade; encourage new entrants to lift competition</td>
<td>9. Measure comparative movements in carbon credit and land-use options</td>
</tr>
<tr>
<td>7. Identify and encourage local food, agriculture and forestry stories to the media</td>
<td>9. Undertake regular attitudinal surveys of stakeholders and the general community</td>
<td>10. Progress DAFWA headquarters development project</td>
<td>10. Promote positive industry advocates and promote to the media</td>
<td></td>
</tr>
</tbody>
</table>

* Blue text indicates ministerial priorities
Appendix 2. Situation analysis

1. Wine

The Australian wine grape industry is one of the nation’s most important rural industries. Wine is the second most important rural export by value, ranking behind wheat and ahead of wool and dairy products. It is one of the leading value-added rural industries, with wine grapes estimated to increase in value by five to seven times as wine at retail. Wine industry investment in rural areas is significant, generating activity and employment in production, winemaking, cellar door sales, restaurants, accommodation and other tourism activities. The economic (value-added) multiplier for the wine industry is estimated to be 3.92.

The WA industry makes up 4.5 per cent of the nation’s wine grape production (ABS 2008) but accounts for more than 15 per cent of the wine value. Between 1995 and 2006, WA wine grape production increased three times faster than the national industry. The wine grape crush has declined from the peak of 82,000 tonnes in 2005 to around 73,000 tonnes in 2008 (AWBC 2008).

Wine regions

Production of wine grapes is in the south-west, west of a line drawn from Geraldton to Esperance. There are nine main growing regions (Blackwood Valley, Geographe, Great Southern, Manjimup, Margaret River, Peel, Pemberton, Perth Hills and Swan Districts) and six subregions (Albany, Denmark, Frankland River, Mount Barker, Porongurup and Swan Valley). Margaret River and the Great Southern are the largest regions and together account for nearly half of the state’s production. Their importance is expected to continue even as the rate of growth slows in the short term.

Wine quality

The WA industry is based predominately on cool climate viticulture. The focus has been on producing premium-quality wine grapes for the super-premium and specialty wine market segments.

The super-premium and specialty segments (‘differentiated’ or ‘fine’ wine) represent about 16 per cent of the global market. The current trend in export demand is for growth at either end of the quality segment price range. The specialty segment is growing at 5 per cent and bulk at 38 per cent although the popular premium category, which represents 47 per cent of exports growth, is declining.

In recent years market forces have driven WA’s wine offering towards the commodity (popular premium and premium) price point end of the market. Some estimates put the current balance in the segments at around 35 per cent differentiated and 65 per cent commodity. The factors influencing this trend have included oversupply of wine grapes, increasing global competition, price discounting and the high value of the Australian dollar. The industry strategy to reverse this trend is to increase the proportion of wine in the differentiated segment at higher price points.

Variety mix

WA has developed a good reputation in domestic and international markets for ‘fine’ wines through its adoption of a range of the world’s premium varieties and clones, strong investment in vineyard and winemaking technology and a focus on quality. The current variety mix is split 55 per cent white and 45 per cent red varieties—a reversal from 45 white
to 55 red in 2005. Chardonnay and Sauvignon Blanc account for about 30 and 27 per cent of white wine production respectively and Shiraz and Cabernet Sauvignon account for 42 and 33 per cent of red wine production respectively (AWBC 2008).

The variety mix and balance between premium white and red grapes is important in meeting future market trends and changes in consumer preferences. The trend is for an increasing demand for white wine relative to red. The industry is responding by increasing plantings of white varieties, top-working red grapes to white and some removal of red grape plantings. The increasing popularity of the white varieties Sauvignon Blanc and Semillon with consumers has seen a focus on these varieties in restructuring the vineyard mix.

**Producers and wineries**

The WA industry is dominated by smaller, mostly family-owned and operated businesses. There are over 600 wine grape growers, 400 wine producers and about 350 wineries. Of the vineyards, 60 per cent are less than 10 ha, 20 per cent are 10–19.9 ha, 10 per cent are 20–49 ha, about 5 per cent are 50–99 ha and 5 per cent are 100 ha and above. The trend is for smaller producers to expand or amalgamate to form larger businesses. Most wineries crush between 20 and 99 tonnes of grapes per year and only about six crush more than 2500 tonnes per year. Most WA wineries are considered to be in the small category.

**Value-adding**

Wine is one of the highest value-adding rural industries. The value of grapes increases by an estimated five to seven times to wine at the retail level. The wine industry and wine tourism is a significant employer on vineyards, in wineries and in restaurants and tourist businesses. The wine industry has a major impact on regional employment, investment, tourism and economic development. The employment multiplier for the wine industry is 5.68.

Future improvements in value-added by the vineyard sector will be from increases in productivity. Value-added by the wineries will be increased by further differentiation of wines to meet the needs of different markets.

**Markets**

WA participates in, and is influenced by, the local, national and global wine market. Despite the current unfavourable supply and demand conditions, production will continue to grow from younger plantings and some further expansion in vineyard area.

Structural trends which are driving the increased demand for specialty wine include:

- increasing affluence and personal wealth
- consumption of premium wines ($5–$7.50 FOB/L), super-premium ($7.50–$10 FOB/L) and specialty wines (> $10 FOB/L) is growing in most western wine markets (WFA 2007)
- lifestyle changes in favour of wine will continue
- globalisation will extend western consumer preferences to Asia
- new world product offer of flavour, consistency, reliability and accessibility of WA wines is better suited to this shift in demand.

The UK and US continue to be WA’s most important export markets. Competition will continue to increase from South America and South Africa, particularly in relation to the European and US markets. Greater effort with exports needs to be applied to the South-East Asian market as they take on more of a western lifestyle. The level of exports has declined from around 20 per cent to 13 per cent in recent years.
Resource base

The WA wine grape sector uses about 12,000 ha, more than half in the cooler areas of the south west. While the industry is still in an expansion phase, new plantings have slowed considerably. The industry is one of the most efficient users of water for irrigation (1.5 ML/ha) and value-adding. An estimated 18 ML of water is used for irrigation, mainly from on-farm dams with some groundwater.

The Wine Industry National Environment Committee (WINEC) has identified several key natural resource management issues including:

- land degradation—salinity and soil acidity
- off-site impacts—pesticide residues, nutrient leaching, packaging
- water availability and quality—water harvesting and water use efficiency
- wine effluent management
- mitigation and adaptation to climate change.

The industry is addressing these issues by implementing vineyard and winery management practices which ensure resource sustainability and minimise off-site impacts. WINEC has developed Entwine, a national environmental assurance program for wineries and vineyards, as a tool to help manage these issues.

Biosecurity issues

The main threats are the introduction of exotic pests and diseases. These threats are being managed effectively by Quarantine WA and the Australian Quarantine and Inspection Service (AQIS). The wine industry interacts with biosecurity systems through Hortguard to identify import risks and how they will be managed.

A number of pathogens (fungi, bacteria, viruses and phytoplasma) are a significant disease risk either because they are not known to occur in WA or because not all strains of the pathogen are present. Imported grape vine material is tested by AQIS under post-entry quarantine (PEQ) protocols. Imported material is grown and tested under quarantine for a minimum of two years, which includes virus testing of material from non-approved sources.

Industry potential

The WA industry has gone through a period of unprecedented growth and has established a national and international reputation for super-premium and specialty wines. The notable competitive advantages WA has created for its wines in the global market include:

- distinctive wine style choices, of which WA has more than any other region in Australia
- superior quality wines
- brand image characterised as bright, youthful, brash, non-conforming and exotic
- strong distribution systems via independent retailers and on premises (cellar door).

Industry has identified opportunities to develop new competitive advantages which include:

1. Production
   - Produce the best range and quality of wine grapes to increase the proportion of differentiated products (super-premium and specialty wines) in our wine offering.
   - Develop lower cost production systems without compromising quality.
   - Ensure that our reputation for quality is maintained.
2. **Focus on regional strengths to deliver a range of superior quality distinctive wine styles to consumers.**

3. **Identify, source, import and multiply new varieties, improved clones and rootstocks to:**
   - enhance the range of superior quality distinctive varietals, wine styles and blends, and regional diversity
   - varieties, clone and rootstocks better suited to vineyard location and site and better adapted to climate change and variability.

4. **Investigate, develop and adapt new technologies and mechanisation for WA vineyards to reduce costs and improve quality.**

5. **Develop new export markets and growing domestic market share.**

6. **Adopt certified environmental management programs (e.g. Entwine) to ensure market access and improve export market potential.**

7. **Build stronger research and development capacity to support the industry.**

The key rate limiters to the wine industry’s ability to capture its potential profitable market share (domestic and international) include:

<table>
<thead>
<tr>
<th>Supply chain area</th>
<th>Rate limiter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs</td>
<td>Lack of access to improved clones, new varieties and rootstocks</td>
</tr>
<tr>
<td></td>
<td>Reduction in resources allocated to R&amp;D</td>
</tr>
<tr>
<td>Production</td>
<td>Low returns if high quality is compromised</td>
</tr>
<tr>
<td></td>
<td>Increased production costs</td>
</tr>
<tr>
<td></td>
<td>Lack of suitable irrigation water to allow for expansion</td>
</tr>
<tr>
<td></td>
<td>Serious pest or disease incursion</td>
</tr>
<tr>
<td></td>
<td>Negative environmental impact resulting from production practices</td>
</tr>
<tr>
<td></td>
<td>Lack of investment in vineyard management and restructuring to optimise fruit quality for wines that better meet market and consumer preferences</td>
</tr>
<tr>
<td>Winemaking</td>
<td>Overproduction of wine styles that are not in demand</td>
</tr>
<tr>
<td></td>
<td>Industry characterised by inefficient producers</td>
</tr>
<tr>
<td></td>
<td>Industry failing to respond to market signals</td>
</tr>
<tr>
<td></td>
<td>Insufficient investment</td>
</tr>
<tr>
<td>Distribution and markets</td>
<td>Insufficient investment in infrastructure projects</td>
</tr>
<tr>
<td></td>
<td>Insufficient market intelligence including identification of new markets</td>
</tr>
<tr>
<td>Market access and trade</td>
<td>Exchange rate fluctuations</td>
</tr>
<tr>
<td></td>
<td>Production of wine grapes or wine not meeting market specification</td>
</tr>
<tr>
<td></td>
<td>Exotic pest and disease incursions</td>
</tr>
<tr>
<td></td>
<td>Imposition of non-trade barriers</td>
</tr>
<tr>
<td></td>
<td>Competition from low cost producers</td>
</tr>
</tbody>
</table>
**Industry needs**

The WA wine industry identified the following key needs and the interventions required by DAFWA, wine industry and others stakeholders to meet key industry needs.

<table>
<thead>
<tr>
<th>Industry need</th>
<th>Intervention required</th>
</tr>
</thead>
</table>
| Improved productivity and quality of cool climate production systems for WA | • Improve vineyard productivity, grape and wine quality for WA’s premium varieties through understanding key contributing factors in viticulture, winemaking and marketing  
• Enhance regional and variety characters meeting consumer preferences and expectations  
• Develop low-input and low-cost production systems  
• Enhance techniques to effectively control pests and diseases using low-input management systems  
• Improve access to and promote use of high-quality clones, new varieties and rootstocks  
• Improve understanding and capacity to adjust to a changing and variable climate  
• Enhance adoption of new production technology through technology transfer, training and education  
• Develop benchmarks for yield, fruit and wine quality, vineyard water balance, integrated pest management, soil health and cost of production  
• Increase share of external funds for new R&D  
• Develop education and training opportunities |
| New market development with the capacity to pay for differentiated product | • Identify and develop the ‘differentiated’ wine segments in new and current markets  
• Improve knowledge of consumer preference and expectations to better match wine styles  
• Improve access to relevant market intelligence  
• Test market new wine varieties and blends  
• Maintain accurate statistical database to ensure accurate investment advice and realistic market projections  
• Maintain positive marketing themes and images  
• Support industry marketing and promotion programs  
• Support industry’s initiative to develop regionally distinct WA brands which promote ‘sense of place’ and encourage consumers to ‘trade up’  
• Improve profitability of wineries through development of integrated wine tourism industry |
| Development of improved water harvesting, water storage and irrigation technologies | • Improve methods of harvesting rainfall, reducing evaporation from dams and more efficient irrigation  
• Improve water-use efficiency and reduce wine reliance on irrigation  
• Improve cover crop options  
• Reduce rising saline groundwater in the Great Southern |
| Management of external factors that impact on wine quality such as smoke taint | • Improve understanding of effect of smoke on grapes and wine and develop ways to protect against smoke taint  
• Identify compounds contributing to aroma and flavour taint in wine and determine sensory thresholds  
• Improve integration of viticulture with other land managers and users to minimise the impact of external factors on grape and wine quality |
| Strategies to manage key biosecurity risks | • Maintain up-to-date industry protection plan (Hortguard)  
• Monitor old and new pest and disease levels in the regional areas through continual vigilance and specific projects  
• Review assessments of *Phylloxera* risk in WA |
2. Cotton and sugarcane

Cotton

Most Australian cotton farms are owned and operated by families who also grow other crops and often graze livestock as well. Australian cotton farms are typically 500–2000 ha, highly mechanised and technologically sophisticated.

The Australian cotton industry generates approximately $1 billion per year in export revenue and, as one of country’s largest rural export earners, helps underpin the viability of many rural communities. Approximately two-thirds of Australia’s cotton is grown in NSW, the remainder in Queensland and there is no commercial production of cotton in WA.

In 2005–06, transgenic (GM) varieties of cotton made up more than 90 per cent of the Australian crop. In the same year 84 per cent of the crop was grown under irrigation (Australian Cotton Industry Council 2006).

Sugarcane

The Ord industry closed following harvest in 2007. In 2006, 13 growers in the Ord River Irrigation Area (ORIA) harvested 399 000 tonnes of cane from 3350 ha. Farms were highly diversified with most also growing a range of vegetable crops. Nationally, average farm size is much smaller with 4800 growers producing cane from 415 000 ha in 2005. Consolidation of the industry is continuing with another 400 growers expected to leave, in addition to 2000 growers who have left the industry over the past five years.

The largest 3 per cent of Australian growers control 22 per cent of production and each produces more than 30 000 tonnes of cane. In 2006, Ord growers produced an average of 31 000 tonnes.

The Ord industry was constrained by milling capacity (500 000 tonnes of cane per annum), resulting in inefficiencies and high costs.

A company set up by growers has purchased the mill from the previous owners and will retain it on a care-and-maintenance basis.

In 2006, 114 people were directly employed by the industry in the ORIA, working on farms, water distribution, research, harvesting, transport and milling. Using a standard multiplier, this would increase to 204 people directly and indirectly employed. A new industry of double the current size would increase these numbers to 217 and 388 respectively.

Production

Cotton

In 2004–05 Australia produced 2.9 million bales of cotton from 314 000 ha compared with China’s 28 million bales and the US’s 22 million bales. Between 1994 and 2004, the Australian industry recorded a 126 per cent increase in production while the area devoted to cotton growing increased only by 50 per cent.

Industry size fluctuates in the range of 150 000–550 000 ha annually. The main determinant is the availability of irrigation water. The recent succession of droughts has impacted heavily on the industry with 2006–07 having the lowest area in production in more than 30 years (150 000 ha).
There is currently no cotton industry in WA and development of a sustainable industry will require use of transgenic cotton. However, yield data from small commercial-sized areas are available through extensive trials at Kununurra (Table A1). These yields exceed the best obtained elsewhere. In 2004–05 the Australian cotton industry average yield was a world record 2038 kg/ha (9.2 bales/ha) which was three times the world average (732 kg/ha).

Table A1 Cotton yield data

<table>
<thead>
<tr>
<th>Year</th>
<th>Kununurra Bollgard II</th>
<th>Australian industry average</th>
<th>World average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bales/ha</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>8.4</td>
<td>7.4</td>
<td>2.8</td>
</tr>
<tr>
<td>2004</td>
<td>8.5</td>
<td>7.8</td>
<td>3.1</td>
</tr>
<tr>
<td>2005</td>
<td>9.4</td>
<td>9.2</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Production in Ord Stage 2 will require cropping of newly developed land. With soils having low inherent nutrient levels, research is needed to establish requirements for successful cropping of cotton under these conditions. This is also required for sugarcane.

New varieties producing higher quality cotton with increased staple length are needed for a competitive industry.

Commercial production of GM cotton requires all planting to occur within a 40-day window. Strategies are needed for this given the need to plant early in the dry season to obtain high yields as there is a high risk of rain delaying planting at this time.

**Sugarcane**

Australian sugar production increased to 5 million tonnes in 2007–08 with higher production forecast to flow through to a 9 per cent increase in exports to nearly 4 million tonnes. With lower world prices, the value of exports is forecast to fall by 12 per cent to $930 million.

Ord average annual cane production and sugar levels have been relatively stable in recent years with higher levels in earlier years due to higher cane yields of ‘first harvest after planting’ crops (Table A2). While yield averaged 122 t/ha, many individual whole-farm averages routinely exceeded 140 t/ha. A new industry using best practice, including better performing varieties, would be expected to perform well above this level.

Table A2 ORIA sugarcane productivity 1996–2005 (Ord Sugar Mill)

<table>
<thead>
<tr>
<th>Year</th>
<th>Cane (t/ha)</th>
<th>Pol (%)*</th>
<th>Pol (t/ha)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>167.30</td>
<td>13.45</td>
<td>22.50</td>
</tr>
<tr>
<td>1997</td>
<td>118.00</td>
<td>13.88</td>
<td>16.38</td>
</tr>
<tr>
<td>1998</td>
<td>134.50</td>
<td>13.43</td>
<td>18.06</td>
</tr>
<tr>
<td>1999</td>
<td>127.50</td>
<td>14.19</td>
<td>18.09</td>
</tr>
<tr>
<td>2000</td>
<td>126.30</td>
<td>14.60</td>
<td>18.44</td>
</tr>
<tr>
<td>2001</td>
<td>92.40</td>
<td>14.76</td>
<td>13.64</td>
</tr>
<tr>
<td>2002</td>
<td>110.60</td>
<td>13.52</td>
<td>14.95</td>
</tr>
<tr>
<td>2003</td>
<td>114.00</td>
<td>13.53</td>
<td>15.42</td>
</tr>
<tr>
<td>2004</td>
<td>125.00</td>
<td>13.30</td>
<td>16.63</td>
</tr>
<tr>
<td>2005</td>
<td>112.00</td>
<td>13.86</td>
<td>15.52</td>
</tr>
<tr>
<td>Mean</td>
<td>122.46</td>
<td>13.85</td>
<td>16.92</td>
</tr>
</tbody>
</table>

* Pol = Equivalent to content of sugar in cane.
Most recent production was restricted to one variety released more than 20 years ago with others no longer used due to smut susceptibility. An extensive assessment program has resulted in selection of new varieties which outperform industry standards. Further assessment will be required before they can be used in large-scale commercial production.

Water management is also a key issue with sugarcane being a high water user. A number of studies to identify strategies for optimising returns and to meet state and federal government environmental targets are being undertaken. Efficient water use, management of rising groundwater and quality of farm drainage water are included with a focus on requirements for production in Ord Stage 2.

ORIA growers are also being assisted to develop and adopt whole-farm approaches to management to maximise benefits through integration of current best-practice soil, water and pest management, using the range of crops grown on each farm.

**Value-adding**

**Cotton**

Some value-adding occurs in Australia but it is small compared with that overseas through the manufacture and retailing of cotton garments.

In Australia, the main value-adding is through the ginning process, which separates cotton fibre from seed. Ginning costs around $70 per bale and in an average production year of 300 000 ha, the ginning industry would be valued at about $190 million.

The cottonseed produced from this process amounts to about 700 000 tonnes. About half is used for stockfeed while the remainder is crushed for cooking oil. GM cottonseed oil is ranked second behind canola as the most consumed oil in Australia.

