

Horticulture Natural Resource Management Strategy

Managing the environmental agenda for horticulture



Know-how for Horticulture™



Australian Government
Department of Agriculture, Fisheries and Forestry
National Landcare Programme

Part of Horticulture for Tomorrow



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For further information, contact:

Alison Turnbull,
Project Manager, Environment,
Horticulture Australia Ltd,
Level 1, 50 Carrington St,
Sydney, NSW. 2000.
Phone: (02) 8295 2300

A collaborative plan for Australia's horticultural industries

The development of this Strategy has been a partnership between the Australian Government and the horticulture industry, for the benefit of growers of all horticultural commodities, their communities and the consumers of Australian horticultural produce. The result is a collective strategy for Australia's horticultural industries. Its development has been managed, on their behalf, by Horticulture Australia Ltd.

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Managed by:

Alison Turnbull,
Horticulture Australia Ltd.
Sydney, NSW
www.horticulture.com.au



Developed by:

Peter Day,
Peter R Day Resource Strategies Pty Ltd
Blackwood, SA
www.resourcestrats.com.au



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The Industry Leadership Group was one of the first bodies to provide ideas, direction and support, and it reviewed and endorsed the final Strategy. Its members' initial input was followed input by numerous industry bodies, leading industry NRM proponents and HAL members, as well as by individual growers who heard about the Strategy and wanted to contribute. The experience, knowledge and insight thus contributed reflects well upon horticulture.

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Introduction

Faced by numerous business pressures, Natural Resource Management (NRM) may not be the most pressing current issue for horticultural producers, but they know it is critical to their long-term survival. Sustainable approaches to natural resource management must be built into, and underpin, all aspects of property management, and successful businesses must integrate NRM as a standard component of all production and business planning. Growers, and their industries, understand the importance of managing environmental issues well and of communicating their success in doing so.

This Natural Resource Management Strategy enables horticultural industries to deal with environmental matters in the economic and social context in which growers operate. It helps ensure that industry approaches are efficient and effective, and that they are understood, and supported, by external stakeholders (e.g. governments). The Strategy enables horticulture to manage the environmental agenda as it affects the industry's future.

Key conclusions

Key conclusions developed in the course of the consultation and analysis that was part of the Strategy's preparation include:

Sustainable production

- Growers manage sophisticated enterprises that require science-based measures to optimise production and maintain their productive base (i.e. soil, water and nutrient management), and to manage risks and threats (e.g. pests, diseases and weeds) in environmentally sound and cost effective ways. They also want to contribute to the local environment as good neighbours (e.g. regarding noise, dust, light, odours and greenhouse emissions).
- Ongoing research is required to develop and adjust management options for growers that reduce production costs and optimise contributions to the environment (which may be reduced negative impacts and enhanced positive ones). Sustainable horticultural businesses incorporate sustainable management practices.



EXECUTIVE SUMMARY

Capability and action

Ongoing, science-based, effort is required to help build the capacity of growers and industries. Strong, wise leadership is required within industry to ensure appropriate programs are in place to assist growers and to manage the relationships between growers, retailers, markets and government.

- Programs to promote on-farm change need to incorporate several components, at different scales, such as:
 - agreed plans and management targets between industry and relevant NRM bodies;
 - an extension program, e.g. on-farm research, trials and demonstrations, field days and shed talks ('seeing is believing') or training;
 - assistance to change, e.g. access to expert on-farm advice, funding for works or equipment, labour and materials; and
 - industry leadership – project champions or farmer advocates who can talk about practical matters to growers and also let governments and NRM bodies know about the good things growers are doing.
- Some form of framework or 'road map' for grower programs would help focus resources, reduce confusion and improve the prospects of success. Developing a central warehouse (and perhaps common branding – like 'Horticulture for Tomorrow') may help growers and advisers more easily find suitable, reliable information. Through approaches like these there may be scope to enhance cross-industry learning within horticulture and to negotiate standard approaches across State borders with the assistance of the Australian Government.

Environmental health and NRM

- Industry needs to understand how the management of farms and different practices can contribute to changes in the local environment. The movement of chemicals (in the air and water), nutrients and sediments will be of particular priority. In some regions, the interaction between industry and biodiversity (e.g. clearance, fauna population dynamics and environmental flows) will also be important. Mechanisms are needed to promote communication and collaborative planning between industry, catchment managers and environmental regulators. Successful collaboration should result in beneficial programs for growers and good environmental outcomes.
- Industry, governments and regional NRM bodies need to engage more closely, ensuring there is mutual understanding and more effective relationships. Consideration is required of the processes (e.g. targets for change) and structures (e.g. industry NRM co-ordinators) that could contribute to better communication and co-ordination at regional, State and national levels.

EXECUTIVE SUMMARY



Sustainable supply

- Horticultural industries need to continue striving for better, more timely, information on production and the promotion of industry development plans. Industry plans will need to encompass environmental issues such as access to water and land (including urban-encroachment) and to provide a means for industry to engage with local governments and water resource administrators. Programs like the Horticulture Water Initiative will be important in positioning horticulture to retain access to the water resources it needs for production.
- The management of strategic risks like disease and pest incursions, as well as climate change, should be part of the forward thinking that informs industry development goals. Similarly, prospects for growth in northern Australia need consideration in light of potential market demand and production costs.
- Consideration is required of the most suitable industry structures to manage natural resource issues and 'Horticulture for Tomorrow' as it evolves and grows in stature and influence.

Market demand

- The cost of production and quality (especially food safety) will remain critical determinants of market demand. Efficiencies in the use of inputs (e.g. water, fertilisers and chemicals) will help optimise gross margins and returns on assets managed.
- European markets require assurance on some environmental aspects of production. In the future, Australian retailers could require similar assurance, so producers are not disadvantaged by imports that are cheaper due to lower environmental production standards. The introduction of such requirements would require the adoption of environmental assurance measures or, alternatively, other industry plans and strategies, as a precursor.
- Niche markets are likely to remain where grower branding and environmental credentials are valued.
- The Environmental Assurance approach should continue to be developed within horticulture, including mapping out a delivery and adoption pathway within individual industries or regions. Such an approach will help promote sound management practices, provide the environmental credentials required for qualified individuals and position the industry if it wishes to promote a producer-by-producer assessment of produce sold in Australia.
- District or industry level options should also be investigated, both in Australia and as a means of assessing the credentials of imported produce, e.g. life cycle assessments (LCA), producer surveys or industry/regional reports for produce sourced from outside Australia.



EXECUTIVE SUMMARY

Strategy overview

Vision

A profitable horticultural industry based on environmentally sustainable production.

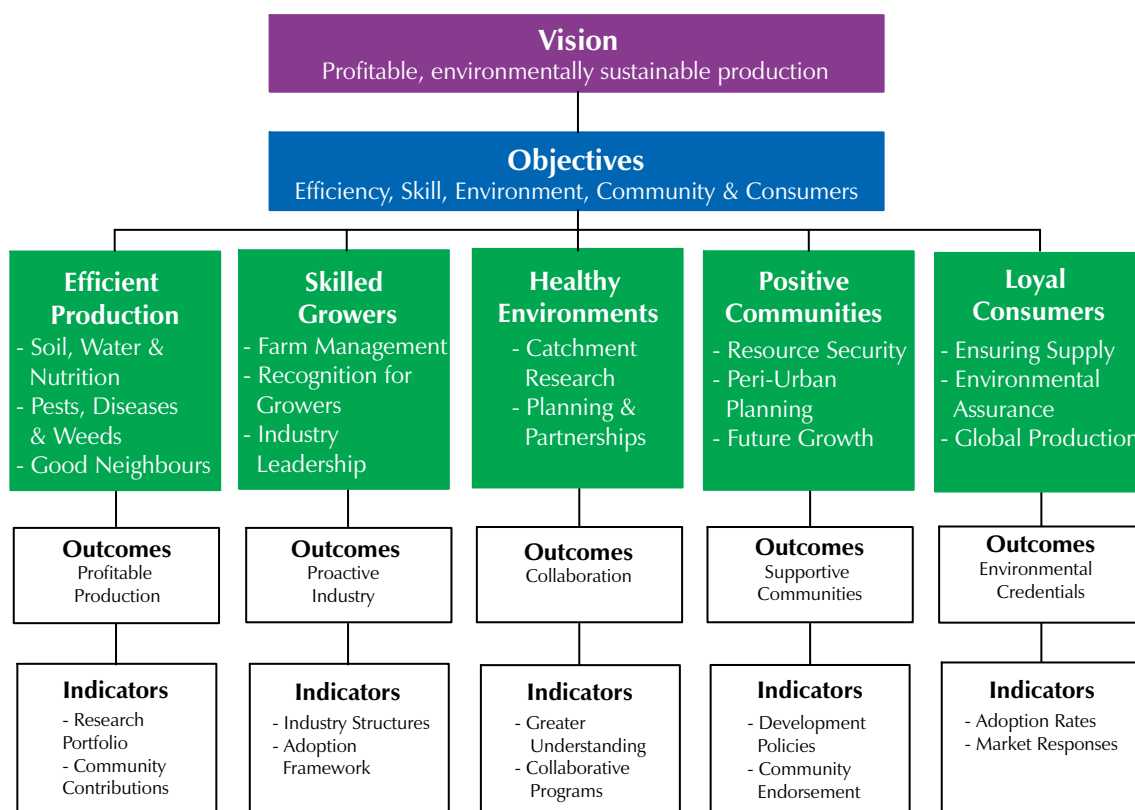
Objectives

- 1 Efficient Production:** Advancing efficient and sustainable production systems for profitable and environmentally sound produce.
- 2 Skilled Growers:** Building the capacity and confidence of growers to understand and manage sustainable production systems and environmental issues.

3 Healthy Environments: Planning environmentally healthy and productive regions through joint programs that engage industries and resource management agencies at all levels.

4 Positive Communities: Providing positive business environments for growers through informed planning and policies to help growers invest wisely and add value to regions and communities.

5 Loyal Consumers: Maintaining ongoing consumer demand for Australian produce with informed purchasers, confident in the availability and quality of produce, and the farming systems that grow it.



EXECUTIVE SUMMARY



OBJECTIVE 1: EFFICIENT PRODUCTION

Strategy 1.1: Soil, water and nutrients R&D – efficient use and resource protection.

Strategy 1.2: Pests, disease and weeds R&D – effective, environmentally sound, pest and disease control.

Strategy 1.3: Good neighbour R&D – good relations with nearby residents.



OBJECTIVE 2: SKILLED GROWERS

Strategy 2.1: Farm management program – excellence in extension and capacity building programs.

Strategy 2.2: Recognition for growers – recognition and reward for environmentally sound growers.

Strategy 2.3: Industry leadership – appropriate structures and processes to lead industry NRM programs.



OBJECTIVE 3: HEALTHY ENVIRONMENTS

Strategy 3.1: Catchment research – solid understanding of the interactions between farms and catchments.

Strategy 3.2: Planning and partnerships – strong relationships between industries and regional NRM groups.



OBJECTIVE 4: POSITIVE COMMUNITIES:

Strategy 4.1: Resource security – ongoing access to suitable land and water resources.

Strategy 4.2: Peri-urban planning – land development controls to support dynamic horticultural enterprises.

Strategy 4.3: Future growth options – sound information for new and expanding businesses and industries.



OBJECTIVE 5: LOYAL CONSUMERS

Strategy 5.1: Ensuring supply – confidence in regions and industries to maintain the supply of quality produce.

Strategy 5.2: Environmental assurance – confidence in the environmental credentials of Australian produce.

Strategy 5.3: Global production – understanding the environmental issues with overseas production and markets.

Timeframe

This strategy is for a five-year term. As it is the first of its type for horticulture, it should be reviewed annually and thoroughly revised after three years.



BACKGROUND

Introduction

Natural Resource Management (NRM) is the way in which resources like soil, water and vegetation are managed. It is fundamental to sustainable agricultural production. It is also sound business practice to ensure the resources we depend on for production are used efficiently and are in optimal condition. A commercial business approach to risk management requires that future operations are free from potentially adverse environmental consequences. This need is strengthened by the trend in Australia to set targets for regional environmental outcomes – and an expectation that industry will do its bit to help achieve them. Many growers also accept a ‘duty of care’ to protect and enhance the environment – leaving their land in good shape for the next generation.

Industry and individual growers are working in conjunction with, and with help from, numerous other stakeholders such as Governments (federal, state and local

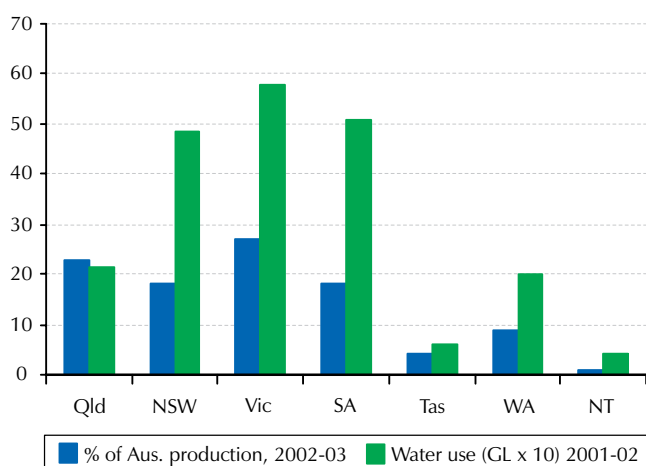
politicians, and NRM, agriculture, EPA, water and environment agencies), regional or catchment NRM bodies, communities (consumer and regional) and markets (global, supermarkets, consumers).