**Sugarcane**

In Australia, sugarcane is value-added through milling to produce either raw or refined sugar. A number of by-products undergo further processing.

Sugarcane at Kununurra was milled to produce raw sugar with the molasses by-product either sold locally as stockfeed or exported. Sugarcane can also be used to produce ethanol. There is potential for molasses, cane tops and protein in the form of urea and cottonseed meal, to be formulated into a nutritionally balanced stockfeed.

Bagasse is used as fuel for the mill boilers to produce steam and electricity for the factory processes. Bagasse from 1 tonne of cane is worth approximately $2.50 worth of oil-derived boiler feedstock. Excess bagasse could also be used in the boilers to produce steam for electricity generation.

Bagasse and filter press by-products can be used in compost production and there is potential for fly ash and filter press to be recycled as fertiliser.

Most cane milled in the Ord was burnt before harvest. Should green cane harvesting become preferred, there is opportunity to bale cane trash for use as fodder and/or garden mulch. Almost 70 per cent of Queensland sugarcane is cut green. This has been successfully trialled in the Ord, netting growers about $270/ha to significantly increase returns.
Markets

Cotton

The world’s main cotton exporters are the US, Uzbekistan, Brazil and Australia. Cotton grown in Australia is mainly exported to spinning mill customers (97 per cent) with China, Indonesia, Thailand, Korea and Japan the main markets. While only accounting for 2–3 per cent of world production, this represents 5–10 per cent of the world’s cotton export trade. It has been one of the highest rural export earners with annual production up to three million bales increasing from 9000 bales in the 1960s.

Australia also produces around 760 000 tonnes of cottonseed with a value of over $100 million which is sold to international markets for stockfeed and other uses. Markets include Japan, Korea, Saudi Arabia and the US.

Based on a yield of eight bales/ha and $370/bale, a new cotton industry at Kununurra would return a gross margin of $650/ha. A 10 000 ha crop would generate around $33 million annually and twice this value when including higher value crops used in rotation.

Sugarcane

High sugar prices ($500/t) during 2005–06 prompted a substantial increase in global production and an associated rise in stocks as consumption grew by less than output.

As the world’s largest producer, Brazil has a direct effect on global prices. By 2011–12, production is forecast to increase by 19 per cent to a little over 40 million tonnes.

Sugar consumption worldwide is projected to grow by around 2 per cent a year over the period to 2011–12 as rising incomes and lower prices make it more affordable, particularly in Asia where per person consumption remains low. Consumption in China will increase in response to some substitution of sugar for starch sweeteners by food and beverage manufacturers. Sugar consumption is also forecast to grow strongly in North Africa and the Middle East as a result of rising incomes and population growth.

Raw sugar from the Ord has only been exported to Surabaya, largely for use in lysine production. With the sale of the mill, a new industry will require access to another export market as previous sales to Surabaya were to a company associated with the mill owners.

Economic analysis indicates that with a yield of 120 t/ha, average growing costs of $14/ha (2006) and a price of $17/t of cane (2007) would provide a gross margin of $360/ha. However, a new industry would be expected to have lower costs with larger production units and higher yields with new varieties resulting in increased margins. Increased efficiency in the milling process would further increase returns.

Resource base

Cotton and sugarcane can be grown on the predominant clay soil of the ORIA, irrigated by water stored in Lake Argyle. Allocation for irrigation for both Stages 1 and 2 provides a reliable supply.

The broader Ord irrigation industry and community have developed a land and water management plan in partnership with the Department of Agriculture and Food, to address existing and potential impacts of farming on the catchment. This plan is now being implemented by a range of stakeholders with the department’s support. Monitoring indicates increasing water-use efficiency by growers, lowering of groundwater and improvement in drainage water quality.
Biosecurity issues

Cotton

There are few significant biosecurity issues confronting the industry apart from soil-borne pathogens. In particular, *Fusarium oxysporum* f. sp. *vasinfectum* (Fov) has emerged as an extremely virulent disease which continues to spread throughout other Australian production areas. Black root rot is also increasing in importance. WA has an advantage in being free of these pathogens as well as Verticillium wilt.

Sugarcane

A number of serious pests and diseases of sugarcane are present in Queensland and other parts of the world. Their absence from the ORIA provides a significant advantage for WA. This issue is being managed through strict quarantine measures in place for entry of cane material into WA as well as regular surveillance for exotic incursions.

Industry growth

Cotton

Despite periods of low production in dry years, there is a trend towards increased cotton production in Australia (see Figure A1). This has been achieved by significant increases in yield rather than increasing the area cropped. Low availability of irrigation water has meant that farmers have grown smaller areas of cotton but on their most productive paddocks. This has contributed to the average yield improvement from 7 to 9 bales/ha. The second major contributor to yield improvement in the past two seasons was the introduction of Bollgard II® cotton, which has provided unprecedented levels of Helicoverpa control and therefore yield improvement.

Despite these achievements, production is likely to decline in the long term as water becomes less available. A reliable water supply in the ORIA provides the industry with an alternative area for production.

![Figure A1: Australian cotton production 1990–2006](image-url)
**Sugarcane**

Given the limited availability of land for expanding the area planted to cane, there appear to be significant agronomic constraints on the extent to which Australian production of sugar can expand, especially in Queensland. Even so, between 2007–08 and 2011–12, Australian sugar production is projected to increase by 4 per cent to 5.3 million tonnes as a result of higher yields and higher CCS (commercial cane sugar) values with exports projected to rise to 4.1 million tonnes over the same period.

The area under production in the ORIA increased rapidly following industry establishment in 1996 to peak in 2003 (Table A3). Since 2003 it has declined due to poor sugar prices and competition for land from other higher value crops.

<table>
<thead>
<tr>
<th>Year</th>
<th>Area harvested (ha)</th>
<th>Cane (t)</th>
<th>Sugar (t)</th>
<th>Value ($m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>3808</td>
<td>474 000</td>
<td>55 830</td>
<td>16.4</td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td>20.3</td>
</tr>
<tr>
<td>2001</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>4017</td>
<td>444 000</td>
<td>50 170</td>
<td>16.4</td>
</tr>
<tr>
<td>2003</td>
<td>4116</td>
<td>469 000</td>
<td>51 230</td>
<td>17.4</td>
</tr>
<tr>
<td>2004</td>
<td>3608</td>
<td>451 000</td>
<td>50 350</td>
<td>16.4</td>
</tr>
<tr>
<td>2005</td>
<td>3402</td>
<td>415 000</td>
<td>46 900</td>
<td>16.1</td>
</tr>
<tr>
<td>2006</td>
<td>3347</td>
<td>399 000</td>
<td>47 200</td>
<td>19.9</td>
</tr>
</tbody>
</table>

**Industry potential**

**Cotton**

Industry growth depends on developing new areas of production because it seems unlikely that additional water allocations will be made in existing production areas. Northern Australia is an obvious region for future growth because land and water resources are little used for productive purposes.

WA has comparative advantages over the Northern Territory and Queensland for cotton industry development which include:

- detailed research that has enabled the development of a production package
- land and water availability via the Ord Stage 2 proposal.

**Sugarcane**

ORIA sugarcane has the advantage of climatic conditions providing potential for high yields with scale of production allowing low production costs and thus be competitive in the world market. It is also free of many pests and diseases present in other areas of Australia and other countries.

These advantages can be enhanced and protected by ensuring that the best varieties are made available to the industry and by continuing to develop and promote improved and more efficient management practices. Continued quarantine measures for import of cane material will also be a key factor.
**Industry development needs**

Development of cotton and sugar industries in the ORIA is about supporting regional development, economic growth and new job opportunities, with a focus on preserving environmental values. There is strong government, industry and community support for development of Ord Stage 2 to enable establishment of these industries.

Much is already known about the requirements for their successful establishment through past R&D activities, numerous studies and analyses and learning from past commercial operations. Many of these requirements are also common to both cotton and sugarcane.

Key needs are:
- Ord Stage 2 land release
- Identification of the best way forward in an uncertain environment.

With mill closure, timing of the release, and conditions for Ord Stage 2, the industry needs to plan for the interim as well as for opportunities that might arise from Stage 2.

Implementation of key initiatives to address needs for industry development will require capacity in facilitation, analysis, planning, natural resource management and R&D over the next five years.

Both cotton and sugarcane require better understanding of crop production on previously uncropped land of low fertility as in Ord Stage 2. Both also need information to allow efficient and sustainable irrigation practices to be adopted. High-performing varieties will be required for yield and quality with cotton requiring increased staple length and sugarcane higher sugar yield. This will be necessary to provide sufficient confidence for investment to establish these industries.

Quarantine will be a key factor in preventing pest and disease incursion to ensure that selected varieties are not lost through susceptibility and to prevent higher production costs associated with a need for their management.
3. Vegetables and strawberries

The department groups vegetables, melons and strawberries together for service delivery due to their common production technologies and production districts, and because strawberry growers often also combine vegetables in rotations. Potatoes are the only vegetable crop that is managed and reported on separately because its marketing is unique, as are some R&D activities conducted overseas. The diverse group of mostly annual row crops, excluding potatoes, will be called ‘vegetables’ for simplicity.

Vegetables are grown in a number of locations where good-quality irrigation water is abundant. Production units range from 1 to 600 ha depending on the crop and district. Business entities are most often specialist producers but in some districts (particularly the South-West and Great Southern) vegetables are grown on mixed farms with livestock or other horticulture.

Large mechanised farms at the top of the size spectrum typically have multimillion-dollar turnovers and may be vertically integrated in marketing and exporting, while the smallest ‘stand alone’ owner-operated farms may have gross turnovers of $100 000 a year.

Values for vegetable crops are typically underestimated by 50 per cent or more depending on the product. A series of studies supports this view. A report by CDI Pinnacle Management & Street-Ryan & Associates funded by HAL and Growcom, describing the economic contribution of horticulture industries to the Queensland and Australian economies in November 2004, raised this concern. A study by Morris and Bradby (1995) to find the economic value of the horticulture industry to the Peel Region concluded that the underestimation of Gross Value of Production (GVP) for vegetables and garden horticulture was 56 per cent of total production.

A comparative analysis between ABS production statistics and trucking data for the Carnarvon region (2001) attempted to calculate the underestimation. Carnarvon was selected as separate trucking data was available exclusively for the region. The values of two vegetable crops—sweet corn and tomatoes—were both underestimated by 65 per cent by ABS.

Vegetable industry size and structure

The industry can be classified into four groups by size and complexity of operation:

- large farms growing highly mechanised field crops such as carrots, onions and potatoes
- medium farms that are semi-mechanised; typical crops include lettuce, celery, heading brassicas, melons and tomatoes
- small highly labour-intensive farms with low-to-moderate levels of mechanisation; typical crops are bunching vegetables, leafy salads and strawberries
- small farms growing in soil or substrate in greenhouses or shelter; typical crops include cucumbers, tomatoes and strawberries.

The proximity of these farms to Perth and large regional centres decreases as farm size increases. Labour intensity tends to be inversely related to farm size.

Overseas and interstate exports have been derived largely from the medium-to-large farms, excluding tomatoes and onions. The exception is strawberries which are WA’s premier fruit export crop. Carrots remain the dominant vegetable export due to high levels of
mechanisation and very favourable production conditions. The bulky leafy and brassica vegetables still offer opportunities for export growth, both overseas and interstate, while interstate exports are an important component of the melon industry. A consistent trend across the industry is for a rapid decrease in the number of growers and increased farm size.

The vegetable industries have become much better organised in recent years with the formation of a state peak body, vegetablesWA, affiliated with the national peak body AUSVEG. The strawberry industry has a similar structure with national affiliation to Strawberries Australia. Both industries are levy payers to Horticulture Australia and collect a state fee for service. Funds are largely directed to R&D with the vegetable industry being the single largest horticultural R&D supporter in Australia.

**Carrots**

The largest vegetable sector is the carrot industry which is dominated by exports and has been more exposed to rapidly increasing international competition and the value of the Australian dollar. Many smaller-scale producers have ceased producing to focus on other crops or have sold their land for urban development. This industry sector is very efficient and highly mechanised.

Carrot production has become more concentrated in the past five years with larger vertically integrated companies that pack and export carrots or supply direct to supermarket chains. Even medium-sized producers often have packing facilities when five years ago they were supplying packer-exporters with bulk unpackaged product. This improves their flexibility to sell packed and pre-packed product (retail ready packs) into export, local and eastern states' markets.

**Leafy and brassica vegetables**

An important group for domestic, export and interstate supply includes crops such as lettuce, celery, cauliflower, broccoli and related brassicas. Although there are no reliable official statistics, their true value is likely to exceed $50 million at the farm gate.

This sector has consolidated rapidly since the mid-1990s with grower numbers falling from an estimated 150 to about 10 large producers supplying 90 per cent of the state’s production. The brassica sector was dominated by cauliflower exports which peaked at around $24 million FOB in 2001–02 to a more domestic and interstate focus in 2008–09.

**Strawberries**

The highly labour-intensive strawberry industry is WA’s highest value fruit export crop. Based on Agriculture Produce Commission statistics, and accepting a compliance rate of no more than 75 per cent, real production is likely to be around 8500 tonnes. Grower numbers have dropped from more than 100 a decade ago to about 45, with a mean property size of 4 ha. The largest farm is around 40 ha.

**Value-adding**

Value-adding is widespread throughout the industry at different levels but there is little traditional processing such as canning or freezing. This is because WA is not a low-cost producer by world standards. Most imports are in processed form for this reason.

Minimal to moderate transformation occurs in almost every sector with about half of all vegetable products packed in ‘single use’ packages made from cardboard, polystyrene or plastic. About half of all vegetables now sold in supermarkets are ‘pre-packed’ in plastic wraps or bags and on over-wrapped trays. Much of this activity is performed ‘off-farm’ by specialist third-party businesses.
Substantial transformation is widely practised in the food service sector to supply raw materials for the plethora of fast food restaurants (or quick service restaurants—QSRs), cafes, hospitals and other institutions. Many specialist businesses in WA supply shredded lettuce, sliced onion, capsicum and tomato, and fresh cut carrots to this sector. At retail and catering levels, pre-cut salad mixes are the fastest growing category. One of the largest processors estimates this category to be worth $20 million per annum at retail prices.

**Markets**

The major market for WA-grown vegetables is domestic. Exports have traditionally been important due to proximity to Asia and the Middle East.

There are few impediments to market access for temperate leafy and root vegetables, except live insects to some destinations. All fruit such as melons and strawberries are precluded from North Asia due to the presence of Mediterranean fruit fly. Tariffs and import restrictions are applied to Australian vegetables in countries including Thailand, Korea and Indonesia.

Eastern Australia is a major seasonal market for sectors such as melons from the North-West in winter and strawberries in spring. For other vegetables, this market is more opportunistic but WA can be an important supplier to the eastern states following natural disasters such as drought and floods.

Exports continue to dominate the WA carrot industry. Leafy and brassica vegetables are firmly focused on the domestic market after a downturn in exports. Lettuce exports have declined over the past decade. Celery exports have been hit hard by a zero tolerance policy for live insects at export inspection for the UAE market. Broccoli has been a minor contributor to exports for the past decade but offers great potential for reduction of supply-chain costs by adoption of bulk handling and sea freight. WA accounts for about 80 per cent of Australia’s strawberry exports and export demand remains strong.

The major market trends will be:

- The supermarket share of vegetables will rise towards 80 per cent while local and farmers markets gain popularity.
- Growers will continue to lose the identity of their product in supermarkets due to policies for more generic labelling.
- More returnable packaging used in the supply chain, coupled with electronic aids to stock control such as radio frequency devices (RFDs).
- More products will be pre-packed and value-added for convenience, food safety and security.
- WA will gain market share in the eastern states because irrigation water supplies, though not as large, are better managed and relatively more secure.
- WA will regain some lost share in export markets in response to more favourable exchange rates, niche marketing in the supply chain, unreliable supply by competitors and future food safety scares in Asian markets from competitors’ produce.
- Healthy eating and ‘designer’ vegetables offering health benefits will become more important as a plank in the national obesity campaign.
- Increasing levels of third party audited quality, environmental and ethical assurance schemes will be required to supply supermarkets in Australia.
Resource base
Vegetable compete with urban development, secondary industry and other agriculture for land and water resources. The greatest threats to a continued viable vegetable industry are:

- accelerated growth in urbanisation of farmland
- competition for water from the urban population and industry
- conflicts between landowners in peri-urban areas over groundwater pollution and perceived nuisances such as flies, noise and smells associated with horticulture
- capture of unallocated water resources by professional investors to grow mechanised perennial crops on a broad scale.

Vegetable growing, as with all agriculture, can degrade land, air and water, and the impact varies by district and crop. In the past the industry has contributed to rising watertables in Kununurra, current groundwater pollution of aquifers on the Swan Coastal Plain and soil erosion in the South-West. These impacts are an unfortunate by-product of the need to feed a rapidly growing population. The industry is acutely aware of its environmental impact and has responded with national environmental management programs such as Enviroveg and Horticulture for Tomorrow. Third-party auditing schemes like these are likely to be implemented and the industry needs help to develop production practices that meet community expectations from environmental sustainability.

The private sector has failed to conduct research that identifies environmentally sustainable production practices while retaining economic viability for producers, and to ensure adoption of those practices by industry. It is the department’s responsibility to perform this role.

Vegetables are an efficient user of water compared with other crops with an estimated gross value per megalitre irrigated being more than double the return for fruit, six times that of dairy and nine times the return for livestock.

Biosecurity issues
Very few vegetables (excluding potatoes) are prohibited imports into WA from eastern Australia for biosecurity reasons. However, a range of leafy vegetables including lettuce cannot be exported from parts of WA to NSW. Biosecurity threats from overseas are too numerous to list for more than 60 vegetables. However, incursions of exotic pests and diseases are likely to increase which will compromise access to some markets.

Rate limiters
- Limited water availability for large-scale production units (> 400 ha irrigated).
- Adverse environmental outcomes associated with production, particularly groundwater pollution tarnishing the industry’s image.
- Rising labour costs and reduced interest in participation by the potential workforce, particularly as the industry is forced further from large population centres.
- Insufficient investment in improvement of production systems due to reduced security over key inputs such as water and land.
- Risk of major exotic pest or disease incursion.
- Lack of investment in new market development and more efficient supply-chain channels.
Plan to Support Horticulture Industry Development 2009–2012

- Inability to compete with differentiated product in international markets due to high cost of processing and transformation as well as expensive air freight.
- Unfavourable exchange rates for international trade.
- Increasing levels of professionalism and accountability for food safety from Asian competitors in South-East Asian and Middle Eastern markets.
- Unwillingness of marketers to pay for ever higher standards of production accountability from growers.

**Industry needs**
- An uninterrupted supply of suitable land and water at competitive prices located in a range of climatic zones.
- A professional approach to cost control and productivity improvement based on high-quality statistics and information.
- New markets, better supply-chain information and better customer service by exporters and growers, particularly in export markets.
- A more competitive position on freight costs for export with an emphasis on sea freight.
- Compliance with production, food safety, environmental, ethical and biosecurity standards needed to access national and export markets.
- Better varieties, postharvest handling and disease resistance.
- Increased product differentiation in domestic and export markets using strategies appropriate to the particular market.
- More efficient and sustainable production systems.
- Workable environmental assurance systems that are audited by third parties.
- High-quality border security to minimise the risk of pest and disease incursions coupled with robust industry biosecurity plans to deal effectively with incursions.
4. **Potato industry**

Potato production in WA is based on about 110 enterprises, some of which comprise several families. Some producers specialise in intensive horticulture with year-round production of other vegetable crops, while others also run grazing enterprises. The average area is about 20 ha, ranging from 60 ha for large producers to about 10 ha for smaller producers. Most producers grow potatoes for several markets.

The industry is represented by the Potato Growers Association.

There are three main components:
- ware production for domestic and export markets
- processing (crisp and French fry) potatoes for domestic and export markets
- seed potato for domestic, interstate and international markets.

**Processing**

The two main products processed in WA are crisps and frozen French fries.

From 1990 to 1999, a French fry plant, originally owned by Edgell and then Simplot, operated in Manjimup. The plant processed about 30 000 tonnes of potatoes and its closure in 1999 had a dramatic effect. Anecdotal evidence points to the relatively low volume of product and resulting factory inefficiency being the reason for closure of the Simplot factory. A year earlier, Simplot opened a processing plant at Ulverstone in Tasmania with a capacity of 250 000 tonnes. Potato processing is a large volume/low margin business. To be competitive, large areas of irrigated, sandy soils with a relatively cool climate and competitive costs for electricity, fertiliser and transport are needed. Nevertheless, a significant potato processor remains at Manjimup owned by the Bendotti families. This currently processes 8000 tonnes and plans to increase to 10 000 tonnes per annum.

The other major player is The Smith’s Snackfood Company (TSSC) which processes around 12 000 tonnes of crisp potatoes at its Canning Vale factory. This company is well established in WA having been processing potatoes for about 30 years. TSSC intends to increase processing and production for local and eastern state sales to beyond 20 000 tonnes. Expansion in the eastern states is difficult due to lack of processing capacity, irrigation availability and biosecurity constraints.

Demand for snackfood is increasing in South-East Asia where processors cannot obtain enough local product of sufficient quality to meet their needs. Exports of processing potatoes grew to over 17 000 tonnes by 2004–05. However, they have fallen since in the face of increased competition from Chinese sales to Singapore and Malaysia and policy measures from countries such as Indonesia which imposed import duties of 25 per cent on non-seed potatoes in 2005.

**Ware production**

The ware, or fresh, potato market is regulated by the Potato Marketing Corporation (PMC) which:
- grants licences to growers
- sets minimum prices for the supply of potatoes to wash-packers
- regulates the quality of potatoes
- regulates wash-packers
- commissions the market promotion of potatoes by Western Potatoes Ltd (WP)
- pays growers.
The PMC does not control crops grown for seed, for processing or export.

Ware potatoes are grown and marketed through seven seasonal pools of growers spread from Lancelin to Albany. Approximately 50,000 tonnes of ware potatoes are grown each year. Until 2004–05 licences were based on area, but now growers are licensed to produce a specified tonnage. Higher prices are paid to growers for varieties in demand in the market. This is likely to lead to more varieties available to the consumer.

Prior to 2005, the PMC and WP were a single entity charged with marketing domestic ware potatoes. However, the regulatory and market promotion functions have now been split. WP now coordinates the domestic market promotion and undertakes other commercial activities, while the PMC is responsible for regulation.

**Seed potatoes**

WA has traditionally produced seed from the Albany region due to the suitability of its low summer temperatures and strong on-shore, aphid-deterring winds. One disadvantage is the low yielding, mostly unirrigated, peat swamp production system. The industry is gradually augmenting the Albany production base with other parts of the south-west in response to growth potential helped by the introduction of a certified seed scheme and opportunities for irrigated production. The certified seed scheme was introduced in 1996 to meet export market requirements with improved minimum standards for disease and biosecurity and reduced damage levels.

**Production**

In WA the main production issues are:

- competitive production from the major warm summer production
- competitive production through winter to maintain year-round production
- increasing scale to improve efficiency.

WA has a year-round supply of potatoes. The benefits are a fresher product and reduced storage costs. Disadvantages are the lower yields from winter crops. The Smith’s Snackfood Company factory is supplied for most months from Pemberton to Lancelin. Ground storage from autumn-grown crops is also used for winter and early spring supply.

Growers are tending to diversify to reduce risk and the marginal cost of production, and increase farm income and efficiency. In the fresh market there is a trend away from traditional pool production areas and times as growers attempt to work with the climate rather than against it.

The seed potato industry is expanding in response to demand from overseas and interstate markets. The demand is mainly from South-East Asian processing factories that require seed of the Atlantic variety for their growers. This has led the increase in export seed sales. Another new opportunity for Atlantic seed potatoes is in Queensland, for the autumn-planted crisp processing crops. There is also demand for WA seed from the southern eastern states for the fresh market variety Nadine. It is estimated that interstate sales of WA seed potatoes were at least 4500 tonnes in 2008–09.

There is a push for increased investment in the dairy industry in the south-west. This will probably lead to additional irrigated land being made available for lease by seed potato growers and will assist expansion.
**Value-adding**

Value-adding is an important part of the WA industry which transforms the farm-gate value of $39 million to a retail value of $240 million with a total value-added worth of $223 million.

Five wash-packers are contracted by PMC Wash Packers to receive, wash, grade and pack ware potatoes prior to distribution. The cost is about $150/tonne and many people are employed. Value to farmers of fresh potatoes is estimated to be $32 million, the wholesale value after wash-packing is $50 million and retail value is $114 million. In addition, there is a small minimally processed fresh market sector (potato salad and mashed potatoes) with a retail value of nearly $1 million. Potato exports, including crisp varieties, are regarded as part of the fresh market, and valued at $4 million.

The crisp processing sector is dominated by TSSC. Four tonnes of raw potatoes are needed to produce 1 tonne of crisps. Production of crisping potatoes has been stable for the past five years at about 12,000 tonnes per annum yielding 3000 tonnes of crisps. Farm-gate value to growers is $4.6 million; wholesale value is $85 million and retail value is $123 million. The prospects for immediate expansion are good as domestic demand increases.

Bendotti Exporters process about 8000 tonnes of French fry potatoes at the former Simplot site in Manjimup, producing 4000 tonnes of French fries. This is much less than the 30,000 tonnes processed by Simplot prior to leaving Manjimup in 1999. Even so, the farm-gate value to growers is $1.6 million, wholesale value is $10.5 million and retail value is $12 million. There is room for expansion as domestic demand is not yet supplied.

The seed potato industry is increasing interstate and export sales. Value to the state is estimated at $10.3 million made up of $3.4 million exports, interstate trade $3.2 million and domestic sales of $3.7 million.

**Export processed potatoes**

Increased consumption of processed potatoes in Asian countries has resulted in increased demand for processing potatoes and for seed to be grown locally.

Anecdotal evidence indicates that increasing quantities of the processing variety Atlantic are being exported primarily to Malaysia, Singapore and Indonesia. Indofood reports that potato snack sales have grown 50 per cent per annum over the past few years. WA does not have the economies of scale for processing compared with the US, Canada and South Australia. However, proximity to the market and the ability to produce nine months of the year—combined with high demand—enabled the industry to grow before increased competition reduced market share in Singapore and Malaysia.

WA does not currently have area freedom from potato cyst nematode (PCN) and cannot export ware potatoes to markets such as Japan and South Korea.

Countries such as Indonesia and Sri Lanka are aiming to develop their domestic industries through policy measures including import duties on non-seed potatoes. In January 2005 Indonesia introduced a 25 per cent tariff on imported ware potatoes. This trend has led to reduced demand for WA processing potatoes as they have to compete with potatoes grown in-country and within the ASEAN region which attract a lower duty.
Export seed potatoes

The main seed potato producing countries are The Netherlands, UK, Canada, Germany and Australia. The Netherlands exports over 750,000 tonnes per annum and the UK over 97,000 tonnes. The bulk of exports are sent to Middle Eastern countries which grow early season ware potatoes for the European market and local consumption. Asia is a relatively small market for European producers.

WA has a significant advantage over major European producers as seed potatoes can be produced for 12 months of the year. Dormancy of seed has a major impact on performance. Seed that is too dormant or too far out of dormancy produces poor crops. WA’s potato industry can produce seed all-year-round and thus supply seed at the correct dormancy at certain times when our competitors cannot. This advantage is being recognised in the market through collaborative research and development projects.

WA has significant advantages in the production of seed potatoes namely:

- freedom from major pests and diseases
- comprehensive seed certification scheme which produces certified seed two generations earlier than the next earliest scheme (Canada)
- proximity to the Asian market
- ability to produce 12 months of the year
- strong technical support from the department.

WA’s seed potato industry is expanding in response to demand from overseas and interstate markets. The demand is mainly from processing South-East Asian processing factories that require seed of the Atlantic variety for their growers as shown in Figure A2.

![Figure A2 Growth in seed potato exports from WA, not including interstate sales of at least 4500 tonnes (Agrifood Infonet)](image-url)
Processing
Consumption of crisps and French fries is expected to grow despite increased consumer interest in healthy eating, including reduced intake of salt and saturated fats. This is due to the countering influence of ‘rushed lifestyles’ increasing the proportion of meals not prepared at home. However, processors of crisps and French fries are diversifying into other lower fat potato products, which may further increase their appeal and acceptance.

Domestic seed
Australian domestic seed potatoes used to be sold by individual growers with the help of growers’ associations. Now, domestic seed potatoes are increasingly marketed by corporate entities which hold the proprietary rights to varieties. For example, in the eastern states Nadine seed is marketed by Elders.

Another change is that eastern states’ seed buyers are looking further afield. In 2007 buyers visited WA growers. Further findings of potato cyst nematode in Victoria, Australia’s largest domestic seed potato producer, have reinforced this trend.

Industry growth
Domestic consumption of potatoes is slowly declining in the face of changing diets, with starch increasingly consumed as rice or pasta.

Export seed and interstate seed sales have increased to around 1800 tonnes each. Although small, this has caused almost a doubling of the seed potato industry over the past six years and there is good potential for further growth.

The domestic processing market has seen recent growth with 8000 tonnes of French fry potatoes now being grown for the factory at Manjimup. Growth in processing is expected to continue as opportunities for increased crisp production are realised.

Future growth potential
Seed potatoes
The main growth potential for the WA industry is in the export and domestic seed potato market. WA’s advantages are:

- Freedom from major pests and diseases which results in improved quality and reduced control costs. The freedom from major potato pests and diseases is considered unique by the International Potato Centre. They believe it makes WA an ideal candidate to become a premier seed potato supplier to Asia. WA’s disease freedom is also substantially better than in other Australian production areas. For example, WA does not have late blight or bacterial wilt.
- A comprehensive seed certification scheme produces seed at least two field generations earlier than competitors. The WA scheme is also more stringent than the national scheme and enables WA to brand its seed in the market.
- Proximity to the Asian market means shipping times are shorter and communications and business links tend to be stronger than for European or Canadian competitors.
- WA has the ability to produce seed 12 months of the year although most is grown over the summer and competes directly with European seed during the September–December window.
- The department has managed to access funding for strong technical support from a number of sources and develop its capacity to support the seed industry.
The Netherlands exports 750,000 tonnes of seed potatoes. It is feasible for WA to gain part of this market or to complement the market with counter-seasonal supply.

If steady growth can be achieved by the existing industry, the opportunity is shown in Figure A3. Export seed sales would increase at 30 per cent per annum over the next 10 years and domestic seed sales by 15 per cent per annum over the same period. These predictions are based on recent export orders that the seed industry has not been able to fulfil plus recent growth in interstate sales. For example, in 2006–07 seed potato exporters received orders for at least 3060 tonnes of seed potatoes but only 1468 tonnes were delivered. Interstate seed potato sales have increased by 33 per cent over the past three years to the current figure of 4500 tonnes.

Seed potatoes have a slow rate of multiplication in conventional field production and rapid increases are not possible unless there is significant up-front investment in tissue culture nuclear (mother stock) material which will not yield a return for five years.

![Figure A3: Potential for industry growth through increasing seed potato sales](image)

**Crisp processing**

Current production of domestic crisp potatoes is expected to climb from 12,000 to 20,000 tonnes with prospects for further growth to 25,000 tonnes to service eastern states’ demand.

WA’s advantages in the production of crisp processing potatoes are:

- sufficient land and water resources in suitable climatic zones for continued expansion
- Eastern states’ production regions affected by biosecurity constraints (potato cyst nematode) and water availability
- processing capacity available to provide increased production
- high-quality product. TSSC reports that potatoes from Manjimup/Pemberton have the best quality from all Australian production regions.
• low back-loading freight rates to eastern states’ markets result in delivery costs from Perth to Melbourne being cheaper than product delivered to Melbourne from Adelaide (Smith’s closest factory to the Melbourne market)
• strong technical support from the department which recently completed an agronomic variety profile project for crisp potatoes as well as variety development work to support the crisp industry.

The snackfood industry has strong demand and the trend for smaller serves may mean that profitability of the industry increases. Aligned with the strong demand are increasing natural resource constraints on eastern states’ producers. This combination of factors means that the WA industry has a good opportunity to become a major supplier of snackfood to the nation.

Growth potential will be determined by the industry’s ability to develop new supply areas that can deliver competitive, high-quality product for processing during the months of July, August and September. Preliminary work by the department indicates that the Carnarvon and Dandaragan regions will be highly suitable.

Cost of production can be reduced through many factors. One major influence is yield. The Canning Vale factory is supplied through winter from crops grown at Lancelin and Myalup. More northerly areas offer potential for higher yielding crops that could also cover this period. Other cost reductions could be obtained through reduced capital expenditure through introduction of contractors and bulk transport to the crisp processing industry.

Expansion will be driven by the processors’ requirements to meet increased demand while production constraints are increasing in other regions. This increased demand for WA crisps ensures processors will pay an attractive price that will recruit existing potato growers to the industry as well as new producers.

South-East Asia demands seed of the Atlantic variety for propagation and later processing. Oversize Atlantic tubers not fit for export as seed can be processed by TSSC at its Canning Vale plant. It is anticipated that as seed potato exports increase there will be more oversize tubers for processing by TSSC.

Industry needs
The industry needs to establish clear priorities and develop a plan to achieve its goals. The plan would tackle the following needs:
• contracts with 18-month lead time for existing seed producers to expand their production for the export market
• improved in-country support for product
• new entrants with financial backing and marketing experience
• identification of new production areas that allow establishment of enterprises on a large, competitive scale
• stakeholder training in improved postharvest handling of export seed potatoes to ensure quality is maintained
• capital investment in suitable infrastructure to meet best practice in quality and economic sustainability.
5. **Pome and stone fruit**

Australia is a relatively small producer of pome fruit (apples, pears and nashi fruit) and stone fruit (plums, peaches, nectarines, apricots and cherries) in global terms. China dominates production, reflecting its policy of improving rural incomes through diversification from grain crops and into high value horticultural crops.

WA is Australia’s second largest producer of plums and has significant apple, nectarine, peach and pear production. The main production is from the Perth Hills, Donnybrook and Manjimup regions. Low-chill stone fruits are grown in small quantities north of Perth.

Production has traditionally come from family farms; however, consolidation is leading to the bulk from a small number of larger enterprises. Farms often incorporate a number of fruit types and varieties to spread labour requirements, cash flow and minimise risk. The development of orchards is capital intensive (> $75 000/ha for the first five years) and smaller growers often lack the capital necessary to make full use of available land and water resources. In comparison, corporate and larger orchards tend to plant a larger percentage of available land.

Statistics provided by the Australian Bureau of Statistics show volumes of pome and stone fruit produced in WA falling from 61 664 tonnes in 1998–99 to 53 881 by 2006–07 with apples falling by about 6800 tonnes and pears by 2600 tonnes. Plum and nectarine production has increased by about 2600 and 1200 tonnes respectively. Despite the fall in volume, the value of production has increased from $66.7 to $90.1 million, reflecting an increase in unit value as growers move out of poorly performing apple and pear varieties and increase plantings of higher value plums and nectarines.

Fruit for the local market is distributed by marketing agents based at Market City, Canning Vale. Some marketing agents are also involved in interstate and export trade. There are a number of different supply chain models in operation with some growers packing their fruit and others sending it in bins to packers. Some marketing agents for the domestic and export markets have packing and cool room facilities while others have an office only. The number of packing sheds and exporters involved in the pome and stone fruit industry has fallen over the past decade.

WA has one main fruit juicing and processing company, Harvey Fresh, which processes and markets orange, apple and other fruit juices as well as processing and selling dairy products. The company has traditionally provided a market for out-of-specification fruit. However, the availability of low-cost apple concentrate from China has reduced this outlet for growers.

Anecdotal information indicates that many smaller growers in the Manjimup region are now leasing out their orchards to one of the two major local corporate enterprises.

Average orchard sizes for the south-west are shown in Figure A4.
Plan to Support Horticulture Industry Development 2009–2012

Figure A4 Average pome fruit orchard size in the south-west

Production

The WA industry is aware of the opportunity and need to move from an extensive system with large trees on full-sized rootstocks to an intensive system based on dwarf and semi-dwarf rootstocks. Intensive production worldwide is reflecting increased land, labour and input costs. The increased density of plantings and small trees provide economic returns to growers through reduced management costs, improved pack-outs and quicker return on investment.

The industry is losing land and water resources in the Perth Hills to urban development, and to hobby farms, vineyards and tree farms in the south-west.

In keeping with most horticultural industries, pome and stone fruit growers are experiencing difficulties in securing affordable labour.

New varieties are required to ensure that growers have a competitive advantage in production and marketing of fruit. The introduction of new varieties over the past decade has been slow. In the eastern states, large marketing companies with good market information match market requirements with production and promote varieties among their growers. In WA, the lack of major exporters means that varieties promoted by nurseries may have limited market and production research. Accordingly, growers often take a risk in growing a new variety and the uptake has been slow.

The department leads the Australian national apple breeding program and in 2008 released the Western Dawn® variety of non-browning apple. Fruit of an appropriate quality may be sold using the trademarked brand name, Enchanted®. Some varieties within the apple and the plum breeding programs are still being evaluated and are not yet ready for release.

The Perth Hills area experienced an outbreak of apple scab in 2006 with a subsequent outbreak in Mount Barker in 2009. WA pome and stone fruit industries do not have the funding to support further surveillance and eradication work and therefore area freedom status has been lost.
Value-adding

Some growers add value to their product by labelling and packing fruit for their marketing agent. In addition, some growers use their packing facilities to pack for other growers, generating further income.

Some growers from Manjimup have been involved in a department-managed project looking at the bulk bin exports of pome fruit. The cost of packing fruit for export (labour, cartons and freight to market) is higher than sending the fruit in bulk bins to market for packing. Trial shipments to India and the UK have demonstrated that in addition to reducing costs, the deferred handling and ability for the client to pack and so market fruit more effectively, adds value to the pome fruit.

WA has limited value-adding for out-of-specification fruit. (Good-quality fruit attracts a higher price when sold fresh as opposed to processed.) The main juicing and processing company has historically provided a market for out-of-specification fruit but the availability of cheaper Chinese apple and pear concentrate has led to a drop in demand for WA fruit for juicing.

A number of small apple cider producers operate in the south-west.

Markets

Apples and plums are the major exports. Approximately 50–60 per cent of apple exports by value are Pink Lady to the UK market. The variety behind this product, Cripps Pink, was bred and developed in WA by the department.

Plum exports have grown over the past decade based on sales to Hong Kong/China, Taiwan, Malaysia and Singapore. In 2005, the policy of restricting imports of plums was enforced by Chinese authorities. This led to a sharp reduction in exports from $3.79 million in 2004–05 to $1.56 million in 2005–06. This market will not be re-opened officially until intergovernmental trade agreements are reached. In addition, Taiwan has placed a quarantine restriction on fruit from Australia and the Australian industry is currently seeking to prove the effectiveness of in-transit disinfestation for certain pests. All countries are adopting more stringent quarantine protocols and increasing pressure on chemical usage and maximum residue limits (MRLs).

WA faces strong competition in export markets from other southern hemisphere suppliers such as New Zealand, South Africa and Chile. South Africa and Chile have considerable cost advantages due to cheap labour and economies of scale. While WA can provide better quality, the margin is being diminished as low-cost competitors improve their quality.

The largest producers, China and the US, are based in the northern hemisphere and are counter-seasonal to WA. The introduction of postharvest treatments such as 1-MCP (Smartfresh®), which can significantly extend shelf life, may lead to the blurring of supply timing and direct competition between northern and southern hemisphere producers.