Australia’s horticulture growers are represented by various peak industry bodies. These organisations represent the interests of their growers and the development of their respective industries, and use Horticulture Australia Ltd (HAL) for their collective good. HAL is a not-for-profit, industry-owned, marketing and research company in which the Australian Government is also a significant investor. It aims, among other things, to ‘improve production efficiency and sustainability in response to market needs’.

Currently, 34 industry bodies are members of HAL, and it works with more than 40 horticultural industries. Through HAL, industries are able to access matching Australian Government funding for research and development activities. Horticultural industries are also active through the Horticulture Australia Council (HAC), which represents the views of the industries and its industry member bodies. HAC takes a lead on policy issues and representation for horticulture.

A Horticulture Natural Resources Management Strategy will help map out and co-ordinate the wide range of NRM related activities under way within horticulture. This Strategy provides a framework for a comprehensive and balanced set of activities across horticultural industries, at industry, catchment and farm levels.

The Horticulture Natural Resources Management Strategy will help HAL, its industry members and HAC, and will be a blueprint for their individual and collaborative actions.



Horticultural production and water use. ‘Horticulture’ includes fruit, nuts, vegetables, nursery and grapes. Source: Bureau of Transport and Regional Economics (2005).



Natural resource management (NRM)

Faced with numerous business pressures, natural resource management (NRM) may not be the most pressing current issue for horticultural producers, but they know it is critical to their long-term survival. Sustainable approaches to NRM must be built into, and underpin, all aspects of property management. Successful businesses must integrate NRM as a standard component of all production and business planning. Growers, and their industries, understand the importance of managing environmental issues well and of communicating their successes.

This Natural Resource Management Strategy enables horticultural industries to deal with environmental matters in the economic and social context in which growers operate. It helps ensure that industry approaches are efficient and effective and that they are understood, and supported, by external stakeholders (e.g. governments). The strategy enables horticulture to manage the environmental agenda as it affects the industry's future.

Why is NRM important?

Natural resources, such as soil and water, are a foundation of horticultural production. Growers need access to suitable natural resources, their future operations rely on maintaining the health and productivity of those resources, and communities (and governments) insist that production does not negatively impact on surrounding environments.

The issues to be considered by a Horticulture NRM Strategy include:

- global matters such as greenhouse and climate change, and market access;
- national issues such as the COAG Water Reforms and food safety;
- State or regional concerns such as environmental regulations affecting water allocations or native vegetation management; and
- local or property level management issues such as pest and disease control, nutrients and soil health.

For a broader list of issues, see Appendix 1 and over page.



BACKGROUND

Why have a Horticulture NRM Strategy?

The Australian horticulture industry is diverse in terms of the commodities grown, the regions, climates and landscapes involved, and the people who make it their livelihood.

Individually, growers and commodity groups will have limited capacity to influence matters outside of their direct operations. Collectively, they make a powerful force that is rich in experience and understanding. Bodies such as Horticulture Australia Ltd and the Horticulture Australia Council are well placed to capitalise on that collective power and influence.

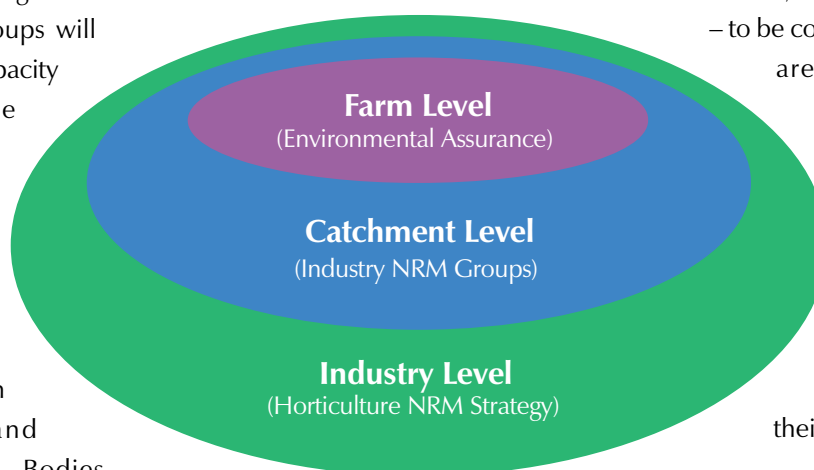
Many natural resource issues are generic across commodities and regions, although always with aspects that are unique to local situations. Collaboration to share experiences and learning is an effective means to avoid 're-inventing the wheel'. The complexity of NRM issues and of government, community, and even industry, programs in response can be bewildering. It provides plenty of scope for duplication, for misplaced emphasis, and for strategic opportunities to be missed.

A horticulture-wide strategy will ensure a comprehensive and balanced approach to environmental issues and co-ordination will develop synergies as individual initiatives

work together for greater effect. It will also provide a clear framework for future activities (especially by individual commodities or regions) and will enable interested external stakeholders (e.g. governments and regional NRM bodies) to understand and support those activities.

Sound environmental management relies on the actions of thousands of individual growers. This strategy will help growers – and, on their behalf, industry leaders

– to be confident that they are managing the environmental agenda as it affects their operations. It will help to continually improve the sustainability of their businesses.



How does the NRM strategy fit?

To be effective, horticultural industries need to be active at different levels and to work with a wide range of stakeholders.

The Horticulture NRM Strategy is an industry-wide initiative operating at the national level. It fits with other activities under the umbrella of 'Horticulture for Tomorrow' and provides a blue-print for future activities. Examples of other activities include the related Industry NRM Groups (operating at a catchment level to bridge the gap between industry and regional NRM bodies) and the development of Environmental Assurance Guidelines that are designed to operate at the grower level. See Appendix 2 for more information.



What are the critical issues?

There are a number of compelling issues and forces that highlight the need for a Horticulture NRM Strategy. They include:

- **Water:** Access to, and efficient use of, suitable quality and quantities of water – and ensuring local water resources are not adversely affected by operations (e.g. insufficient environmental flow or contamination by chemicals, nutrients or sediments).
- **Soil:** Maintaining the physical, chemical and biological properties of soil to ensure they are fertile and productive (e.g. managing acidity, sodicity, organic carbon, root diseases, fertilisers, water-holding capacity and soil structure) and that soils are not lost through erosion or are causing off-site effects such as dust, sedimentation or nutrient pollution.
- **Air:** Ensuring operations do not unduly disturb neighbours (e.g. noise, spray-drift, and odours) and minimise the generation of greenhouse gases (e.g. energy use, cultivation and fertiliser management).
- **Native biodiversity:** Minimising any negative impacts on native biodiversity (e.g. as a result of vegetation clearance), managing production losses from native animals (e.g. birds and fruit bats) and optimising contributions to the local environment (e.g. using native plants for integrated pest control and as wind-breaks and buffers, or establishing nesting boxes in wetlands).
- **Biosecurity.** Ensuring pests, diseases and weeds are not introduced to, or escape from, horticultural properties (e.g. using integrated pest and disease management to reduce reliance on chemicals, and vetting the introduction of new plant varieties).
- **Changing and use:** Contributing to land development policies and controls to ensure growers are able to continue operations, the introduction of new technologies and the development of additional lands.
- **Capacity building:** Ensuring growers and industries have sufficient understanding and adequate resources (including community support, links to Regional NRM Bodies and government funding when appropriate) to manage environmental issues within a commercial production context.
- **NRM planning:** Ensuring industry leaders are involved in, and contribute to, regional NRM planning and programs.
- **Sustainable business operations:** Maintaining the productive base (healthy soils and water supplies) is a primary requirement for a successful horticultural enterprise. Using inputs efficiently (e.g. water, nutrients and chemicals) can optimise gross margins and reduce risks to the environment. Modern horticultural enterprises are significant investments; their operations can't afford to be undermined by a declining resource base or the risk of prosecution for environmental breaches.