There is increasing demand for Pink Lady apples in the UK market and, while produce from other countries is increasing market share, WA still produces the best quality.

New Zealand apple exporters cannot access Australian markets as fire blight is endemic there. However, there is ongoing debate over whether fire blight can be transmitted by mature apples and Australia may eventually accept New Zealand imports with resulting falls in prices.
Resource base

Pome fruit covers about 1300 ha in WA, with stone fruit production of plums, peaches, nectarines and apricots on approximately 700 ha.

Seasonal staff requirements for pruning, thinning and harvesting can be an issue for some growers. A move toward small, higher density trees would cut labour and skills level requirements.

Pome fruit production in WA is traditionally managed through extensive systems with large well-spaced trees. The industry, with assistance from the department, is seeking to move to an intensive system, with dwarf or semi-dwarf rootstocks used to control plant vigour with the resulting small trees grown close together. This system will reduce input use per kilogram of fruit and generate an earlier return on investment.

Stone fruit orchards are intensively managed and use inputs relatively efficiently.

The fruit industry is adopting strategies and methods to maximise production impact and minimise environmental impact. Industry is adopting integrated systems for:

- fertiliser management
- integrated pest and disease management
- irrigation management
- water harvesting.

Biosecurity

The pome fruit industry is free of a number of major pests and diseases which afford it reduced costs of production and a marketing advantage on export markets.

The department and the industry have spent considerable funds in trying to ensure that WA remains free of diseases, particularly apple scab, which is a serious problem in every major apple region of the world. WA has suffered a number of outbreaks of apple scab including:

- 2009 Mount Barker
- 2006 Perth Hills
- 1989 Pemberton and Newlands.

The pome fruit industry through WAFGA agreed in 2006 to cover part of the cost of identifying, eradicating and ongoing monitoring for apple scab. Unfortunately, the industry has not been able to continue funding this work and the recent outbreak in Mount Barker has led to WA losing its disease-free status.

Industry potential

The industry is experiencing a period of consolidation with terms of trade, particularly for pome fruit, leading to focus on higher value varieties of apples and pears and greater planting of plums and nectarines. The value of production has increased steadily since 1998–99 from $66.7 million to $90.1 million in 2006–07 (although this figure will be lower than actuals reflecting the underestimate of the apple crop by the Australian Bureau of Statistics). WA is not a low-cost producer; however, the focus on valuable crops such as stone fruit and Pink Lady™ apples has seen the industry grow in dollar terms.
Table A4  Value of pome and stone fruit production in WA (Agrifood Infonet)

<table>
<thead>
<tr>
<th>Fruit</th>
<th>1998–99</th>
<th>2006–07</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$ million</td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Apples</td>
<td>38.8</td>
<td>31.2</td>
<td>–19</td>
</tr>
<tr>
<td>Apricots</td>
<td>0.7</td>
<td>1.7</td>
<td>137</td>
</tr>
<tr>
<td>Nashi</td>
<td>0.4</td>
<td>1.1</td>
<td>165</td>
</tr>
<tr>
<td>Nectarines</td>
<td>6.0</td>
<td>13.4</td>
<td>124</td>
</tr>
<tr>
<td>Peaches</td>
<td>3.9</td>
<td>10.8</td>
<td>178</td>
</tr>
<tr>
<td>Pears, excluding nashi</td>
<td>8.3</td>
<td>8.6</td>
<td>3</td>
</tr>
<tr>
<td>Plums</td>
<td>8.6</td>
<td>23.2</td>
<td>170</td>
</tr>
<tr>
<td>Total</td>
<td>66.7</td>
<td>90.0</td>
<td>35</td>
</tr>
</tbody>
</table>

Freedom from major pests as well as lower pest levels overall, combined with integrated production systems, provides quality and some cost advantages to the WA industry over other Australian and international production areas. Production of Cripps Pink apples for export to the UK is still highly profitable and there are opportunities to expand production in the lower south-west where climatic conditions ensure a high quality product.

The department manages the National Apple Breeding Program and a small plum breeding program, both based at the Manjimup Horticultural Research Institute. In the absence of large exporters to drive the introduction of new varieties, these programs will enable growers to access new varieties which will provide production and marketing advantages.

The department receives considerable royalty funding from the Cripps Pink variety and this money is directed towards the apple breeding program with the aim of developing new varieties.

Market access to China and Taiwan for plums is a major issue which will shape the future of the stone fruit industry. The focus on these Asian markets led to the planting of red, sweet varieties which are not always suitable for other markets. Accordingly, re-entering these markets or finding alternative markets, most likely in Asia, is the key to the future of the plum industry. The current disinfestation research will take three years providing entry to markets such as Taiwan and Japan.

Industry needs

For industry development, orchard performance must improve. Yields and crop value per hectare must increase to generate sustainable profits, allowing re-investment and growth.

1. **Increase profitability by adoption of new production systems**
   - Encourage intensive production systems to reduce costs, improve pack-outs, generate higher profit per hectare and speed returns on investment.
   - Develop dwarfing rootstocks and high health status planting material.
   - Integrate production to meet market demand for reduced chemical use and to streamline growers’ compliance. This will enable the use of good agricultural practices, ensuring long-term sustainability.

2. **Manage water resources and biosecurity threats**
   - Establish effective and secure biosecurity for industry.
   - Develop better understanding of irrigation practices to manage a limited resource.
   - Reduce growers’ biosecurity costs.
3. **Use labour-saving technologies**
   - Implement orchard systems which allow for future mechanisation (thinning and harvesting).
   - Assist growers in adopting new management techniques associated with newer production systems (for example, choice of suitable rootstock, crop load management).

4. **Access to new varieties**
   - Evaluate breeding and new varieties for pome and stone fruit.
   - Produce market and production information to guide selection of new varieties.
   - Evaluate commercial summer fruit varieties in local conditions.
   - Focus on higher value crops such as Pink Lady apple and its derivatives.

5. **Marketing**
   - Establish and communicate effective and electronic crop forecasting, estimation and flowering program.
   - Increase WA consumption of local products through a distinctive labelling system and developing customer loyalty.
   - Identify, analyse and develop new markets aimed at specific market niches and avoiding direct competition with low-cost producers for traditional varieties.
6. **Table grapes**

The table grape industry can be divided into four major production regions: Carnarvon, the Mid-West, the Swan Valley and the South-West.

The industry harvests grapes from 10 November to 15 May each season. This is only achievable because of geographical spread. The marketing period can be extended to September by cool storage, making WA-grown table grapes available for 10 months of the year. No grapes can be imported from the eastern states or overseas due to quarantine restrictions.

The key aspects of industry size and structure are:

- Almost all table grape vineyards are family-owned and managed.
- Vineyards producing less than 50 tonnes per year also produce other cash crops.
- All successful vineyards have replanting programs that reduce the area planted to old, less popular seeded varieties and increase new seedless varieties.
- All commercial vineyards are irrigated and the availability of water can be a major limiting factor.
- Table grapes have high labour requirements which represent 80 per cent of the cost of production. The availability of labour is a major limiting factor to industry expansion.
- The cost of vineyard establishment in WA is far higher than other regions in Australia. Most vineyards outside the Swan Valley are fully enclosed in bird netting to protect the fruit from silvereye damage.

The key trends in recent years are:

- adoption of new table grape varieties
- steady expansion in the Carnarvon region
- expansion in the Mid-West
- stabilisation in the Swan Valley with more full-time growers
- decline in the South-West where growers have left the industry rather than diversifying into varieties to replace Red Globe
- increased direct marketing to supermarkets.

**Production**

The table grape industry in WA relies heavily on family and casual labour. The availability of casual labour is a major problem for large vineyards and is driving a trend towards new varieties that can produce a high-quality product with less labour. Most large vineyards are in Carnarvon and the Mid-West and these rely heavily on backpackers for short-term labour.

The greatest potential for export expansion are grapes that are harvested in December and January from Carnarvon and the Mid-West to supply the South-East Asian markets before Chinese New Year, and export of premium-quality Crimson Seedless grapes to countries that will pay a higher price than currently paid on the domestic market.

The growth of the tourism in viticultural regions where wineries operate will increase the potential for table grape sales.
Value-adding

The table grape industry is not involved in value-adding apart from the use of cool storage to extend the marketing period. All grapes that fail to make market grade, that is, do not reach legislated minimum maturity standards, are destroyed. The industry is too small to contemplate a canning industry to process seedless grapes. The fresh grape juice market tends to be oversupplied or satisfied by conversion of wine grape varieties to the fresh juice trade. Table grape varieties are generally not suitable for wine production.

Markets

Exports of table grapes steadily increased from 1992 to 2003 but have declined since 2004 (see Figure A5). The fall was mainly due to a drop in price due to the closure of the Chinese market which resulted in oversupply for markets such as Thailand, Singapore and Malaysia.

![Figure A5 Export of table grapes from Western Australia 1992–2007 (tonnes)](image)

Export of table grapes out of Carnarvon and the Mid-West is important for Australia. Table A5 shows WA as a percentage of Australian exports from 2002–03 to 2006–07. This clearly identifies that these are important in December and January.

<table>
<thead>
<tr>
<th>Month</th>
<th>2002–03 %</th>
<th>2003–04 %</th>
<th>2004–05 %</th>
<th>2005–06 %</th>
<th>2006–07 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>December</td>
<td>9.8</td>
<td>23.5</td>
<td>35.6</td>
<td>57.5</td>
<td>23.6</td>
</tr>
<tr>
<td>January</td>
<td>8.8</td>
<td>16.9</td>
<td>11.9</td>
<td>12.2</td>
<td>9.6</td>
</tr>
<tr>
<td>February</td>
<td>7.1</td>
<td>5.9</td>
<td>3.8</td>
<td>1.2</td>
<td>3.2</td>
</tr>
<tr>
<td>All year</td>
<td>3.1</td>
<td>1.4</td>
<td>1.4</td>
<td>0.6</td>
<td>1.8</td>
</tr>
</tbody>
</table>

The main competitors on export markets are long-term storage North American grapes in December and January and supplies from the eastern states, Chile and South Africa from February to June. Importers have paid higher prices for WA export grapes than other suppliers into the same market in the past but the level of competition is steadily reducing prices paid. However, WA remains a niche marketer of high-quality table grapes.
On the domestic market there is no competition due to quarantine restrictions. Should those restrictions be removed, the WA industry would be judged entirely on fruit quality and maturity in the marketplace. WA producers market a high-quality product at maturity levels that appeal to the consumer.

New varieties are usually in high demand. Prior to 2005, all growers had freedom to sell their grapes through any agent or retail outlet. Since 2005, new varieties released by private organisations such as Sun World or from the CSIRO breeding program have planting caps and can only be sold through limited, appointed marketing outlets in each state. This trend is expected to be followed with all future releases.

**Industry growth**

Production of table grapes has increased from 2200 to 7000 tonnes in the past 15 years. In that period The department assisted over 150 growers to enter the industry.

Major growth has been in the Carnarvon region shown in Figure A6. Production increased from 220 tonnes in 1996 to 2282 tonnes in 2006. In 1998 a survey of growers indicated 57 ha were planted to table grapes. Later surveys indicate plantings increased to 88 ha by 2001, and 130 ha by 2003. It is estimated plantings reached 186 ha in 2006. Research by the department, which identified rootstocks and varieties that produced viable crops in the region and that solved many of the unique limiting factors to production, was the basis for this steady growth.

Further potential increase from Carnarvon is shown in Figure A7.

The second major growth area is the Mid-West. The department identified this region as having potential for Red Globe grapes for export during January and early February. Over 40 ha have been planted in the past eight years.
The third growth factor has been the rapid adoption by industry of Crimson Seedless grapes. The department has developed techniques that improve yield and fruit quality to the stage where WA is recognised as producer of the world’s best. As a result, consumer demand for Crimson Seedless has been very high resulting in record prices for grapes harvested in March, April and May. The high domestic prices have meant planned expansion of the export industry based on Crimson Seedless has not occurred. Plantings are between Walkaway and Donnybrook with most new developments on the coastal plain north of Perth.

**Drivers for future growth**

- The table grape industry has had an advantage of a three-person full-time equivalent R&D team working closely with industry for the past 15 years. This service is not available in other states of Australia.
- The department has developed a system of evaluating new varieties that identifies those that have the best potential. Industry rates the introduction and evaluation of new varieties as one of its highest priorities.
- The department has the leading role in evaluating new table grape varieties bred by CSIRO. This has led to two new varieties being released in the past five years and two more being identified as having potential for the Australian industry.
- With increased production of export grapes in December and January, Carnarvon and the Mid-West are well suited to take advantage of this opportunity.
- The Table Grape Industry Advisory Committee identifies R&D needs and sets priorities for activities conducted by the department. Growers pay a state and national levy for R&D.
- No grapes grown in the eastern states or overseas can be sold in WA because of quarantine restrictions. This protection is currently under threat.
- The WA industry has legislation that minimises the volume of sour grapes entering the market. This has increased demand and one of the two big retailers has indicated that table grapes are the fastest growing category in their stores. It is considered that the maturity standards have been a major contributing factor to this increase.
- The climate is ideal for the production of coloured table grapes. The fact that harvest occurs from early November to late May gives industry a considerable marketing advantage.

**Actions required to gain maximum benefit from these drivers**

- Table grape production is a specialised science that is not taught in Australian universities. It is critical that WA maintains a team with this specialised knowledge.
- The industry relies on the adoption of at least one new variety every five years. Most new varieties have an economic life of 15 years before they are superseded. As a result, the Australian table grape breeding program needs to be supported and varieties from private breeding programs evaluated.
- The role of the Table Grape Industry Advisory Committee must be encouraged. This committee ensures that the department only conducts research that is required by industry.
- The quarantine barrier that restricts the importation of table grapes should be maintained as long as there are scientific grounds for such a barrier. Nevertheless, research must develop techniques that will improve fruit quality of each variety to the point where the quality of WA-grown grapes exceeds that of any imported product.
- Current grape code legislation needs to be examined to ensure that, should the quarantine barrier that prohibits the import of table grapes be dropped, all imported grapes also have to meet WA minimum maturity standards.
- New packaging and cool storage techniques that can extend the supply of WA-grown table grapes during July to October need to be adopted by industry.
Figure A7 Potential increase in table grape exports from Carnarvon

- Total production could increase from 7150 tonnes in 2006–07 to 10 450 tonnes by 2011–12 (see Figure A8). Most increases will occur in November, January and February due to the impacts of new varieties. Total production for the 2007–08 season was estimated at 7735 tonnes (APC 2007–08 Annual report)

- Industry value could increase from $18.6 to $28.5 million in the next five years (see Figure A9). This would increase the retail value to $45.6 million by 2011–12.

Figure A8 Projected increase in total production of table grapes in WA
Industry needs

Needs are identified during regular liaison between the department and growers. Technical workshops are held each season at Carnarvon, Swan Valley and the south-west. Each region has a representative on the Table Grape Industry Advisory Committee which nominates areas of R&D each July and sets the priorities.

The highest R&D priorities for the 2009–10 season are to:

- conduct an industry-wide survey of plantings and production
- introduce and evaluate new varieties
- develop minimum maturity standards for new varieties and maintain minimum maturity standards for existing varieties
- extension activities.

A benefit–cost analysis for the development of two new white seedless varieties for the Carnarvon region has been conducted. This analysis was based on experimental results obtained in 2006–07. The evaluation measures show that it is a particularly profitable investment where $1 of investment will generate approximately $7.43 in income if the projections are achieved. Sensitivity analysis shows good resilience to shifts in key assumptions, particularly yield and price.
7. Mango

Mangoes are grown from Kununurra in the north to Gingin in the south, giving WA a unique production window from September to April. Production has grown rapidly over the past 15 years (shown in Figure A10) and is expected to continue at a similar rate for at least another 10 years as new orchards come into production.

The WA industry uses about 1500–1700 hectares of land which, apart from a single 100-ha farm in Kununurra under flood irrigation, all use under-tree sprinklers. Drip tape is used by some growers in the southern regions.

![Figure A10 Growth of WA mango industry 1990–2005](image)

The main centres of production are the Ord River Irrigation Area (ORIA) which is characterised by larger growers and one large corporate producer; Broome which comprises mostly part-time producers; and Carnarvon which comprises mostly diversified producers—that is, mangoes are often not their main source of income. Gingin is a developing region and currently comprises several larger growers and a number of small part-time producers. A large corporate development is under way here which will contribute a substantial increase in future production.

The industry is going through a maturation phase which is seeing greater investment into mango properties, larger producers and the introduction of semi-mechanised harvesting. Small and part-time producers are feeling the pressure compared with the economies of scale experienced by larger producers. The industry will expand considerably over the next few years due to corporate investment.

Production

The industry is currently based on the Kensington Pride cultivar which has irregular bearing habits. This is leading to dramatic on-off supply years, making it difficult to develop large long-term markets.

Production is increasing rapidly, especially from the Kimberley, and this will continue for the next 10 years, with increased production for the Gingin area expected in the next five years.
Value-adding
Very little value-adding occurs on any significant scale. There is only one moderate-scale processing facility in the Ord region. As production increases, there will be more serious interest in investing in value-adding opportunities for mango.

Markets
The bulk of the crop now goes to domestic markets in Perth, Sydney and Melbourne. However, significant export opportunities are available and there has been good growth in Middle Eastern and European markets.

Quarantine restrictions prevent access to Taiwan, US and South Korea, with very prohibitive restrictions for entry into China. Entry into New Zealand has recently been reinstated for mangoes treated with irradiation. India has a 30 per cent tariff on imports.

The main competition comes from other Australian producers and, to a lesser extent, South America. As they sell a distinctively different product, the South Americans generally do not compete in the same segment of the market.

Australia is the highest cost producer in the world and air freight makes export fruit very expensive. This is limiting growth in some markets but sea freight may be a solution.

Market trends
Asia is the biggest consuming market but the largest importers are the US, Europe and Dubai. All of these markets, particularly the European Union, have displayed significant growth in the past few years.

Rapid expansion has occurred in South America targeting the US and EU. Efforts to establish in Dubai have been poorly received due to the cultivar preference. This has been the same in the South-East Asian markets. None of the South American producers has a cultivar suitable for the premium market in the EU and currently they do not directly compete with Australian mangoes.

Biosecurity issues
The main biosecurity risks facing the WA industry are the importation of mango seed weevil from interstate movement of fruit, followed by Queensland fruit fly, mango hopper, red banded mango caterpillar and mango scab.

Intrastate biosecurity risks include Mediterranean fruit fly spreading to the ORIA thus causing the region to lose its area-free status. Fruit fly is being managed through maintenance of area freedom and disinfestation (fumigation and chemical treatments for interstate trade, and vapour heat treatment for export trade).

Industry growth and potential
The industry has grown at an average of 20 per cent per annum over the past 15 years and is expected to continue this trend for some time (see Figure A11). The main driver for growth has come from an undersupplied domestic market during the October–November and March–April periods and an undersupplied export market during October to December.

The WA industry can supply for eight months of the year in a time slot that coincides with the lowest supply on the global market. It also is one of the few regions free from seed weevil and the ORIA is free from fruit fly. Being very dry, the west coast has an ideal climate for low disease levels which makes fruit suitable for export to long distance markets.
The industry will grow significantly through current and planned plantings. The rate will depend on addressing current supply chain issues in domestic and export markets. There are opportunities to:

- capitalise on low volumes on the global market during the October–January period
- capitalise on the very low volumes of fruit on the domestic market during March–April
- develop local processing
- capitalise on area freedom status for direct access to Japan and China and future access to the US, Taiwan and India
- capitalise on our dry growing environment producing low disease levels and thereby developing a good sea freight trade.