BACKGROUND

The strategy in context

- **Government and community support:** Primary producers are the principal managers of significant natural resources. Governments and communities expect primary industries to manage those resources in a sustainable manner. Industries that are aware of these issues, accept that responsibility and demonstrate their credentials will be better placed to develop supportive relationships with communities and governments instead of responding to imposed policy agendas.
- **Market confidence:** Consumers rightly expect all food produce to be safe for their consumption and not contaminated with harmful chemical residues, etc. Some (albeit small at present) market segments are also showing a desire to be confident that the systems behind the horticultural products are similarly safe for the environment. Having, and demonstrating, safe and sustainable practices may be of increasing importance to future higher paying markets, or in ensuring imports are of equal status.
- **Pride and satisfaction:** Growers can take great pride in their businesses, their role in meeting community (consumer) requirements for healthy foods and lifestyles, and in their environmental management. There is pride in continually improving the physical attributes of their properties (e.g. 'leaving it in good heart for the children') and in doing their bit, as members of a local community, to improve the environment enjoyed by their families and neighbours.

The way natural resources are managed is critically important to the continued operations of growers and industries. It may not be the most pressing immediate issue, but it cannot be ignored. It is best dealt with proactively and strategically as an integral part of business planning and operations.

The Horticulture NRM Strategy shows that the industry is aware of environmental issues, accepts its responsibilities, has been and continues to be active in addressing them, and has a clear and effective plan to continually improve its performance. The plan operates at a whole-of-industry level and provides a framework to support, stimulate and promote activities by individual commodities and regions. It also serves as a vehicle for communication with governments and communities about how they can assist industries and growers.

The Strategy presents challenges to industry. The Strategy's development would not have been possible if horticultural industries did not have considerable understanding and experience, and a keen desire to collaborate and share ideas and experiences. The challenge is to maintain, and enhance, those approaches and to continue building on horticulture's strong natural resource management foundations.

This Strategy is not a start, nor even a new beginning. It is another flagstone in the industry's path to a profitable and sustainable future. It provides an opportunity to reflect on the journey so far, to re-group and to stride confidently forward as part of 'Horticulture for Tomorrow'.

INDUSTRY OVERVIEW



Horticulture is a diverse commodity grouping, including numerous vegetable, fruit, nut and nursery industries. Nearly 70 lines of production are recognised, with a gross value of production estimated at \$6-8 billion a year, ranking third in terms of agricultural commodities, behind grain and livestock production (HAL, 2003).

More than 80% of the profit in Australian agriculture (including all horticulture, cropping and grazing enterprises) comes from less than 1% of the area used. Irrigated production generates more than 50% of all profits. Horticulture is a major contributor to that situation, maximising returns and production through the efficient, intensive management of relatively small areas (NLWRA, 2002).

Most horticultural production comes from Queensland, NSW, Victoria and South Australia. All States rely, to some extent, on irrigation; NSW, Victoria and SA are the biggest users.

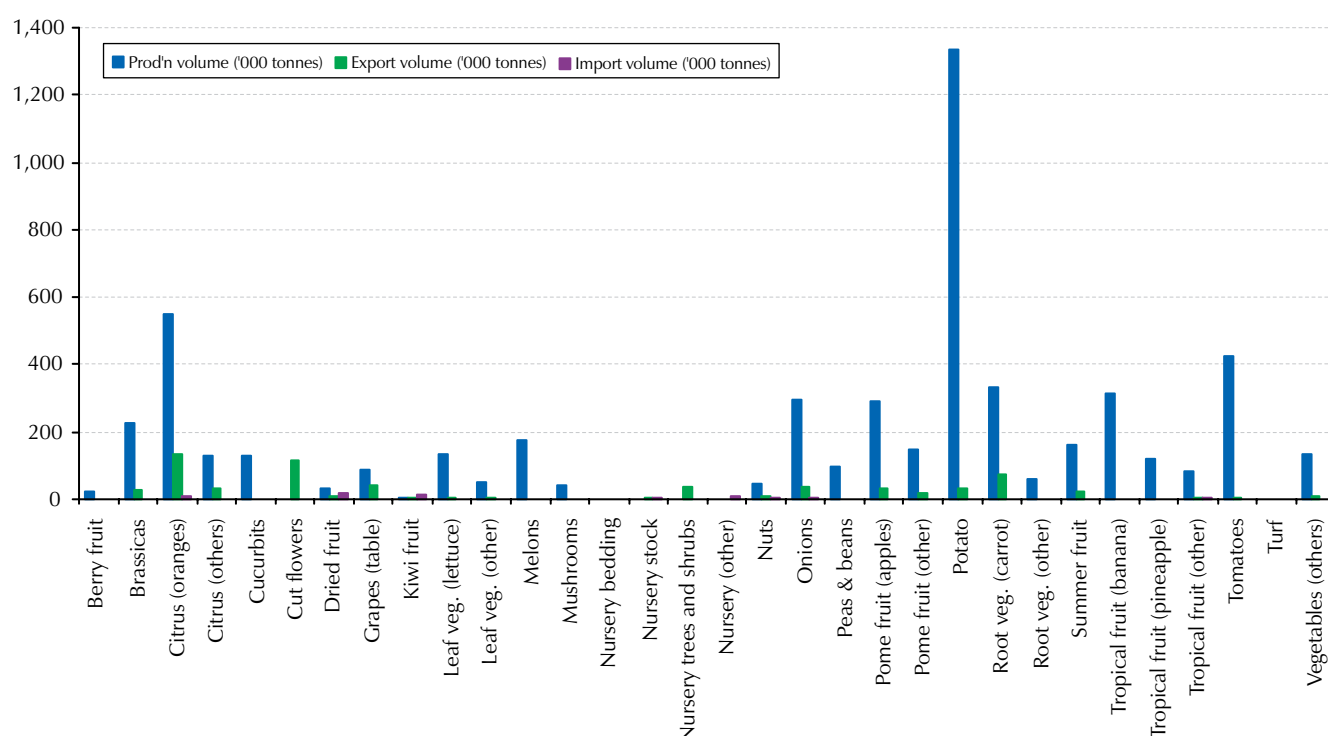
Australia is blessed to be virtually self-sufficient in safe, reasonably priced horticultural produce.

The nursery industry (including bulbs, bedding and indoor plants, propagation stock, trees and shrubs, and turf) provides stock for fruit and nut industries and greenery that is so significant in our lives for parks, playing fields, our own gardens, office greenery or plants for revegetation programs.

Since Great Britain entered the Common Market in the early 1970s, most Australian horticultural industries have become more reliant on the Australian market rather than exports and there have been few imports.

Over the past decade or so, there has been a significant increase in horticultural output – increasing the value of production by more than 20% in five years (HAL, 2003). A greater diversity of crops is grown to meet changing health, taste and lifestyle needs, and to support increasing exports. Some attention is also being given to the nutraceutical and pharmaceutical value of produce.

Volume of horticulture production, 2002/03 ('000 tonnes).
Sources: HAL (2004) 'The Australian Horticulture Statistics Handbook' & NGIA (2004) 'Nursery & Garden Industry Size & Structure'.



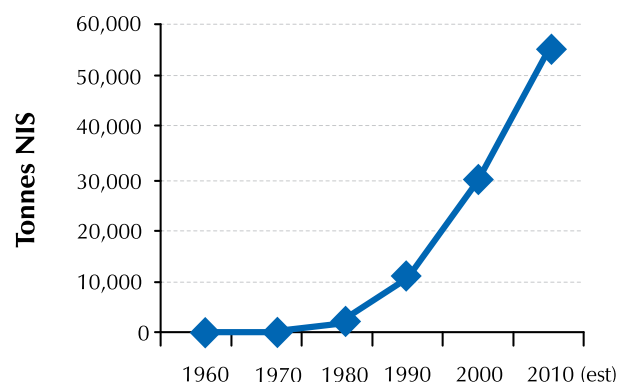


INDUSTRY OVERVIEW

CASE STUDY – MACADAMIA

The growth in production of 'Australia's nut' is continuing rapidly, supported by an industry philosophy that it must help sell the world's macadamia production in order to maintain the price for Australian nuts.

Australia is the predominant supplier to global markets, but also one of the highest cost producers. If demand drops behind global supply, low-cost producers will weather lower prices better than Australian growers.



Australian macadamia production (tonnes, nut in shell). Source: Australian Macadamia Society

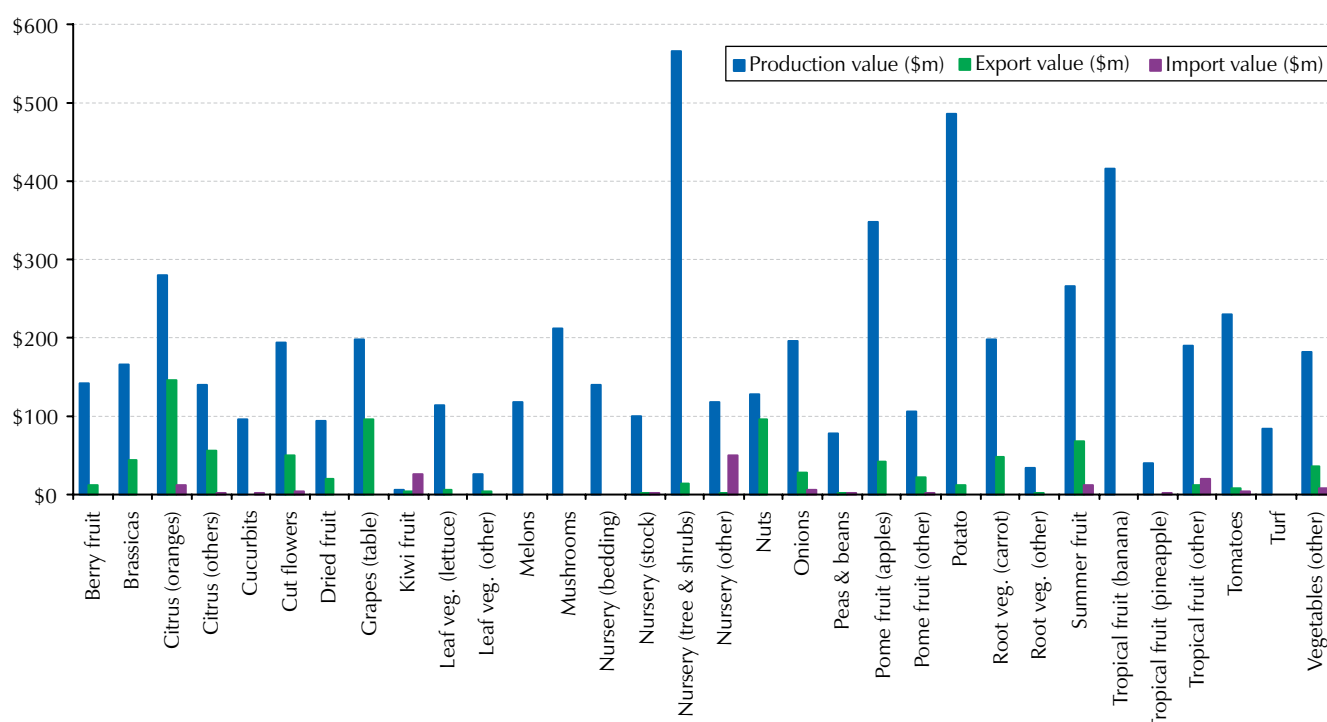
Around \$0.8 billion of produce is now exported (a 65% increase in seven years), with the bulk going to Asia. Citrus is a big exporter with 20-25% of produce sold overseas, as are dried vine fruits, asparagus (45% of production), summer fruits (e.g. peaches and apricots), brassicas (15%) and some nuts (e.g. 75% of macadamias).

Exports often represent a higher percentage of the value of production than of volume, indicating a price premium for export quality.

The 2002/03 production charts provide more information.

The volume of recorded imports has generally not been large. In 2002/03, produce worth less than \$0.2 billion was imported. Kiwi fruit is one of the few industries where Australian consumption relies heavily on imports.

Value of horticulture production, 2002/03 (\$ million). Sources: HAL (2004) 'The Australian Horticulture Statistics Handbook' & NGIA (2004) 'Nursery & Garden Industry Size & Structure'



INDUSTRY OVERVIEW



Some industries, e.g. oranges, can face significant seasonal variations in Australian demand, based on the availability and price of imported alternatives to local supply. Although small, imports are understood to have risen significantly in recent years. In some commodities (e.g. potatoes), imports may contribute to consequent local oversupply. Growers who, in the past, may have seen their neighbours or other horticultural industries as competitors are now learning about competition from low-cost imported produce.