**Innovation opportunities**

- Develop new early cultivars from National Mango Breeding Program
- Export by sea freight using advanced technology
- Export to Japan under area freedom thus avoiding costly and potentially damaging VHT treatments
- Potential direct access to Chinese and US markets

**Industry needs**

- Improved cultivars
- Increased labour supply and/or improved labour efficiencies, increased mechanisation
- More market access
- Improvements in supply-chain management and development
- Improved technology transfer
- Increasing supply base
8. Citrus

The WA citrus industry is dynamic, integrated, consumer-driven and focused on profitability. It has developed over the past 10 years from a small-scale, low-quality, high-output industry to focus on quality and consistency which has driven demand for its product.

The industry is in a period of consolidation. Smaller properties are winding down, fewer pack-houses pack more fruit and the focus has moved from production to marketing and supply-chain communication.

Citrus is estimated to occupy 1400 ha comprises about 170 active growers. The average orchard is around 5 ha. Growers comprise many small enterprises with 1 ha or less, around 30 with between 1 and 20 ha and about 10 with more than 20 ha. More than half of the total area is managed by the five largest growers.

Production is spread from the tropical north to the Mediterranean south:

- Kununurra—red grapefruit, limes
- Carnarvon—red grapefruit, pink grapefruit, navels, limes
- Moora, Dandaragan—navels, mandarins, limes, grapefruit
- Gingin, Bindoon, Chittering—navels, mandarins, grapefruit, tangelos
- Harvey, Balingup, Capel, Donnybrook—navels, Valencia, mandarins, grapefruit, limes

Industry structure

The WA industry is represented nationally by Citrus Australia Limited (CA) and by the WA Fruit Growers Association (WAFGA) Citrus Council. The Citrus Council comprises growers from all key production areas from Kununurra to the Harvey region. This representative structure has been a driving force behind recent developments. However, is likely to change when the Agricultural Products Commission (APC) appoints a new Producers Committee which will be responsible for development.

Recent changes to the national peak body to a company limited by guarantee means that individual growers must become members rather than the state peak body. The CA board comprises a minimum of four growers and three professionals appointed on skills-based merit and elected by grower members.

Key trends

- Large-scale growth is occurring particularly to the north of Perth, primarily funded through managed investment schemes (MIS), and considerable private development.
- Traditional areas such as Chittering, Armadale Foothills and Harvey are in decline. Harvey is less affected because while the number of smaller farms is in rapid decline, several growers are expanding, including Harvey Fresh, the only juicing company of reasonable size.
- Developments are focused in the West Gingin, Bindoon and Moora areas, using water drawn from underground bores.
Citrus production

Citrus trees take up to two years in a nursery depending on technique. From planting in the orchard, trees begin to produce reasonable volumes of fruit in four years, and are in full production by the eighth year. Citrus trees remain viable for 12–15 years when most commercial orchardists will replace them.

Production issues

Production is focused on improving current recommended practices for sustainable production while meeting consumer demand for easy-peel and seedless varieties.

The department has a number of innovative trial sites in the Kununurra, Carnarvon, Gingin, Bindoon/Chittering and Harvey regions. These aim to identify superior scion and rootstock combinations as well as test new public and private varieties for suitability to WA conditions.

The sites are also used to promote innovation in canopy management, nutrition, irrigation and pest and disease management. Past production issues, such as watermark (damage to the rind of some varieties preventable through the use of gibberellic acid sprays), have been targeted using these sites. The sites are being used to demonstrate the best management techniques for albedo breakdown, a physiological disorder of the citrus rind.

The department has targeted improving quality across the industry and bringing quality to a high level. The key production trends indicate a rise in the production of easy-peel and seedless varieties (mandarins), more navel oranges across the season (early, mid and late varieties) and a significant increase in the volume of grapefruit.

The variety landscape is changing and, while driven by consumers, the varieties are being developed by private companies. For many citrus growers this raises new management issues, dealing with ‘grower clubs’ and understanding the impacts of breeders’ rights.

It is predicted that increased production generated by the rapid development will require new markets in two to three years, even sooner for grapefruit which is already at a point that could flood the entire Australian market for six to eight weeks. The industry has identified communication through the supply chain, marketing and export as some of the major issues that must be dealt with in the next five to 10 years due to this increase in production.

Drought in the eastern states has an impact on WA, with frequent shipping of low-quality, low-value fruit to the central markets. There have been moderate levels of inquiry from eastern states’ growers regarding land values and availability of water in newer growing regions.

Many of the major growing regions in the world have suffered from the introduction of Huanglongbing (‘greening disease’), which originated in Asia. The disease is spread by two types of psyllid—the Asian and the African psyllid—an insect not found in Australia. Production in these areas will be severely affected as there is no cure. This may present further opportunities for the WA industry.

Value-adding

Approximately 75 per cent of WA citrus is sold as fresh market fruit. This is minimally transformed in pack houses through washing and waxing. Nearly all pack houses are currently operated by grower/packers, with 80 per cent of the fresh fruit being packed by the eight largest pack houses (pers. comm. Greg Beales, Citrus Council Chairman, 2006), some fruit is transported in bins to the markets and is packed by market agents. With current food safety and market access trends, more small producers are looking towards central facilities to pack and market their fruit.
The other 25 per cent of citrus grown in WA is substantially or elaborately transformed into juice products. Most is processed by Harvey Fresh and marketed as fresh and long-life products for local and export sales.

Rewards Group in Kununurra is likely to build a juicing plant onsite to reduce the cost of transporting juice grade and over-run fruit. The fruit juice will be shipped to the eastern states or exported from Kununurra.

Harvey Fresh are the only growers continuing to plant for the juice market as the price received for juicing fruit is generally low. Currently the technology in WA cannot produce a long-lasting juice from navel oranges due to its tendency to become bitter after 24 hours.

**Markets**

WA citrus is predominantly sold into the Perth market, with some grower-direct sales. WA produces less than half of local demand and about 60 per cent of demand in season. With the aid of a strong WA branding strategy, demand for local produce is increasing.

Growers within a two-hour radius of Perth (Central and South-West regions) have a strong freight advantage over interstate and international competitors. However, the two large supermarket chains use a central purchasing strategy and tend to purchase a larger proportion of their citrus for WA stores from the eastern states, even in WA’s growing season. Smaller retailers and locally-owned grocers have benefited from the industry’s strong local marketing strategy.

As production increases, growers will have the volume to pursue identified export opportunities, particularly in South-East Asia. Grapefruit grown in the Kimberley region is export-focused and Japan is the prime target. Central and South-West growers are well placed to take advantage of market windows for navel oranges and easy-peelers from September through to November. This time frame fits between the end of the South African season and before the Spanish season.

WA citrus growers will require assistance in accessing export markets. There will be several quarantine issues, predominately relating to fruit fly and Fuller’s rose weevil. Japan’s Ministry for Agriculture and Forestry has recently approved the research done by Dr Francis De Lima, of the Department of Agriculture and Food, on cold disinfestation of navels and mandarins at two and three degrees which may in turn improve the accessibility of fruit to many South-East Asian countries. This will also allow access of fruit from other regions.

Quality of fruit will be an issue in attaining markets. For instance, many farmers still do not apply correct pruning procedures, which impacts greatly on the percentage of fruit affected by wind rub, a common export rejection.

Citrus exports are dominated by countries such as Brazil, Chile, Spain, South Africa and the US. These countries tend to have cheaper labour and lower costs of production.

**Resource base**

Citrus is grown in Mediterranean and tropical climates on soils that vary from clay loams to sand. The root system is no deeper than 30 cm which allows for shallow soils.

A grower survey was conducted in 2003 to identify orchard management practice change and benchmark understanding of environmental issues, attitudes and aspirations.
The two practices citrus growers believe pose the highest risk to the environment—chemical sprays (86 per cent) and fertilisers (50 per cent)—involved practices they had recently changed, that is, pest management (73 per cent) and nutrition management (70 per cent). When asked: ‘Why did you make a change?’ the most common responses were ‘to improve quality’ and ‘to improve yields’.

It is important to note that growers ranked ‘to reduce environmental impact’ as more important than ‘to save money’. Another notable result was that 80 per cent of those surveyed wanted more information on environmental management.

This survey led to the establishment of demonstration sites designed to show benefits of applying current recommended practices and introduce monitoring and recording systems to demonstrate good environmental management (GEM).

Possible threats to the environment come in the form of leaching of applied nutrients, which is monitored at the demonstration sites. However, many growers are more threatened by the declining quality of water due to the increased levels of salt.

Water is the primary resource issue, both supply and quality. The industry is estimated to use 10 gigalitres per annum. Citrus rootstocks can be salt-tolerant. However, irrigating with saline water can have detrimental effects on tree health and fruit quality.

The department and the industry have identified a need to benchmark inputs such as nutrients applied and irrigation practices as well as yields across the regions to determine profitability and sustainability.

**Biosecurity issues**

Biosecurity threats are generally managed on a national level. The 2004 outbreak of citrus canker in Queensland is a recent example. The industry has strong links with Plant Health Australia (PHA) through the national body (ACG). However, PHA is geared towards national exotic pest and disease incursions, so something exotic to WA but found in other places will receive no assistance. In such cases CA would provide a level of service, but the main responsibility would fall to WAFGA and the department.

A major issue is Huanglongbing or greening disease. This is particularly so for Kununurra, which could be the entry point. Kununurra’s proximity to islands to its north plus cyclonic winds are weaknesses in the prevention of Asian psyllid (*Diaphorina citri*), the vector of greening disease, entering Australia.

Managed threats within Australia include Queensland and Mediterranean fruit flies. The recently approved protocols for cold disinfestation of some citrus will provide better access to export markets in future.

Other biosecurity risks are posed by work teams that may be brought from other growing areas—both nationally and internationally. The project has identified that an education/extension program is required for farm managers and workers about the risks involved in using staff from other growing regions.

**Industry potential**

An industry survey in 1998 showed the production area to be about 700 ha. Since then substantial investment has increased area by more than 200 ha at Kununurra, 30–40 ha at Harvey and around 110 ha at Gingin-Bindoon. New plantings at West Gingin and in the Moora-Dandaragan area began in 2007, increasing development there to over 400 ha.
Key drivers for this growth are: previously identified markets; grapefruit for export, particularly Japan which consumes 300,000 tonnes per annum; and navel oranges and easy-peelers for the Perth market initially, with a view to export as volume allows. Growth is primarily funded through managed investment schemes (MIS) although there is equal interest and investment from private growers (properties around 50–60 ha compared to those developed by MIS which have typically been 200 ha).

At the current rate of production excluding planned MIS plantings, output is estimated to reach 22,000 tonnes by 2012. However, projections for new plantings at Kununurra and Moora-Dandaragan, under current recommended practice, will see total state production far exceed the current trend. The Moora Citrus Project alone is expected to generate up to 54 equivalent full-time positions (with current technology) in the region and have a catalytic effect in attracting other similar industries to cluster nearby.

Import replacement, reducing the imports of fruit from the eastern states in the growing season, provides growth potential. Potential for extending the WA season is being investigated through plantings of citrus varieties in the lower south-west at the Manjimup Horticulture Research Institute.

Export inquiries have been received from Japan, China and Iran. At present local production cannot supply these inquiries for oranges. Export of grapefruit is likely to expand rapidly as production from Kununurra increases to between 2000 and 4000 tonnes next year. The Rewards Group sent trial containers to six international destinations last season. More work needs to be done to assist these attempts to enter markets.

A benefit–cost analysis in 2004 (shown in Table A6) found that it had been worthwhile to invest both public and industry funds in developing the citrus industry in WA. With the expected rate of growth in the next few years and effective technology transfer, performance could well exceed these previous estimates.

### Table A6 Results of benefit-cost analysis

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### Industry needs

- Maintain the industry development role to provide extension of information and knowledge to improve quality of product as quantity increases in this growth phase.

- Foster relationships between the department, WAFGA, and CA to provide clear linkages through the industry with communication between all parties.

- Variety development and involvement in the national breeding program continued to keep WA at the forefront of marketing opportunities, both locally and overseas.
Climate change/natural resource management

- Awareness of environmental impacts. There is a great need to benchmark current practices to determine the level of potential impact and what may be required to offset this impact.
- An understanding of the citrus industries’ impact on climate change. Could citrus plantings have a carbon sequestration function? What are the impacts on citrus? What is the footprint associated with citrus?
- An understanding of the impact of climate change on WA’s citrus industry including identifying the impact of global warming on growing citrus in WA, understanding how our competitors will be affected and responding to the associated opportunities and threats.

Biosecurity

- Keeping out citrus canker and Huanglongbing (greening disease) and Asian psyllid are critical to the industries’ survival.
- Increase marketing opportunities through disinfestation protocols.

Food and trade development

- Increase consumption of citrus in the local market, interstate, and through exports.
- Market development for grapefruit in the short term and for navel and mandarin varieties in the medium to long term (three to five years).
- Develop further infrastructure to absorb excess juicing-grade fruit.
9. **Avocado**

The avocado industry in WA is centred mainly within the South-West, following the coastal strip from Gingin to Albany. The peak industry body is the Avocado Growers Association of Western Australia (AGAWA).

The industry collects funds for research and development via the ‘fee for service’ levied by the Agriculture Products Commission of WA (APC). These funds can be used for a range of industry issues and to seek matching funds from Horticulture Australia Limited (HAL). The prioritising of spending is via an industry-elected committee.

The national avocado industry is represented by the peak industry body, Avocados Australia Limited (AAL). Avocados are a full levy paying industry under the HAL umbrella. These funds can be used for R&D (with matching federal government funds) or for marketing purposes. The use of levy funds is prioritised by the board. From 2008, AAL commenced collecting valuable industry statistics on behalf of its members, including product dispatch and market destinations as well as forecasts of production.

The WA industry has a healthy spread of participants from small producers with ‘off-farm’ income support, medium-sized farms using mainly family labour, larger producers who employ full-time and seasonal staff, and corporate ventures.

The industry principally sorts and packs through larger facilities rather than individual self-packing. These packers also consolidate produce and distribute it via market agents or directly to the main supermarket chains. Wholesale market agents also act as consolidators for smaller producers who self-pack, as well as providing ripening services for them and some larger producer/consolidators. Central packing and distribution is encouraged for economy of scale and biosecurity issues. This is essential for movement of fruit outside of the Perth wholesale markets.

![Figure A12](image.png)  
**Figure A12** Recent and projected Western Australian avocado production
Plan to Support Horticulture Industry Development 2009–2012

Production
Avocado production in WA has been increasing steadily for the past 10 years and this trend is expected to continue at a slightly elevated rate into at least the next five years (see Figure A12). This is the result of increased plantings, particularly in the past five years.

Avocado production from WA orchards is relatively low, averaging 13 tonnes per hectare from mature stands of trees. The variation between high and low producers is known to be substantial. In the past three seasons, climatic events have resulted in a much more obvious industry-wide biennial bearing pattern. Strategies are being investigated to increase average yield per hectare to 16 tonnes and to reduce the level of biennial variation from season to season to less than 20 per cent.

Markets
Some 62 per cent of the WA crop is sold onto major Australian markets other than Perth (Figure A13). The limited overseas trade is due to the high demand on the Australian market, the relatively low production base and resulting high prices achieved. Australia is a recognised high-value market for avocados. Our nearest producing neighbour, New Zealand, exports to Australia as well as to the US, Japan and South Korea, markets not available yet because of biosecurity issues (fruit fly).

New Zealand is a high-priced market when production is low, but not available to WA due to biosecurity issues (sunblotch viroid and fruit fly). Some avocados are exported to New Zealand from the east coast with avocado sunblotch viroid freedom certification.

Other markets of interest include Singapore, Hong Kong, Dubai and Europe, though all at this stage would provide lower returns for growers overall. They may, however, offer markets for specific lines, small or large fruit, for example, or simply an alternative market to spread the risk or take excess fruit out of Australia in order to maintain high prices.

Only New Zealand has import access to Australia. Their industry is also growing, but without any consistency in yield increases over the past few years. The potential for large crops is there, although climate issues are likely to be important. Australia is New Zealand’s main export market and a big New Zealand crop means significant supplies of their avocados will enter Australia. New Zealand produces avocados at the same time as WA. They predominantly trade on east coast markets as these are larger than Perth and because of the transport distance and competition from WA. Large volumes of New Zealand fruit in east coast markets can result in price dips there. In a regular year, the east coast receives about half of the WA crop, so high volumes of fruit on this market will impact on returns.

Value-adding
At present, the avocado is a high-priced fresh product with low levels of reject fruit. Even second grade product provides healthy returns. As a result, traditional processing ideas such as cosmetic oil or paste have not promised high enough returns to encourage investment. New, high value-added options such as culinary oil or sliced, diced or halved fruit have recently attracted interest. The hold-back at this point is that these new industries require substantial investment in machinery and, with avocado crops still reasonably small and with a high demand for the fresh product, there may not be sufficient available to sustain the new ventures. As fruit production increases, the viability of such ventures will improve, plus machinery costs may drop to more economic levels, or as new methods are developed.
There have been investigations into setting up large-scale culinary oil operations, as well as the use of ‘ultra-high pressure’ packaging to supply diced/sliced/halved fruit. An oil processing operation operates out of Queensland, as does a guacamole factory. New Zealand currently has two large commercial culinary avocado oil processing operations.

Worldwide processing is substantial, with cosmetic oil and avocado paste the main industries. Much research continues into new methods to store and supply avocados to world markets in ‘easy to use’ or ‘ready to use’ packaging.

![Figure A13 Market destinations of WA avocados in 2008–09](image)

**Resource base**

The avocado tree, while adaptable, needs high-quality horticultural soils and plentiful water. As a result, competition with other horticultural crops and timber plantations for deep, well-drained soils and quality water reserves is arguably the main constraint for continued growth.

Seasonal staff for harvesting can also be an issue for some growers but the main growing region is an attractive destination for backpackers and harvest is during spring to autumn. The trees provide some shade so conditions are reasonably comfortable for pickers. Large tree size can be an issue for harvesting.

High levels of irrigation, currently applied with minimal soil moisture monitoring, is a cause for concern with potential for excess being applied and potentially leading to subsoil nutrient leaching. Further research into optimum water usage and encouragement of uptake of moisture monitoring devices is essential for long-term sustainability, both in terms of economics and environment. Moisture monitoring has been limited due to limited data to support its use in the form of moisture thresholds and yield impacts. Monitoring of leachate levels passing beyond the trees’ root zone is required to determine ‘benchmark levels’ to highlight any potential areas of concern and then to set improvement targets if necessary.
Avocado production has minimal significant pest issues and, as a result, minimal use of pesticides. This is a distinct environmental advantage over some crops. The main chemical group of potential concern is copper-based fungicides for control of anthracnose. Copper has been identified in some countries as a product of environmental concern. WA’s current level of use is reasonably minimal due to our weather conditions.

**Biosecurity**

The limited pest and disease pressure is a distinct economic and environmental advantage over other crops and growing regions. WA’s quarantine measures have kept out a range of pests and diseases that affect other production regions around the world. To assist in maintaining this in the face of increasing free trade, Plant Health Australia and the national avocado industry (with WA assistance) have developed and implemented an industry biosecurity plan. This provides details of major threats to Australia and strategies to deal with outbreaks.

Movement of fruit and trees into WA from other states is allowed under certain quarantine guidelines. Several pests are a potential problem but to date no significant issues have resulted from imports. A couple of minor pests have been detected in the past few years but without any apparent economic or environmental impact.

Because of Mediterranean fruit fly (MFF), WA has protocols for access to other Australian markets. These protocols are variety-specific with data developed for three varieties to date. Any new variety with expectation for sales outside of WA will require follow-up research. Access to several international markets is restricted because of MFF and it is unclear if our current protocols will be accepted into these markets.

**Industry potential**

The industry will continue to grow because:

- avocado is a crop for which demand in Australia during WA’s production window is very strong and high prices have been maintained despite increasing supply
- the avocado is recognised as a product of high nutritional value
- WA avocados have a good reputation on Australian markets for high quality in terms of flavour and robustness (keeping quality that reduces stock shrinkage)
- there are relatively untapped export opportunities close to Australia, such as South-East Asia
- Australian consumption per capita is growing annually and the gross unit value of avocados is also increasing annually.