There are often quarantine threats (i.e. pests and diseases) associated with imports and even minor quantities can be critical in determining the price Australian distributors will pay for Australian produce. Depending on the country of origin, production (and therefore price) may

be subsidised and there may be questions about the environmental sustainability of production.

Some imported produce may also be of poor quality by the time it is delivered to Australian consumers. Local growers are concerned about the negative overall impact on demand if consumers have unsatisfactory experiences with their commodity.

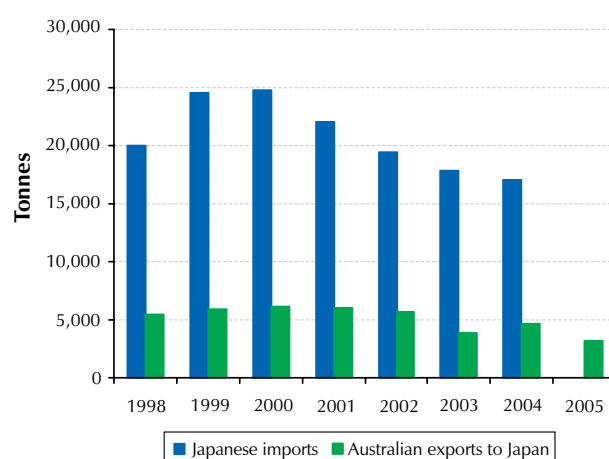
These import and export trends, together with dynamic seasonal differences in production, contribute to volatility in some industries and to quite rapid changes. Examples can be seen in the rapid, export-driven, growth of macadamia production and the contraction of the Australian asparagus industry (see case studies).

CASE STUDY – ASPARAGUS

The Australian asparagus industry grew significantly from the early 1980s (with the advent of improved air-freight) in response to, and with guidance by, Japanese markets who took the bulk of exports. Demand was reasonably strong and Australia was able to supply produce outside of the typical Japanese growing season.

However, since a peak in 2000, Australian exports have dropped away considerably and many growers (and some whole regions) have ceased to produce asparagus. The drop in profitable demand was associated with a drop in demand (Japanese consumption is estimated to have fallen by around 25% since 2000), a rising Australian dollar, and increased low-cost production from South America, which could also provide out-of-season asparagus. Attractive export prices also attracted an increasing number of producers within Australia, increasing supply.

There has been a slow increase in Australian consumption of asparagus to help offset the drop in export demand and local use is now approximately equivalent to export. However, prices in the domestic market are lower than for exports. Prices have fallen from an average of around \$1.80/kg (field weight) to about \$0.80, with harvest costs alone of \$0.60-\$0.65/kg. Industry sources expect the trend of declining Australian asparagus production to continue – possibly dropping a further 30% in the next few years.



The Japanese asparagus market. Source: Momack Produce. NB Japanese imports rose in 2004 following severe typhoon damage to local production that year. The 2005 export figure (3,159 tonnes) is an estimate – a drop of nearly 50% from 6,086 tonnes in 2000.

The examples highlight the paramount need to contain production costs. When developing solutions to environmental challenges there is merit in searching for measures that will also lower input or maintenance costs. The examples also highlight the importance of industry production data.



INDUSTRY OVERVIEW

Historically, horticultural industries consisted of numerous small holdings, often strategically close to major urban markets. Those patterns still persist but there are other trends (e.g. consolidation) at work as well.

In many industries, the few biggest producers account for the majority of all produce (e.g. in the mushroom industry, five businesses produce 60% of the national crop; 60% of the volume of processed tomatoes comes from 15% of growers). There has been a move from ‘market gardening’ (small-scale enterprises) to ‘vegetable farming’ (much larger enterprises). With this shift, there is also more prospect for corporations and, in some situations, increased leasing (rather than ownership) of land and water.

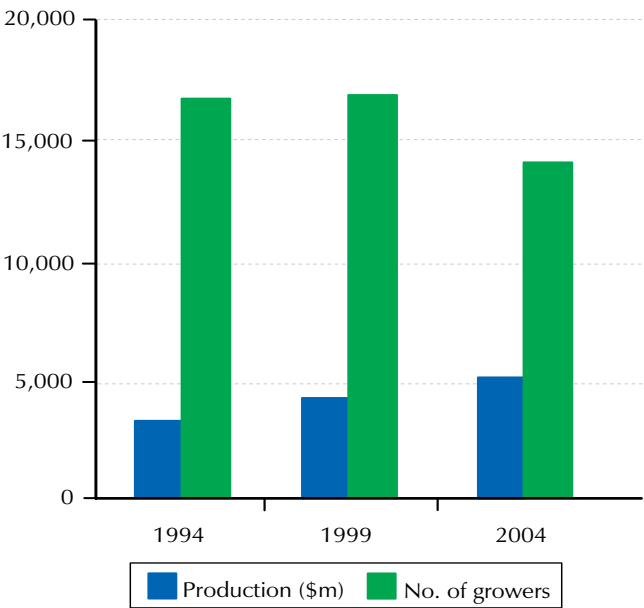
Consolidation has also occurred in sales. Many lines of fruit, nuts and vegetables are now sold predominantly through supermarkets, where the major companies dominate sales. An estimated 55% of fruit and vegetables are sold via the major two supermarket chains, Coles

and Woolworths. For vegetables alone, around 70% is sold fresh, with more than 80% of that produce moving through supermarket chains.

In the nursery industry, 35% of product is sold direct to landscapers and property developers (a growing market segment), with 16% via retail nurseries, 16% via garden supplies and 13% through hardware stores. Little import or export occurs due, in part, to the phytosanitary requirements associated with the organic mediums in which live plants are grown.

Horticultural industries are spread throughout Australia. Some of the 70 product lines are grown in a wide variety of locations; the production of others is geographically concentrated in areas of optimal climate, soils or water availability. As ‘value chains’ are shortened, there can be significant regional value-adding through packing and processing, adding to the considerable economic value horticulture generates to the regions in which it is predominant.

The geographic and climatic diversity of production is matched by the diversity industries face in terms of the administration of environmental matters. Any commodity may have to deal with legislation in a number of States covering factors from water allocations, to chemical use, to noise generation, to native vegetation management. The regional arrangements and approaches to resource management and planning are even more diverse, and there is a wide spread in the capacity of local bodies to engage with industry. This range of policy and administrative environments is a challenge horticultural industries must accommodate.



Australian horticultural production and grower numbers. Source: Australian Bureau of Statistics (2005).



Horticultural growers and industries must manage environmental issues at a range of scales

Sustainable production

Growers face numerous challenges in maintaining the productive capacity of their properties, constraining production costs and meeting their environmental obligations – while running a profitable business. Most also have a strong affinity for their land and local community and want to do the ‘right thing’ to enhance them.

Their productive base relies on the sustainable management of soil, water, nutrients and (in some cases) biocides. Soil erosion is a risk in many horticultural areas if soils are left without adequate cover, and acidity, sodicity and the loss of soil structure, etc, can result from inappropriate management. Matching fertiliser applications with plant needs and existing availability, and timing and managing the application will optimise production per unit cost as well as reducing the risk of losses of nutrients to the environment. Similarly, sound irrigation scheduling and management will optimise the value of water resources and reduce the prospect of induced salinity. For hydroponic producers, the issues of efficiency in nutrient use are similar and the issue of losses to the environment is focused on the disposal of used water.

Conclusions

Sustainable horticultural businesses incorporate sustainable management practices.

Growers manage sophisticated enterprises that require science-based measures to optimise production and maintain their productive base (i.e. soil, water and nutrient management), to manage risks and threats (e.g. pests, diseases and weeds) in environmentally sound and cost effective ways. They also contribute to the local environment as good neighbours (e.g. regarding noise, dust, light, odours and greenhouse emissions).

Research and development is required to establish and advise sustainable farming systems and practices.



NRM ISSUES FOR HORTICULTURE

CASE STUDY – NUTRIENT AND SOIL MANAGEMENT

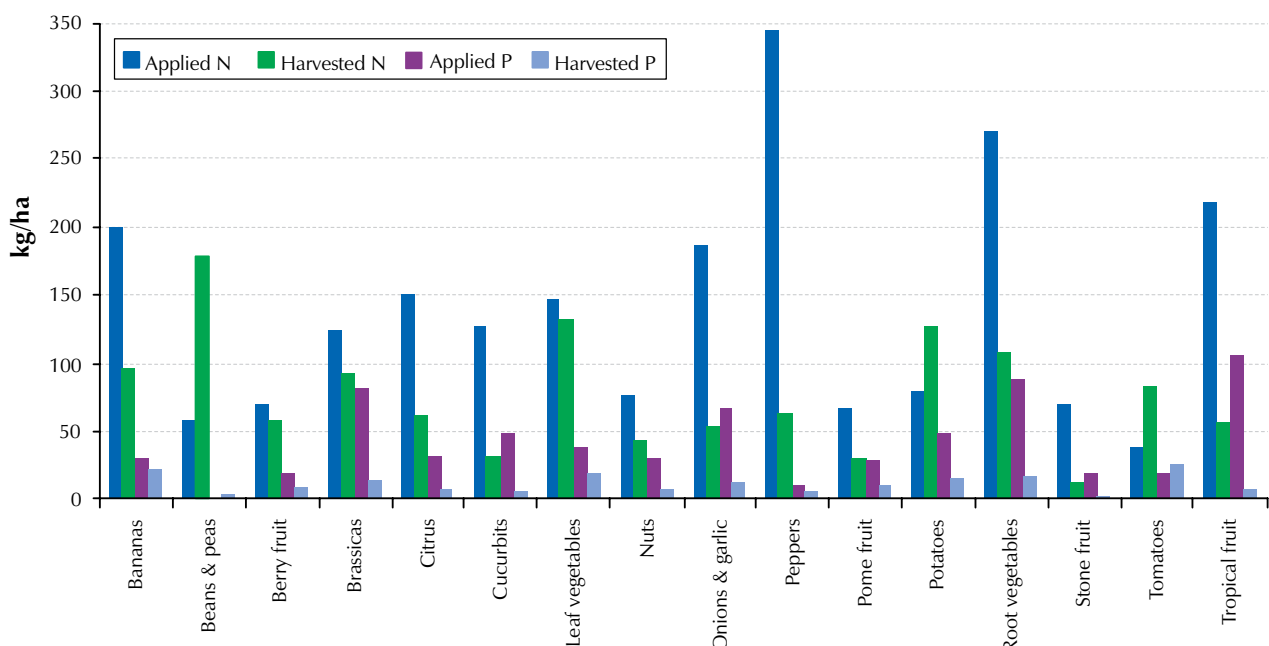
High rates of fertiliser are applied to many crops to drive high production levels, but unless the nutrients are efficiently converted to produce there is a risk of leakage to the environment. As an example, high rates of nitrogen application can result in potentially high rates of loss via emissions of the greenhouse gas nitrous oxide, (especially in acidic and / or cultivated soils), or leaching of nitrate (Dalal et al, 2003). The accompanying graph shows the difference between nutrient application and harvest rates for some crops. Individual grower practices may vary from these averages, and a difference between application and harvest does not mean the 'gap' is lost – it may be locked up in plants or soils etc. However, it does illustrate the potential for losses to occur. Continually harvesting produce and applying acidifying forms of N (e.g. urea) can also promote the acidification of soils. In its *Australians and Natural Resource Management 2002* report the Audit concluded that acidity and sodicity were reducing the potential profitability of several horticultural industries (as measured by the 'yield gap' – the difference between actual and potential yield). Threats to production come in the form of pests, diseases and weeds – and extreme weather events. Integrated Pest and Disease Management (IPDM) reduces the amount of chemical used (and the potential for resistance to be established) and can be beneficial to local biodiversity.

	% of land used with constrained yield		Yield gap (as a % of profit at full equity)	
	Acidity	Sodicity	Acidity	Sodicity
Fruit	44.4	32.1	58.0	10.5
Vegetables	59.3	32.0	57.2	8.8
Tree Nuts	55.7	13.4	17.2	5.5

Source : Australians and Natural Resource Management 2002, NLWRA

IPDM relies on using a number of different approaches in collaboration to reduce the reliance on any single measure – although spraying may still be necessary, e.g. when large numbers of insects descend over-night courtesy of winds that bring them from hundreds of miles away. The philosophy of using several integrated measures can be applied to sensitive matters like managing native animals that present as pests to production (e.g. parrots and fruit bats) as well as to insect pests and diseases.

Nutrient application and harvest rates. Source: 'Horticulture Productivity & Sustainability' 2001. HRDC & NLWRA. The data are derived from grower surveys, agency gross margin models and the Fertiliser Industry Federation of Australia.



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CASE STUDY – INTEGRATED PEST AND DISEASE MANAGEMENT

Integrated Pest and Disease Management can involve a variety of measures that are adopted before chemicals are applied to manage pests. It can include putting in plants that attract beneficial insects; releasing and maintaining beneficial insects/parasites in sufficient numbers to bring a pest under control; using pheromones to attract and trap pests (or disrupt mating); putting in wind breaks; erecting netting; and removing or incorporating crop waste as soon as possible after harvest (Brad Wells, HAL Fact Sheet).

IPDM reduces risks of pest resistance, residues, Occupational Health & Safety issues and environmental impact or contamination, as well as containing what can be a significant production cost.