WA’s late season, which results from slowly maturing fruit, produces avocados with high oil content which would be ideal for oil production.

The avocado industry will continue to provide and increase opportunities for employment in the south-west. It provides both full-time employment and casual seasonal work at peak harvesting, packing and pruning times. The industry leads to allied employment in transport, refrigeration, irrigation, fertiliser, chemicals and machinery. There is real potential for downstream processing which would lead to increased employment and regional wealth creation.
Industry needs

Through consultation with industry, the following priorities have been identified:

- identification of new strategies to deal with low yields and biennial bearing, such as improved pollination, better vegetative growth to yield ratios, improved nutrition management and measures to deal with climate limitations.

- faster adoption of better practices in water and canopy management to maximise yield potential and improve production efficiency, while maintaining high fruit quality

- research into plant water use to identify opportunities for reduced water use per hectare, with acceptable impacts on yield and quality

- assistance in developing new markets. This may require market access assistance for quarantine issues, providing suitable market contacts, facilitating promotions and monitoring product out-turn

- improved communication strategies

- investment in new plantings, new product handling facilities and market growth strategies

- access to new varieties and rootstocks plus production data demonstrating benefits.

DAFWA support opportunities

The department has the capacity to assist the WA industry in all areas. The level of support is reliant on ongoing industry financial contributions. The areas of need and potential support fit into the department’s investment initiatives 1, 2, 3, 4 and 5.

Current departmental activities, with industry financial assistance, include support for industry needs 1, 2, 3 and 5. Industry has initiatives to deliver on industry needs 4, 6 and 7.
### Industry SWOT analysis

#### Strengths
- Young expanding industry, with significant numbers of trees yet to reach full production
- Predominant supply during the summer and autumn when Australian supply is lowest and market prices are highest
- National industry operates an aggressive marketing program
- Good industry statistics available on production and distribution
- Avocados are a high value and sought-after fruit
- High use of central packing and distribution/marketing services

#### Weaknesses
- Limited market diversity
- Small production base limiting market capture
- Heavy reliance on a single variety
- Limited rootstock diversity and understanding
- Slow uptake of best practices—moisture monitoring, canopy management
- Relatively high production costs and low yields per hectare

#### Opportunities
- Still room to grow Australian consumption of avocados
- Underdeveloped markets available overseas—Singapore, Hong Kong, Thailand, Dubai, Europe, China, US and Japan
- Many recognised health benefits in an increasingly health conscious marketplace
- Product transformation options available—oil, paste, sliced, halves
- New improved varieties and rootstocks becoming available from international breeding and evaluation

#### Threats
- Significant levels of alternate bearing may erode market confidence, opening up our markets to competitive suppliers
- Climate change issues reducing fruit set, therefore yields and profitability
- Increasing competition for land and water limiting growth
- Market development not keeping pace with increase in supplies
- Significant pest incursion reducing the profitability of the industry
10. Cut flowers and native plants

The cut flower industry is composed of both native and exotic flowers. The native industry is based on Australian flowers and includes South African proteaceous species and supplies mainly Japan, America and Europe and a growing eastern states’ market. Flowers are sold fresh and dry or preserved. The exotic cut flower industry is based on traditional blooms such as roses, chrysanthemum and carnations for the WA domestic florist trade.

Native cut flowers

The industry produces approximately 24 million cut flower stems worth $8.2 million at the farm gate of which 20 per cent is from the bush-picked sector and 80 per cent from the cultivated sector.

Native cut flowers are mostly exported (with 95 per cent sold fresh) and few sold in WA. Some are sold in growing eastern seaboard markets. They are either exported direct or via packing sheds in the eastern states (24 per cent). Flowers are sold through a few WA exporters or direct from farms, with some larger growers doing their own exporting.

The main markets are Japan (50 per cent), the US and Europe. Profit margins are less for Japan because of exchange rates. This has forced a switch to new varieties such as pearl flowers, which receive a higher price. Sales to Europe have also declined due to high cost of freight. New markets closer to WA in South-East Asia and India are being developed.

Properties range from 2 to 30 hectares with a few larger farms. Most product comes from a few large growers (over 50 ha) but a very useful range is produced by smaller growers. There are about 260 ha of native wildflowers and 100 ha of South African proteas.

Traditionally, the industry has expanded with lifestyle participants who cultivated small areas. A limited number of larger family farms produce large volumes and have the ability to carry the industry. An ageing workforce and the lack of young family members interested in taking on the enterprise is causing concern to some.

Exotic cut flowers

The industry produces 35 million stems with a farm-gate value of $27 million. These are predominately grown under cover in greenhouses and shadehouses. Enterprises are capital intensive and concentrate on roses, carnations, gerberas, lilliums and chrysanthemums.

Flowers are sold to florists and promotional companies. The retail florist industry in the state is worth $65 million. Increasing use of wildflowers is estimated to be worth $7 million.

Profit margins are under threat from interstate and overseas imports and price pressures applied by the large retail chains. Generally the smaller producers can’t compete in retail chain markets against large corporate bunch assemblers.

Pot and amenity plants

Over the past 10 years there has been a focus on native flower development by the department to capture the potential of our unique flora.

The introduction of native species as pot plants is emerging within the state and has considerable potential. Small numbers of wholesale nurseries sell natives mainly for amenity plants. There are great opportunities for the industry to develop native Australian flora as new amenity products focusing on the ‘Waterwise’ garden.
Other opportunities

Many native Australian plants with commercial value require special tissue culture techniques and as a result IVS technology was developed by the department. This technology has commercial value to the propagation industry and has been refined to have application to other horticultural industries such as in viticulture (wine and table grapes), capers, avocados, macadamia and Hoodia by providing superior selections through clonal propagation.

Other new technologies to overcome hybridisation barriers, such as early embryo rescue and somatic fusion and chromosome doubling to overcome hybrid sterility, are being developed by the department. These will allow breeding of a range of new varieties opening up further commercial opportunities in cut flower and pot plant industries.

Value-adding

Cut flowers are minimally transformed in terms of being bunched to different stem lengths and bunch sizes depending on markets. The US market requires bunch sizes based on meeting a fixed bunch weight. The Japanese markets require set stem numbers per bunch. There is also some value-adding in terms of carton size and number of bunches per carton.

Exporters and wholesalers minimally transform bunches by producing mixed cartons containing several varieties to give a range of colour. They are also substantially transformed by selling bouquets containing mixed fresh and fresh dried flowers. These are increasingly sold through retail chain outlets and via the internet.

Industry potential

The present lack of scale does not position the industry well for future growth. New markets and new investment in flower farms to supply those markets are needed. With the increase in populations in Australian cities there are strong opportunities for the industry to develop a larger domestic market. New investments will increase capital investment, improve scale and efficiency and make the industry more competitive.

Biosecurity

The wide range of plants involved in floriculture means there are potentially very significant disease and insect threats with some of these threats common to other horticulture crops.

Gaining access is also an issue for strict quarantine markets such as Japan and the US. Native insects on flowers can restrict access or cause destruction of shipments. Protocols have been developed to treat export flowers for pests and minimise insects on flowers. Eradication of pests threatening wildflowers in plantations is therefore important for the expansion of export wildflowers

Value drivers

- New varieties and new crops
- Promotion of new varieties
- Improved market intelligence and greater access to markets
- Consistency of supply of quality product
- Larger critical mass of production base
- Improved management and skills
- Increased capital
- Production packages
- Overseas development of varieties
Industry needs

- New high-value varieties commercialised
- Development of specialist crop production packages
- Increased quality product and returns per plant
- Protection of varieties from overseas competitors
- Access to cheaper airfreight space
- Increase production base for wildflower industry
- Increased domestic market opportunities
- Reliable and profitable export markets, especially close to WA
- Increased research in agronomy, gall wasp management, postharvest quality and clonal banksia production
11. Nursery and garden industry

The Nursery and Garden Industry of Western Australia (NGIWA) is the peak state body representing producers, retailers and allied traders in the production and sale of ‘greenlife’ across WA. NGIA relies on statistical data supplied by the Market Monitor report that has been facilitated by NGIA and Horticulture Australia Ltd. It is funded by the nursery and garden industry levy with matching support from the federal government.

The total value of the WA nursery and garden industry as reported by Market Monitor was $689.9 million to the end of June 2009 increasing by 2 per cent over the previous financial year (2007–08) and having 11 per cent of the national market. This figure is the combined total of goods and services supplied including greenlife (plants), allied trades (potting media and compost, fertilisers, pots and chemicals), nursery cafes, gift lines and gardening.

The industry in WA exports in excess of $10 million of greenlife making it one of the largest exporters of horticultural products.

Outlets are located in most communities and environments, providing greenlife and associated products (including fertilizers and growing media) to a diverse customer range. The sector produces in excess of 10 000 plant species with many and varying target markets.

Markets

Growth of the industry by 2 per cent has been an outstanding achievement in the current economic climate. This is forecast to remain stable, if not improve, over the next three years.

New home purchases have impacted on the demand for greenlife and landscaping services. Energy-efficient homes are boosting green industries which impact on boosting waterwise garden products and services.

Tax breaks will assist with running sustainable businesses in the garden industry. Some opportunity exists for the industry to be part of developing ‘green’ schools.

Resource base

NGIWA has approximately 400 wholesale and retail businesses in WA extending from Kununurra in the north to Esperance in the south and employing more than 4700 people.

The industry recognises and supports the ‘Nursery Production Farm Management System’. This provides production nurseries with the necessary tools to evaluate and continuously improve their business professionalism, productivity, profitability and sustainability. This system included three key programs: NIASA, Eco Hort and HACCP BioSecure.

The Australian Garden Centre Accreditation Scheme (AGCAS) supports and promotes excellence in garden centre retailing. The scheme aims to benchmark and improve businesses in areas such as chemical and fertiliser handling and use, environmental impacts such as water, weeds, and waste management as well as areas such as plant quality and hygiene, customer service and merchandising.

The industry has an ongoing research program funded by a pot levy.
Biosecurity

The nursery and garden industry remains committed to safeguarding the environment and minimising or reducing any adverse environmental impacts of its operations. To this end, the industry is committed to working with government, research organisations, the community and other stakeholders to address and manage key environmental issues.

In 2005, the Nursery and Garden Industry of Australia became a signatory to the Emergency Plant Pest Response Deed (EPPRD) and is at the forefront of developments in biosecurity. The EPPRD is a progressive partnership arrangement between governments and NGIA that sees Australian industries and governments cooperating as equal parties in the management of emergency plant pests.

The NGIA, in conjunction with HAL, has developed BioSecure HACCP guidelines to manage biosecurity in nursery production. These guidelines assist the growers in determining their current and future pest and disease risks, as well as guide their businesses in the implementation of management strategies at critical control points.

Industry growth

NGIWA has achieved 2 per cent growth over the past financial year.

Climate change through carbon trading will see an increase in forestry and farm tree plantings throughout the state and should increase over the next three years.

Governments are expected to increase urban green areas that will have flow-on effects to carbon trading, lifestyle, health and population growth. Urban lifestyle is focusing more on landscaping, edible gardens, open spaces.

The environment and sustainable gardening practices will continue to support industry growth. The ‘grow your own’ phenomenon, organic gardening and increased public awareness of the environmental effects of gardening practices (both positive and negative), will have a major impact.

Industry needs

- Supply chain improvements—understanding logistics and where efficiencies can be gained
- Sustainable industry development through extension and targeted communication
- Enhanced professionalism through accreditation and recognition
- Investment in R&D to ensure industry is prepared for climate change
- Development of better natural resource management
- Promotion of the industry and the positive benefits and contributions to environmental issues
12. Olives

The olive industry is emerging as an important horticultural industry which is attracting public interest and investment.

It has been fortunate to be led by a number of skilled business people who are committed to success while supporting the establishment of strong state and national bodies to represent them. Like all new industries, a period of consolidation occurs after the initial euphoria and the trials of establishing a business. The olive industry is going through that consolidation phase with some early leaders withdrawing, focus shifting from production to marketing and making a sale to generate a return on investment.

Key facts

- 2 million trees planted in WA since 1998
- 6000 ha equivalent under trees
- Approximately 300 growers
- Investment in excess of $90 million
- GVP olive oil $10.5 million and table olives $0.3 million (farm gate estimate for 2008 harvest)
- GVP $20 million by 2010 (estimated)
- Olive oil exports worth $4 million in 2007–08 (22 per cent of Australian exports)
- Industry creating regional investment, employment, enhancing tourism, value adding

The industry

The peak national body is the Australian Olive Association Ltd (AOA). Formed in 1995, it has played an important role in guiding development and in the early stages providing communication and linkages between growers, researchers, service providers and overseas oil experts. It was set up with representation based on the main growing regions with regional associations affiliated with the AOA. However, as the industry has matured and corporate players become more dominant, smaller grower members have perceived that the association is neglecting them, realising they do not have commercial groves. Membership has declined, causing financial strain.

Olive producers have a state-based representative body where issues can be addressed and local marketing, events and training arranged. WA is represented by the West Australian Olive Council which comprises presidents of the eight regional associations and representatives of the large groves.

Exports

WA’s olive oil has been around 22 per cent of Australian exports in recent years but reached 32 per cent in 2006–07 when drought and frost affected eastern Australia (see Table A7). Some major groves established in the early 2000s had take-off agreements with an Italian company to support their prospectus and used this connection to make bulk oil sales to Italy.

Italy is now an important market with 433 tonnes valued at $1.9 million shipped there in 2007–08. Some eastern states’ oils may be blended with WA oils to make up this volume. An important emerging market is China taking 240 tonnes valued at $1.4 million in 2007–08 while the US also remains valuable at $0.5 million but less than in the previous two years.
Plan to Support Horticulture Industry Development 2009–2012

### Table A7 Export of olive products from Australia and WA

<table>
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<tr>
<th>Year</th>
<th>Australia</th>
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<td>$/t</td>
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<td></td>
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<td>2 368</td>
<td>6 167</td>
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<tr>
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<td>196</td>
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<tr>
<td></td>
<td>2005–06</td>
<td>2 491</td>
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<td>5 496</td>
<td>498</td>
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<tr>
<td></td>
<td>2006–07</td>
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<td>16 526</td>
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<td>706</td>
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<tr>
<td></td>
<td>2007–08</td>
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<td>17 726</td>
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<td>779</td>
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<tr>
<td></td>
<td>2008–09 (e)</td>
<td>4 481</td>
<td>29 522</td>
<td>6 588</td>
<td>1 322</td>
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### Table olives (processed)

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<tbody>
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<td>$’000</td>
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<td>Tonnes</td>
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<tr>
<td>2007–08</td>
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<td>1 124</td>
<td>5 563</td>
<td>4</td>
<td>62</td>
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<tr>
<td>2008–09 (e)</td>
<td>279</td>
<td>1 463</td>
<td>5 243</td>
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</table>

Source: ABS, Agrifood Infonet

Commercial olive growing in WA has only gained prominence in the past decade. The growing awareness of the health benefits of olive oil and its promotion in Australia by the International Olive Council (IOC) has led to increased consumption of olive products which is currently mainly met by imports. In the mid-1990s there was strong interest in olives as a diversification option in the woolbelt as low prices were impacting on farmers’ incomes. The department assisted prospective growers with information, hosted workshops and international visitors, and provided a consultancy service for site assessment. There was also considerable interest from investors and individuals purchasing rural land for lifestyle but seeking a minimal-care, low water-use crop.

As a consequence, many small olive groves were established from Geraldton to Margaret River and east to Esperance, mainly in the medium to high rainfall belt. The establishment of groves in the eastern states through managed investment funding led to corporate interest in WA which resulted in three large groves in the Gingin region and one at Frankland.

### Areas of production

Olive production in WA is mainly located in six main areas:
- **Moore River Region** (Gingin, Dandaragan, Guilderton)
- **Great Southern** (Frankland, Mt Barker, Denmark)
- **South-West** (Margaret River, Busselton, Donnybrook)
- **Peel Region** (Wandring, Williams, Mandurah)
- **Avon** (York, Beverley, Toodyay)
- **Mid-West** (Chapman Valley, Dongara)
The main reason for plantings in the Moore River region was the availability of underground water and large areas of well-drained soils at reasonable cost. This region now accounts for about 70 per cent of the state’s trees and production.

**Olive production**

Olive trees take about eight years to reach full production. Estimates of yield at full production range from 35 to 55 kilograms per tree, but harvestable yield is influenced by many factors including seasonal conditions, variety, site, pollination, management including irrigation, and the ability of the harvester to remove fruit. One major issue is biennial bearing and some observers believe the lower WA yields in 2006 and 2008 were the commencement of a pattern in WA groves which will have to be managed.

The table olive market is supplied by a number of smaller WA producers as well as interstate and overseas imports.

By 2012, total olive production in an ‘on-year’ could be around 20,000 tonnes based on an estimated 1 million mature olive trees producing fruit by that time.

**Value-adding**

Olive oil and table olive production are significant value-adding operations. There has been large investment in modern olive oil processing facilities in WA in the past six years. As production on the large groves increases over the next few years, further expansion of processing capacity and storage will be required. Processing olives into oil is followed by filtering, storage, bottling, labelling and packaging for distribution to domestic or export markets. Some producers blend oil from different varieties to suit market requirements or buy oil from other producers and regions to produce the style of oil required by the market. Solid waste product from processing has opportunity to be developed into compost and some research work is being carried out in this area. Waste water from processing is high in nutrients and is a problem for some that has yet to be managed.

Table olive production is more involved and can take 18 months before product is sold. Some innovative packaging, product mixes and food products such as tapenades and dips have been developed. These are primarily for on-farm sales and specialised outlets. The table olive industry is small with only a few medium-sized commercial producers but could expand as some growers find olive oil less profitable. High labour costs mean that local producers will find it hard to compete with imported processed olives in larger retail markets.

Extra virgin olive oil is the main product. Some producers are producing olive oils infused with flavours including lemon, orange or even native plants such as lemon myrtle to widen their market appeal. Producers offer a range of different packaging sizes from 250 mL bottles through to casks and 20 L drums to support different market segments.

**Key players**

- Frankland River Olive Company (listed company)—groves at Frankland and Mogumber (Jingilli brand)
- Fini Olives (Fini family)—grove at Regans Ford (Fini Olives brand)
- Great Southern Limited (GSL) had receivers and managers appointed May 2009—groves at Preston Valley, West Beverley, North Gingin and Dandaragan (Dandaragan Estate previously owned by Olea Australis)
- Olives West (Tana family)—groves at West Gingin (Sumich brand)
- Guilderton Olives (Barrington Partners syndicate)—grove at Guilderton (bulk oil sales)
Industry structure

1. Large-scale producers (Frankland, Fini, GSL, Olives West) targeting bulk oil export and packaged oil and olives to supermarkets. Capable of supplying sufficient volume to major supermarket chains. Corporate or private investments operate at this level and process 2–5 t/hr and trade in large volumes (1–3 ML) of olive oil.

2. Medium-scale processors (0.5–3 t/hr), for example, Olio Bello, York Olive Processing, Preston Valley Grove and Green Gold Farm, which have often driven industry development in their regions. Most are committed to marketing and have provided a market chain entry point for their growers. These are privately owned but several small groups have initiated investigation as a cooperative structure.

3. Smaller processors (50–400 kg/hr). These also market their own product, often at farmers markets, retail and tourist outlets, and less intensively into metropolitan areas.

Resource base

WA has a true Mediterranean climate suitable for olive production which means a wet winter with adequate chilling and a hot, dry summer. There are concerns that areas north of Gingin may be too warm which would reduce quality of oil, particularly if climate change leads to a rise in temperatures. However, it is possible that through the introduction of new varieties—principally from Spain or Greece—that are more tolerant of heat and with lower chilling requirement, this will not be an issue to expansion in these areas.

WA has a large area of soils suitable for olives ranging from sandplain areas north of Perth to selected areas of well-drained soils in the south-west, Great Southern and western wheatbelt. There are also opportunities for dryland olive growing in the higher rainfall grazing/cropping areas such as Boyup Brook and Kojonup.

The limiting factor to further expansion both in WA and Australia is availability of water.

The WA olive industry presently covers about 6000 ha. It consumes an estimated 30 gigalitres of irrigation water (based on average 5 ML/ha).

Biosecurity issues

WA is fortunate that it does not have any of the serious pests and diseases that impact on olive production in overseas countries, particularly olive fruit fly and olive knot disease.

Strict quarantine protocols prevented large numbers of olive seedlings being brought into Australia from overseas during the rush of plantings in the late 1990s.

Most trees planted to date would have been sourced from interstate nurseries and it is fortunate that major pests and diseases have not become established in WA. WA did have an incursion of olive lace bug in 2002 which was eradicated, but it has since established in a limited area in the south-west. Peacock spot, endemic in some areas in the east, was also detected in a new planting in 2006 and appears to have been successfully eradicated.

Current biosecurity threats to the WA olive industry are olive fruit fly (OFF), peacock spot (PS) disease and olive knot (OK) disease and further expansion of olive lace bug (OLB).
**Industry needs**

*Strong West Australian Olive Council*

The WA olive industry needs a strong and well resourced state body such as the WAOC. With interest waning in regional olive associations, the state body should be the conduit for national issues being communicated to WA olive growers, organising major events and promoting local products.

*Industry development officer*

The olive industry in WA would be well served by an industry development officer based in the department, similar to the citrus industry. With limited research funding at present, there is the opportunity to tap into research being undertaken in the eastern states and demonstrate outcomes to the WA industry as well as using departmental contacts and resources.

*Industry levy*

As discussed previously, the olive industry needs to support a compulsory levy to support future R&D and marketing issues and also to fund the national and state organisations. A number of large players have expressed support for a voluntary levy rather than a compulsory levy (fee for service in WA) but collection would always be an issue.

*Western organoleptic panel*

For an olive oil to be traded internationally, it requires an IOC-approved chemical test (only Wagga Research Institute can do this) and an organoleptic test by an IOC-approved tasting panel. The World Trade Organisation has a description of olive oil similar to that of the IOC and this is the basis of many trade deals. Australia did have an approved panel based in Adelaide but this has now been transferred to NSW Department of Primary Industries at Wagga. IOC will only recognise a government-accredited panel.

WA would be well served by establishing a western panel with government support that could do the organoleptic assessment for local producers. This would fit in with the training of producers to identify good oils and faults which would improve the quality of their product, benefit olive oil research, increase consumer education and boost the food industry standing in WA. If the panel were coordinated by the WA Chemistry Centre, this would parallel the government facility at Wagga.

*Biosecurity plan*

The industry needs to develop a biosecurity plan to prepare for a possible exotic pest outbreak. Recent incursions involving olive lace bug have shown excellent cooperation between the olive industry and the department. While attempts for the industry to obtain funding from Plant Health Australia and RIRDC to assist with the development of the plan did not succeed, the industry must develop a strategy to progress this issue. The department can provide information for the pests and diseases of olives but on a user-pays basis.

Industry also needs to develop more useful information on grower contacts, area of trees, locations and practices to support the plan. It will be harder in the future for the industry to use quarantine and pest-free status as a basis for government support if it does not have an efficient industry network and a funding mechanism which can assist in managing any pest incursion.
Appendix 3. Value drivers

The various sectors within the horticulture industry have some common and some unique value drivers. Examples of drivers within selected key industry sectors are provided below. Access to water, land, labour, markets and new varieties are clearly common drivers for many sectors of the industry.

1. **Wine**

The value of vineyard and wine businesses will be driven by industry willingness to continue to invest in:

- vineyards and wineries to produce high-quality fruit and wine products that better meet market and consumer preferences
- market development strategies to increase market demand for WA wines in high-value and emerging markets
- R&D to underpin investments in vineyards, wineries and market development.

The industry has identified effective and efficient vineyard management, reduced transaction costs and development of niche markets as the key drivers. This is likely to involve:

- increasing the production of quality fruit through improved vineyard management and fruit harvesting practices
- restructuring vineyards to produce fruit for wines that better meet the preferences of the market and consumers (for example, variety mix, alternative varieties, improved clones, choice of planting sites, vine row orientation and planting systems)
- strengthening relationships between growers, winemakers and marketers to produce the quality that markets and consumers want
- a more cohesive industry structure with stronger linkages between the state and regional wine associations, and grape and wine producer groups
- increasing product differentiation
- developing high-value niche markets
- greater focus on financial management and the differentiated wine business.

2. **Cotton and sugarcane**

Establishing either a cotton or sugarcane industry in WA will require land and water resources. At least 10 000 ha of cotton or 8000 ha of sugarcane crop is required to justify processing facilities. Guaranteed water allocation is essential because it will ensure reliable production and the ability to forward sell when high prices can be obtained.

The major driver for cotton production in northern Australia is the diminishing availability of irrigation water in traditional areas. Constraints to development include unreliable fibre quality in winter-grown cotton, and potential for global over-production causing low prices.

A sugar industry of sufficient area would be able to finance the adoption of new technology for production, milling and general infrastructure such as transport, loading and port facilities.
3. **Vegetables and strawberries**
   - Capacity to produce a wide range of products year-round from a wide range of latitudes
   - Relatively secure and well managed water resources compared to eastern Australia
   - Reputation for safe food in Asia and the Middle East and shorter sailing times to these markets
   - Well-developed production and marketing infrastructure for key exports such as carrots
   - Relative isolation of WA domestic market making high quality post-harvest handling a key prerequisite to compete here

4. **Potato seed industry**
   Quality is the value driver for customers as it is the assurance that seed will not spread pests and diseases, that it will germinate strongly and rapidly, and produce a high yield in a short time. While WA has significant advantages, it must work on key areas detailed below to fulfil the quality value driver.

**Postharvest quality**
One of the main problems is poor postharvest handling of produce both in WA and in the export market compared to competitors. There is opportunity for improved out-turn. Tuber harvesting and storage practices are causing damage and leading to diseases such as dry rot and soft rot. While the tubers hold up well in Australia and markets such as Thailand, which have sophisticated cool store facilities, the product has sometimes performed badly in Indonesia and Mauritius.

**Customer service**
After-sales advice and training to ensure growers obtain maximum benefit is essential. Dutch and Scottish buyers have in-country representatives to ensure that seed flows smoothly through the supply chain and provide agronomic and post-harvest advice to buyers. WA growers do not have in-country representatives but provide support through training and collaborative research projects undertaken by the department and training by leading growers.

**Seed size**
Smaller seed size reduces the seeding rate which reduces cost. One major value drivers of our competitors is the seed size they are able to supply. Asian buyers traditionally demand small round seed as they are reluctant to cut the tuber and expose it to damage from pests and disease. Seed potatoes are graded according to size, treated with anti-fungal chemicals, packed into bags and cool-stored prior to shipment.

**Other**
WA’s main advantage is its freedom from pests and disease. An incursion by exotic pests or diseases would threaten that status.

North American and European suppliers pay the same rates to ship 40-foot refrigerated containers to Asia as Australian suppliers pay for containers half the size.

The statutory marketing system for fresh potatoes in WA prevents seed exporters from selling their large, out-of-grade potatoes on the local market which is an opportunity available to overseas and eastern states competitors.
5. **Pome and stone fruit**

Land and water in suitable climatic zones may prove key constraints to these industries particularly in traditional areas such as the Perth Hills.

Access to new varieties and higher quality nursery trees are the major factors for industry development. Stone fruit industry representatives also identified the need for new commercial varieties to be evaluated prior to orchardists planting them only to find them unsuitable in local conditions.

Access to the major markets of China and Taiwan is needed for stone fruit exports to remain viable. Greater domestic consumption is required for industry to develop.

The lack of quality nursery stock often limits new plantings. Suitable dwarfing rootstocks, similar to those used in other states, are the single most limiting factor for the apple industry, as it slows the move towards more intense production.

Intellectual property issues with restricted access to new varieties from breeding programs and commercial nurseries can limit future industry growth. This is caused by breeders and marketing agents agreeing to limit the trees sold to maintain prices.

The risk of the introduction of exotic pests and diseases is increasing due to greater access for some fresh products and tree materials into WA.

6. **Table grapes**

Growth potential will be determined by the availability of new varieties and their success in finding a distinct place in the market. There are indicators, for example, that the market is looking for more seedless grapes that have a distinct flavour.

Availability of viticultural land with access to irrigation water is one aspect that may limit the growth potential. New developments at Carnarvon, Walkaway and the coastal plain north of Gingin have the greatest potential for industry growth.

The uncertainty of competition from imported table grapes is a major concern for established growers and potential investors. Currently the Industry is protected from competition from Chile, South Africa, California and the eastern states of Australia. The Californian industry indicated in 2007 that it wished to sell grapes in WA from July to December each season.

7. **Mango**

- Export and domestic market opportunities
- Supply chain development in both domestic and export markets
- Industry coordination/cohesion
- Market access

8. **Citrus**

The following snapshot of value drivers is from the Moora Citrus PDS 2006, which reflects many of the drivers for expansion in the industry:

- 18 000 tonnes of citrus for the fresh food market is imported into WA each year.
- Western Australians consume 50 per cent less fresh citrus than the Australian average.
- Significant opportunity exists to grow the consumption of fresh citrus.

A very significant opportunity exists to replace the fresh citrus product imported from outside WA.
Growth potential will rely on new developments implementing current recommended practice for production. This should include a systems approach to:

- irrigation and nutrition management
- pest and disease management
- canopy management and the use of plant growth regulators (PGRs).

This is more likely if managers of new developments become involved in research and development activities being undertaken by the department with industry support. Industry has been divided over its approach to MIS involvement in citrus. This has been addressed through the Industry Development Officer role who will continue to working with both sectors.

MIS growers have already begun to change the industry, with most growers accepting that there will be pressure to improve quality to compete with potential supply from bigger properties.

Key constraints are:

- reaching a production level which satisfies demand in the local growing season—possibly affecting farm gate prices adversely
- accessing export markets for excess fruit
- cost and availability of labour
- access to new varieties.

9. Avocado

Land and water in suitable climatic zones are the key constraints to continued growth. If we can gain a better understanding of water use and potential ways to reduce it, this would allow increased expansion in certain areas.

Supply of quality nursery stock is also in strong demand and often limits the rate of plantings. Production of rootstocks can often be limited by poor seasons for seed production. There is opportunity for improved clonal production of rootstocks to overcome this problem and provide greater reliability of production.

Average yields per hectare are lower than their potential. This are believed to be due to, among other things, poor fruit set, irrigation and canopy management. Continued research into these fields will assist the industry to expand and improve competitiveness.

The drive for new markets will come from higher production resulting in lower wholesale prices. Ideally, growers will see the need to explore new market opportunities before they see a consistent drop in prices.

Major risks are rapid growth without a market focus and declining quality standards. WA competes well against competitors in current markets because of high quality standards.

Another risk could be climate change, reduced rainfall resulting in less water and a possible corresponding increase in incidence and severity of both winter and spring frosts.
10. Cut flowers and native plants

Land availability is a serious rate limiter for the production capacity of the exotic industry because of urbanisation. Increased demand for housing land is increasing prices and a number of growers have sold out for subdivision. This trend will continue.

Increasing demand for limited water resources in the South-West together with impact of drought and climate change could restrict future growth of floriculture (cut flower, nursery and amenity). Development and implementation of sound environmental practices will help to manage this need. R&D into water management on farms and selection and promotion of waterwise plants is necessary to effectively manage resources.

The demand for labour in the resource and building industries has reduced availability for the cut flower and nursery industries and placed pressure on growers’ ability to manage their enterprises. There are moves to employ overseas labour.

11. Nursery and garden industry

The industry has identified key factors that have contributed to increasing the value of greenlife in WA including gardening on television/media promotions, garden design trends, edible gardens, green walls and sustainable gardening and landscapes.

12. Olives

Although linked to scale of operation, all growers need low costs of production to be profitable and to compete with subsidised imports and to be competitive on export markets. The major cost of production is harvesting and while it is hoped some of the new and innovative harvesters being developed will suit small groves as well as larger ones, the fact is that harvesting costs will always be higher on small groves compared to the large ones using mechanical harvesting. The availability and cost of labour in regional areas is prohibitive for hand harvesting and this will restrict table olive operations.

Examples of costs of harvesting are:
- Manual—$1440 per tonne
- Tree shakers—$480/t
- Overhead harvesters—$80/t (excluding capital).

Many recognise that unless industry contributes funding, research on olives will be limited and product promotions will be ad hoc.

The olive industry has established a good relationship with the federal government, particularly through working on the Codex Australia issue for olive oil, and now the Industry Partnership Program.

Water availability will limit expansion. Existing horticulture water licences are under review by the Department of Water (DOW) and the olive industry is seen as a large user of underground water north of Perth. Some large groves have not fully used their allocations as their trees have not matured. They should not have allocations reduced until these groves demonstrate optimum water use and production.

Codex Australia (part of DAFF) and the AOA have lobbied the international Codex Committee on Fats and Oils to change standards and have backed this up with research on oils by the Wagga Research Institute. The amendments to standards are also supported by other non-EU countries such as the US and Argentina.
Appendix 4. Summary of consultation feedback

The following table is a summary of the consultation process.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event and location</th>
<th>Industry invitations</th>
<th>Industry attendance/feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 September</td>
<td>Minister’s launch of Industry Plans</td>
<td>Five representatives of sector were formally invited</td>
<td>Two representatives attended from the sector</td>
</tr>
<tr>
<td>1 September</td>
<td>Email advice sent on where to find the Plan on DAFWA website and feedback process</td>
<td>Sent to 60 representatives of the sector</td>
<td>Website feedback from 6 industry associations, 2 individuals and 3 associations linked to horticulture</td>
</tr>
<tr>
<td>10 September</td>
<td>Horticulture Industry Forum</td>
<td>Written invitation to 32 leaders of 18 industry sector and regional groups</td>
<td>Attendance by 11 delegates representing 8 industry sectors</td>
</tr>
<tr>
<td>10 September</td>
<td>Presentation at Fresh Ideas Conference Centre, Market City</td>
<td>Invitation sent through the Chamber of Fruit and Vegetable Industries</td>
<td>Attendance by Martin Clarke, Mike Donnelly and 4 market agents</td>
</tr>
<tr>
<td>14 September</td>
<td>Presentations at Frank Wise Research Station Kununurra and Kimberley Grande Motel</td>
<td>Invitations forwarded by the Director, Food Industries</td>
<td>Attendance by 11 growers</td>
</tr>
<tr>
<td>18 September</td>
<td>Presentations at DAFWA Bunbury Regional Office</td>
<td>Advertisement in 4 South West regional newspapers</td>
<td>Attendance by 13 industry and government reps and 3 horticultural growers</td>
</tr>
<tr>
<td>21 September</td>
<td>Presentations at DAFWA Albany Regional Office</td>
<td>Advertisement in <em>Albany Advertiser</em></td>
<td>Attendance by 9 industry and government reps and 6 horticultural growers</td>
</tr>
<tr>
<td>24 September</td>
<td>Presentations at DAFWA Geraldton Regional Office</td>
<td>Advertisement in <em>North West Times</em></td>
<td>Attendance by 5 industry and government reps and 1 horticultural grower.</td>
</tr>
<tr>
<td>30 September</td>
<td>Presentations at DAFWA Carnarvon Regional Office</td>
<td>Advertisement in <em>Northern Guardian</em></td>
<td>Attendance by 15 industry and government reps and 13 horticultural growers.</td>
</tr>
<tr>
<td>28 October</td>
<td>Turf Industry Meeting</td>
<td>President and Secretary of Turf Growers Association of WA</td>
<td></td>
</tr>
</tbody>
</table>

Industry feedback

Comprehensive stakeholder engagement is difficult to achieve in an industry that is as complex and diverse as horticulture. Inevitably, there were examples where additional stakeholder consultation would have been desirable to fully engage with all sectors of industry. There was also a misunderstanding among some individuals in the industry on the intent of the Plan and its scope. In particular, there was an expectation that the Plan could have gone further than just setting strategic directions, and should have included significant operational detail. Therefore, much of the feedback provided by industry related to issues of an operational nature that needs to be considered in the future development of the operational plans.

Specific issues raised by respondents that related to strategic directions for the industry or its sectors included:

- the omission of reference to anti-GMO, pro-organic and pro-biodynamic in the Plan
- the importance of marketing in the wine industry
• a perception that there was reduced government support for biosecurity
• some industry bodies were concerned that their industries were not represented
• the absence of budget allocations in the Plan
• the growth target of $3 billion was considered by some to be too optimistic
• the government needs to be more explicit about its expectation of industry investment and the linkages with national RD&E plans.

In response to the feedback received, the following significant changes were made:
• The value-added economic model was reworked to a 2008–09 base with projected growth for all sectors estimated to 2012.
• The floriculture and nursery industry section was separated into cut flowers and native plants and a new section entitled Nursery and garden industry.
• Changes were made to industry statistics and industry needs for pome and stone fruit industries.
• The avocado industry profile in Appendix 2 was updated with new statistics.
Appendix 5. Value-added contribution of WA horticulture sector

Value-chain models help to quantify the relative contribution of major agricultural industries to state and regional economies. They can also help to identify constraints to and potential for increased value-adding from the research and development activities for agriculture in WA (Islam 1997).

To calculate the value added by an industry, the sectors involved in transforming and moving the product are identified and the value added by each sector is summed to get the final value-added contribution of the industry.

A value-chain model was developed for 10 horticulture industries to avoid undervaluation by ignoring the flow-on benefits.

The ‘Gross Value of Agricultural production’ (GVAP) of these 10 modelled industries represents only 47 per cent of the total GVAP of horticulture (derived from ABS cat. no. 7125). With a farm gate value of $422 million per annum for the modelled industries, the total estimated farm gate value by extrapolation for WA horticultural industries is $898 million. Based on the outcomes outlined in the industry plans, this $898 million will increase to $1085 million in real dollars by 2012.

The total value-added contribution made by these 10 industries is $1206 million and the total contribution of horticulture is estimated to be $2565 million. Based on projected outcomes, the value-added by WA horticulture will increase to $2917 million by 2012.

The following results are for the aggregate of the 10 modelled horticultural industries.

1. **Farm-gate value – $422 million**

Farm-gate value is traditionally defined as the value at the point of production and represents the gross value of production to the grower. In this analysis, because of the structure of the industries, some on-farm transport and packing costs have been included. Figure A14 shows the various shares of farm-gate value for different industries. Wine has the largest share at $83 million followed by carrots ($53 million).

![Figure A14 Farm-gate value of 10 selected horticultural industries](image-url)
2. The value-added by modelled industries – $1206 million

Value-added is the sum of wages, profits, rents and interest contributed by the industry to the state’s economy. As the product flows through the chain, the value added by the different sectors is identified and summed to calculate the total added by the industry. The 10 modelled industries are adding a value of $1206 million to the economy.

The WA wine industry is the largest contributor adding $473 million to the economy, constituting 40 per cent of the total value added by the modelled horticultural industries (see Figure A15).

![Value-added by 10 modelled industries ($ million)](image)

Figure A15 Value-added by 10 modelled industries ($ million)

**Sectoral contribution in value adding**

A number of sectors are involved and their contribution varies between industries. In general, these sectors are categorised as growers, wholesale, processing, eastern states exports, overseas exports and retail.

Figure A16 shows that the retail sector makes the largest contribution of $416 million (35 per cent) to added value. This is due to the highly domestically focused nature of horticulture.
Plan to Support Horticulture Industry Development 2009–2012

Figure A16 Value-added by different sectors of industry ($ million)

The role of different sectors in adding value to the product is described below.

1. **Growers (farm value-added) – $270 million**

   This is the value added at the production level or growers' contributions to the total value-added. $270 million is added at the farm level which constitutes only 22 per cent of the total.

2. **Processing – $339 million**

   The processing sector is a major contributor (28 per cent) in adding value to the product, second only to the retail sector. Most comes from wine (67 per cent) and potatoes (19 per cent). A considerable amount of processing takes place in the potato industry through the production of French fries and crisps. Minimal processing is done for fruits, mainly grading and packing. Processing of fruit for juice and jam is small and does not contribute significantly to the total.

3. **Wholesale – $84 million**

   Wholesalers adding value through their handling, especially in industries such as wine, table grapes and strawberries. Their value-added contribution is $84 million (7 per cent).

4. **Western Australia – $416 million**

   At the retail level, the largest contribution to value-adding is made by the potato industry ($144 million) followed by wine ($102 million).

5. **Eastern state exports – $79 million**

   Wine accounts for 61 per cent of the total value-added by eastern state sales. Other major contributors are the apple (21 per cent) and cut flower industries (12 per cent).

6. **Overseas exports – $19 million**

   Overseas trade contributes 2 per cent to the total value-added by horticulture but there is potential for expansion. The trade is dominated by the carrot industry. Carrot exports add $8.6 million to the state economy, constituting 46 per cent of the value-added by the total exported commodities modelled, followed by wine (22 per cent).
As explained above, value is added to the product as it moves along the chain from production to consumption. The total value-added by these industries after production (post-farm value added) is $937 million, which is 78 per cent of the total. Hence horticulture has a high ratio of post-farm value added to farm value of 3.48. A comparison of the ratio of post-farm value added to farm value for the different industries is presented in Figure A17.

![Bar chart showing added value in different industries beyond the farm gate](image)

Typically more value is added at the post-farm sector than the farm sector, a reflection of the minimal post-farm processing. The wine industry has the largest ratio of post-farm value added to farm value at 10, followed by potatoes (6.8).

3. **Total value of the 10 modelled industries at point of final sale – $1650 million**

The gross value of these 10 industries is $1650 million, of which $1206 million is the total value added and $444 million is the cost of purchased inputs. The wine industry alone contributes 41 per cent of the gross value of all these industries followed by potatoes at 21 per cent.
Figure A18 Final sale value different industries ($ million)

This final sale value is the sum of the end value at three points of sale—WA domestic, eastern states and overseas exports.

Retail sales

Final domestic sale value is dominated by the value of the product at the WA retail level. It also includes the direct retailing undertaken by growers or at the processing point, for example, table grapes sold from farms in the Swan Valley and wine sold at the cellar door. The total value of WA sales is $1246 million which is 76 per cent of the total final sale value.

The retail sale of wine includes sales through cellar doors, retail stores, bars and restaurants and retail sales of potatoes include retail stores, caterers and fast food outlets and shown in Figure A19.
**Eastern states sales**

This includes the value of the product supplied to eastern states' wholesalers. For the 10 industries modelled it has a total value of $294 million and contributes 18 per cent of the total final sale value (Figure A20).

![Figure A20 Value of eastern states exports for 10 modelled horticultural industries ($ million)](image)

**Overseas exports**

Exports account for approximately 7 per cent of the total sale value and are dominated by the carrot and wine industries (Figure A21).

![Figure A21 Value of overseas exports for 10 modelled horticultural industries ($ million)](image)

**Growth projection**

The value-chain model was used to estimate the economic impact that achieving projected industry outcomes would have on the 10 modelled industries by 2012 (Figure A22). See Appendix 6 for the assumptions underlying the outcomes for each industry and the detailed individual industry results.
Plan to Support Horticulture Industry Development 2009–2012

Figure A22  

Current and project value-added for 10 modelled horticultural industries

Conclusions

The following conclusions can be drawn from the analysis:

- In 2009, the value-added contribution of the 10 modelled commodities is $1206 million and the total value-added contribution of WA horticulture is estimated to be $2565 million.
- The wine industry contributes 40 per cent of the total value added.
- The retail sector contributes $416 million or 34 per cent of the total value added.
- Domestic trade (sale value) is dominated by the wine industry (37 per cent) followed by potatoes (27 per cent) and apples (8 per cent).
- Export trade is dominated by the carrot industry (38 per cent) followed by wine (35 per cent).
- The ratio of post-farm value added to farm value added is high at 3.48 for horticultural industries with wine (10) being the highest contributor, followed by potatoes (8.8).
- By 2012, the projected industry growth will result in the value added by the 10 modelled industries increasing to $1371 million and the value added for all WA horticulture will be $2917 million.
Appendix 6. WA horticulture industries’ value chain projections

1. Wine

A value-chain model for the wine industry was developed to assess the real contribution of the industry to the state’s economy. Different sectors involved in the production, transformation and flow of the product were identified and the values added by each of these sectors calculated. These sectoral contributions were used to estimate the total value added by industry. The projections were developed from industry situational analyses and consultation with industry leaders.

Projection

The model was used to simulate the effects of the following changes to the industry by 2012 and 2020, in current dollar terms and shown in Table A8 and Figure A23.

- A shift in the proportion of commodity to differentiated wine production to 55:45 from the current ratio of 65:35. The longer-term goal is to reach a ratio of 30:70 by 2020.
- An increase in the proportion of differentiated wine sold through cellar door and mail order sales to 17 per cent by 2012 and 18 per cent by 2020.
- An increase in the exports of differentiated wine to 10 per cent of total production by 2012 and 12 per cent by 2020.
- Five per cent reduction in the cost of differentiated wine grape production by 2012 and 10 per cent by 2020.
- No growth in plantings.

Table A8  Projected value added in wine industry by 2012 and 2020

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2012</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm gate value ($m)</td>
<td>83.04</td>
<td>88.48</td>
<td>102.08</td>
</tr>
<tr>
<td>Value-added ($m)</td>
<td>472.73</td>
<td>517.01</td>
<td>642.79</td>
</tr>
<tr>
<td>Value of the industry ($m)</td>
<td>668.31</td>
<td>714.61</td>
<td>848.72</td>
</tr>
</tbody>
</table>

Figure A23  Current and projected value added by 2012 and 2020
• Wine is the largest value-adding industry of all horticultural commodities modelled with a contribution of $473 million which is 39 per cent of the total value added by all the industries.

• Differentiated winemaking is the largest contributor currently at 28 per cent of the total value-added, followed by the retailer (27 per cent).

• One dollar increase in farm value added will increase the flow-on benefits to the state economy by 10 times, making it the highest of all horticultural industries modelled. This is mainly due to the considerable amount of processing that takes place in this industry.

• Gross value of the industry is expected to increase from $668 to $714 million by 2012.

2. Carrot

A value-chain model for the carrot industry was developed to assess its real contribution to the state economy. Different sectors involved in the production, transformation and flow of the product were identified and values added by each sector calculated. These sectoral contributions were used to estimate the total value added by industry. The projections were developed from industry situational analyses and consultation with industry leaders.

Projection

The model was used to simulate the effects of the following changes to the industry by 2012, in current dollar terms and shown in Table A9 and Figure A24.

• Increase in production from 95 000 to 120 000 tonnes.

• Exports expected to increase to 67 per cent of the total from 59 per cent.

Table A9 Projected value added to carrots by 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm gate value ($m)</td>
<td>52.96</td>
<td>64.43</td>
</tr>
<tr>
<td>Value-added ($m)</td>
<td>64.29</td>
<td>75.04</td>
</tr>
<tr>
<td>Value of the industry ($m)</td>
<td>97.78</td>
<td>117.09</td>
</tr>
</tbody>
</table>

Figure A24 Current and projected value added in carrot industry by different sectors

![Current and projected value added in carrot industry by different sectors](image-url)
• Carrots are adding $64 million to the economy and this is expected to increase to $75 million in three years.
• Growers account for 52 per cent of the total value added.
• The gross value of overseas exports is expected to increase from the current $42 million to $59 million in three years.
• $1 increase in farm value-added will increase the flow-on benefits by 0.96 times to the state economy.

3. Strawberry

A value-chain model for the strawberry industry was developed to assess the real contribution of the industry to the state’s economy. Different sectors involved in the production, transformation and flow of the product were identified and values added by each of these sectors calculated. These sectoral contributions were used to estimate the total value-added by industry. The projections were developed from situational analyses and consultation with industry leaders and shown in Table A10 and Figure A25.

The model was used to simulate the effects of the following changes to the industry by 2012, in current dollar terms.
• Increase in the quantity produced by 12 per cent
• Decrease in fertiliser cost by 20 per cent

Table A10 Projected added value for strawberry by 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm gate value ($m)</td>
<td>42.97</td>
<td>48.00</td>
</tr>
<tr>
<td>Value added ($m)</td>
<td>37.98</td>
<td>43.11</td>
</tr>
<tr>
<td>Value of the industry ($m)</td>
<td>62.46</td>
<td>70.32</td>
</tr>
</tbody>
</table>

Figure A25 Value projected to be added by sectors in strawberry industry by 2012

• The strawberry industry is currently adding $38 million to the state’s economy and it is projected to increase to $43 million in five years.
• The farm sector is the largest contributor (57 per cent) to value addition.
4. Potato

A value-chain model for the potato (ware, seed and processing) industry was developed to assess the real contribution of the industry to the state’s economy. Different sectors involved in the production, transformation and flow of the product were identified and values added by each sector calculated. These sectoral contributions were used to estimate the total value added by industry. The projections were developed from industry situational analyses and in consultation with leading players from the industry sectors.

Projection

The model was used to simulate the effects of the following changes to the industry by 2012 and 2016, in current dollar terms, and shown in Table A11 and Figure A26.

- Increase in seed potato production from 13 000 to 19 000 tonnes by 2012 and to 42 000 tonnes by 2016, with most additional production going to export.
- Increase in crisp production from the current 16 400 to 20 100 tonnes, with 50 per cent of additional production sold to eastern states and 50 per cent consumed domestically.
- No change in ware production is expected.

Table A11: Projected added value for potato industry by 2012 and 2016

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2012</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm gate value ($m)</td>
<td>50.94</td>
<td>56.80</td>
<td>77.33</td>
</tr>
<tr>
<td>Value-added ($m)</td>
<td>237.79</td>
<td>249.86</td>
<td>275.97</td>
</tr>
<tr>
<td>Value of the industry ($m)</td>
<td>346.44</td>
<td>364.67</td>
<td>421.01</td>
</tr>
</tbody>
</table>

Figure A26: Value-added by different sectors of potato industry by 2012 and 2016

- The potato industry is currently adding $238 million to the state’s economy. This value is highly sensitive to the ratio of crisp sales in 50 g and 175 g bags. The current assumption is 20 per cent is sold in the smaller bags and 80 per cent as larger bags. If this ratio changes to 40:60, the new value-added figure would be $245 million.
• $1 dollar increase in farm value-added will increase the flow-on benefits by 8.91 times to the state economy, making it the second highest among the 10 modelled commodities. This is mainly due to the considerable amount of processing that takes place.

• The value-added by different sectors handling ware potatoes appears to be stable, as no change in the quantity of production is expected.

• Increased production in the crisp sector is expected to go to overseas and eastern state markets after processing, and hence not affect the WA retail sector.

5. Apple

A value chain model for the apple (Pink Lady™, Granny Smith, Gala and Sundowner®) industry was developed to assess its real contribution to the state’s economy. Different sectors involved in the production, transformation and flow of the product were identified and values added by each sector calculated. These sectoral contributions were used to estimate the total value added by industry. The projections were developed from industry situational analyses and consultation with industry leaders.

Projection

The model was used to simulate the effects by 2012 of the following changes to the industry, in current dollar terms and shown in Table A12 and Figure A27.

• Increase in yield by 5 per cent.

Table A12 Current and projected value of apple industry

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm gate value ($m)</td>
<td>47.54</td>
<td>49.92</td>
</tr>
<tr>
<td>Value added ($m)</td>
<td>111.09</td>
<td>116.92</td>
</tr>
<tr>
<td>Value of the industry ($m)</td>
<td>131.52</td>
<td>138.10</td>
</tr>
</tbody>
</table>

Figure A27 Current and projected value to economy of different sections of apple industry

• The apple industry is adding a value of $111 million.

• A one dollar increase in farm value added will increase the flow-on benefits by 1.98 times to the state’s economy.
6. **Pear and stone fruit**

A value-chain model for pear and stone fruits (peach, nectarine and plum) was developed to assess the real contribution of the industry to the state’s economy. Different sectors involved in the production, transformation and flow of the product were identified and values added by each of these sectors calculated. These sectoral contributions were used to estimate the total value-added by industry. The projections were developed from industry situational analyses and consultation with industry leaders.

**Projection**

The model was used to simulate the effects by 2012 of the following changes to the industry, in current dollar terms and shown in Table A13 and Figure A28.

- Increase in the yield by 5 per cent.

**Table A13 Current and projected value of pear and stone fruit industries by 2012**

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm gate value ($m)</td>
<td>45.22</td>
<td>47.48</td>
</tr>
<tr>
<td>Value-added ($m)</td>
<td>77.54</td>
<td>81.20</td>
</tr>
<tr>
<td>Value of the industry ($m)</td>
<td>92.20</td>
<td>96.81</td>
</tr>
</tbody>
</table>

![Figure A28 Current and projected value of pears and stone fruit sectors by 2012](image)

- The pear and stone fruit industry is adding a value of $78 million. Of the total value added, 48 per cent is added by growers.
- $1 increase in farm value added will increase the flow-on benefits by 1.1 times to the state’s economy.

7. **Table grapes**

A value-chain model for the table grape industry (Red Globe and Crimson Seedless varieties) was developed to assess the real contribution to the state’s economy. Different sectors involved in the production, transformation and flow of the product were identified and values added by each of these sectors calculated. These sectoral contributions were used to estimate the total value added by industry. The projections were derived from historical growth rates in consultation with industry leaders.
Projection

The model was used to simulate the effects by 2012 of the following changes to the industry in current dollar terms and shown in Table A14 and Figure A29.

- Increase in total production of grapes by 19 per cent (this projection is based on the historical rate of growth in production).
- Increase in total export of grapes by 100 per cent.

Table A14  **Current and projected table grape industry value by 2012**

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm gate value ($m)</td>
<td>26.11</td>
<td>31.52</td>
</tr>
<tr>
<td>Value-added ($m)</td>
<td>46.15</td>
<td>55.37</td>
</tr>
<tr>
<td>Value of the industry ($m)</td>
<td>50.06</td>
<td>60.02</td>
</tr>
</tbody>
</table>

![Figure A29 Current and projected added value by table grape industry sectors](image)

- The table grape industry is adding a value of $46 million to the economy and this is expected to increase to $55 million in three years.
- Almost half (48 per cent) of the total value is added by the grower sector.

8. **Citrus**

A value-chain model for the citrus industry (orange, mandarin, lime, lemon and grapefruit) was developed to assess the real contribution of the industry to the state’s economy. Different sectors involved in the production, transformation and flow of the product were identified and values added by each of these sectors calculated. These sectoral contributions were used to estimate the total value added by industry. The projections were developed from industry situational analyses and consultation with industry leaders.

**Projection**

The model was used to simulate the effects of the following changes to the industry by 2012, in current dollar terms and shown in Table A15 and Figure A30.
• An increase in orange production by 50 per cent with additional production equally distributed between domestic and overseas markets. This prediction is based on the increased plantings in the West Gingin and Moora-Dandaragan areas.

• Production of mandarins to increase by 30 per cent with the additional production equally distributed between the domestic and overseas markets.

• Increased production of limes and lemons by 10 and 20 per cent, respectively.

• Grapefruit production to increase by 900 per cent with most additional production going overseas. This prediction is based on the increased production base in the Kununurra region to more than 200 ha.

• Exports of lime and lemon to begin.

<table>
<thead>
<tr>
<th>Table A15</th>
<th>Current and projected value of citrus industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>2009</td>
</tr>
<tr>
<td>Farm gate value ($m)</td>
<td>15.25</td>
</tr>
<tr>
<td>Value-added ($m)</td>
<td>34.85</td>
</tr>
<tr>
<td>Value of the industry ($m)</td>
<td>46.28</td>
</tr>
</tbody>
</table>

Figure A30 Current and projected value for different sectors of citrus industry

• The citrus industry adds $35 million of value to the economy which is projected to increase to $50 million by 2012.

• Overseas exports are expected to increase from less than $1 million to $20 million in three years mainly due to the export of grapefruit.

• $1 increase in farm value-added will increase the flow on benefits by 2.26 times to the state economy.
9. **Avocado**

A value-chain model for the avocado industry was developed to assess the real contribution to the state’s economy. Different sectors involved in the production, transformation and flow of the product were identified and values added by each of these sectors calculated. These sectoral contributions were used to estimate the total value added by industry. The projections were developed from industry situational analyses and historical performance.

**Projection**

The model was used to simulate the effects by 2012 of the following changes to the industry, in current dollar terms and shown in Table A16 and Figure A31.

- Increase in average annual production by 93 per cent.
- Increase in sales to eastern states from 62 to 70 per cent of total production.
- Increase overseas exports from 1.7 to 5 per cent of total production.

**Table A16 Current and projected value of avocado industry by 2012**

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm gate value ($m)</td>
<td>22.75</td>
<td>43.87</td>
</tr>
<tr>
<td>Value-added ($m)</td>
<td>29.73</td>
<td>55.17</td>
</tr>
<tr>
<td>Value of the industry ($m)</td>
<td>39.55</td>
<td>74.22</td>
</tr>
</tbody>
</table>

**Figure A31 Current and projected value of avocado industry sectors by 2012**

- The avocado industry is adding a value of $30 million to the economy currently and this is projected to increase to $55 million by 2012.
- The growers’ sector makes the largest contribution in value adding 59 per cent of the total, and this share is expected to increase to 61 per cent by 2012.
10. Cut flowers

A value-chain model for the cut flower industry was developed to assess the real contribution to the state’s economy. Different sectors involved in the production, transformation and flow of product were identified and values added by each sector calculated. These sectoral contributions were used to estimate the total value added by industry. The projections used in this analysis were developed based on industry change, population growth and consultation with industry leaders.

Projection

The model was used to simulate the effects, by 2012, of the following changes in current dollar terms and shown in Table A17 and Figure A32.

- Average increase of 15 per cent in production and 15 per cent in price of bush-picked natives.
- Average increase of 100 per cent in production and 20 per cent in price of cultivated natives.
- Average increase of 30 per cent in the production of exotic varieties with a 5 per cent increase in price due to quality improvements.
- The percentage exported overseas and to the eastern states to increase and the share to the WA domestic market remain constant.

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm gate value ($m)</td>
<td>35.26</td>
<td>51.30</td>
</tr>
<tr>
<td>Value-added ($m)</td>
<td>94.44</td>
<td>128.88</td>
</tr>
<tr>
<td>Value of the industry ($m)</td>
<td>115.42</td>
<td>158.78</td>
</tr>
</tbody>
</table>

Figure A32 Current and projected value of cut flower industry sectors by 2012
• The cut flower industry adds $94 million to the economy, with the retail sector contributing the largest share (48 per cent) to this value adding.

• 92 per cent of total wild flower production is supplied to overseas or eastern states’ markets.

• $1 increase in farm value-added will increase the flow-on benefits by 2.9 times to the state economy. The high ratio is partly due to the considerable amount of processing activity in the industry.
References


Islam, N 1997, Agriculture and the Western Australian economy: value-added contribution of agricultural commodities, Agriculture Western Australia, South Perth.


Morris, V & Bradby, K 1995, Peel horticultural study, a study into the economic value of the horticultural industry to the Peel Region of Western Australia. A consultant report for the Office of Labour Market Adjustment; Peel region, Peel Development Commission and the Western Australian Department of Agriculture.