A recent project in the Northern Adelaide Plains horticultural region, 'Revegetation by Design', was supported by Horticulture Australia Ltd (along with several other investors under the Australian Government's 'Stronger Regions' program) and showed that:

- Key pests of horticultural plants are rarely present on several species of vegetation native to the region, even when planted adjacent to infested plants (Schellhorn and Wood 2004).
- There was a high diversity of beneficial insects on native plants (Stephens et al 2005 in press).
- Insect predators and parasitoids of key horticulture pests were found on a range of native plants and quickly colonised young replanted native vegetation.
- Several of the native plants produced products such as cut flowers, bush tucker (e.g. Muntries, wattle seeds) and seed for the revegetation industry (priced at \$40-\$240/kg), and thus generated additional income for the farm.
- The native plants replaced weedy communities that were known to harbour pests and diseases of horticulture (the odds of finding pest thrips on weeds was as high as 12:1, but they were rarely found on native vegetation).
- One of the native plants, *Atriplex suberrecta*, harboured a native insect known to vector disease in tomato, lucerne and grapes, and was not recommended for planting. This confirmed that particular species and groups of species will be more appropriate than native vegetation per say.

Source: Personal communication, Nancy Schellhorn, CSIRO Entomology. Indooroopilly

Horticulturalists in some regions are now also testing collaborative approaches where they act together ('area wide management') to combat pests and diseases, e.g. removing weeds hosting pests. Some work is also commencing in testing native plants as ground cover within perennial plantings. There is also thought about whether measures associated with IPDM could build the resilience of horticultural districts and assist in biosecurity measures by providing resistance to exotic imports. Critical weather events can be important to many crops, either to trigger plant responses or as a threat to production (e.g. chilling or frosts). Irrigation is widely used as a buffer against drought but variable stream flows and salinity, coupled with water trading, present growers with additional seasonal factors to manage in their businesses. Predictions of climate change generally include scenarios of increasing variability between years and more intense episodic events (e.g. storms). Climate variability, and change, may become more important to horticultural producers in coming years. Being able to remain in production can also rely upon maintaining a 'good neighbour policy' with nearby residents. Managing noise (e.g. tractors, trucks and gas-guns), dust, wastes and sprays will be important. At a global scale, a good neighbour policy can result in attention to minimising contributions to greenhouse and striving for energy efficiency.



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Capability and action

Combining sound environmental management with profitable production practices in successful businesses is not straightforward. It requires considerable understanding and knowledge of complex interplays and the ability to develop solutions tailored to the unique situations at hand. Sophisticated science may lie behind what appear to be simple management actions, and the timing of actions may be as important as the activities themselves.

Growers need a range of activities (e.g. field days, training courses or industry meetings) and different materials (e.g. fact sheets, management guidelines, decision support tools and calculators) to help raise awareness, knowledge and understanding of environmental issues and their interplay with production. Support and guidance (e.g. peer groups or 'one-on-one' advisers) can be useful in helping growers trial generic approaches and adapt them to their farming system.

There is, however, confusion and concern among growers about the number of systems and regulations they may be expected to apply. Growers hear about numerous competing EMS programs, ISO certification, Best Management Practices and Farm Management Systems, leaving them uncertain of what is likely and fearful of the potential costs (in time and money). Some also are fearful that grower initiated environmental programs may be converted into enforced regulations.

Conclusions

Ongoing, science-based, effort is required to help build the capacity of growers and industries. Research is the fuel for such processes; and attention is required to continually improve the capacity of growers and their industries. Strong, wise leadership is required within industry to ensure appropriate programs are in place to assist growers and to manage the relationships between growers, retailers, markets and government.

Some form of framework or 'road map' for grower programs would help focus resources, reduce confusion and improve the prospects of success.



Environmental health and NRM

All States have environmental protection legislation that covers various risks that may harm or damage the environment. Regulations may govern odour and noise as well as contaminants. Other State legislation (and national strategies) address issues like weeds or pest plants. Local Governments can also be important in the regulation of environmental health and the management of natural resources (e.g. weeds), although their role varies from State to State.

Governments are also supporting regional approaches to environmental (catchment) management. Through programs like the Natural Heritage Trust (NHT), National Action Plan for Salinity and Water Quality (NAP) and the National Landcare Programme (NLP), the Australian Government is requiring regions to establish targets for future environmental condition (e.g. salinity or sediment loads in streams) and design programs to achieve those outcomes. The programs are recorded in investment strategies that gain government endorsement and consequent funding via the regional NRM bodies.

In many regions there has been a steep learning curve for those involved in preparing the plans and strategies, and industry and growers have not always been sufficiently engaged in their development. Targets may be set for river sediment loads, nutrient levels or chemical detection. Producers will inevitably be at least partly responsible for their achievement but it is difficult to link farm management with these catchment outcomes and to make the targets realistic or practical to growers. A process, 'Targets for Change', has been developed under funding from the National Landcare Programme and is being tested by horticulture to address that need.

Similarly, it is likely that without adequate communication and collaboration between industry and catchment planners the programs funded via the investment strategies may miss their mark and be ineffective. Industry is sometimes confused by the apparent array of disjointed activity and is concerned that programs being promoted by catchment planners may not meet the needs of growers

CASE STUDY – THE NURSERY INDUSTRY

The nursery industry provides an excellent example of the multi-faceted contributions horticultural industries can make in addressing environmental issues. It has an important role to play in minimising the likelihood of new 'weeds' (invasive species) being introduced as garden escapees, provides plants and expertise for rehabilitation and revegetation works, and develops and promotes environmentally sustainable gardening (e.g. low water use – 'water-wise' - and native animal friendly plants and gardens – see www.floraforfauna.com.au for example). The health aspects associated with turfed playing areas and oxygen provision by

plants in cities and offices, and the therapeutic benefits of gardening are other examples of environmental and social contributions from the industry.

The nursery industry is finalising a position paper on water that includes strategies to promote responsible water use by gardeners, the use of plants based on their water requirements, better understanding of the impact of water conservation measures (i.e. water restrictions), industry input to water policy and secure access to water. A similar document is being developed regarding the industry's role in managing invasive species or garden escapees.



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– or be likely to generate the environmental outcomes required.

A wide range of programs is likely to be required to assist industries and growers to play their part in achieving the environmental targets and outcomes aspired to in the catchment plans. They will range from extension and promotion to support and assistance (e.g. expert advice, funds, materials or labour) and may involve group or individual activities. In some cases, e.g. drainage (and its disposal) in irrigation areas, it may be more appropriate to undertake capital works at a district, rather than property, scale. The horticulture industry is well placed to help design NRM programs and to integrate them with production initiatives.

In *Australian Agriculture Assessment, 2001*, the National Land and Water Resources Audit prepared nutrient budgets for the nation's river catchments. It noted positive nitrogen (N) balances (i.e. inputs exceed outputs) in regions where dairying and horticulture were predominant and positive phosphorous (P) balances in the dairying and horticultural regions of Victoria and Tasmania. In *Australia's Natural Resources 1997-2002 and Beyond*, the Audit reported that many catchments in which horticulture occurs exceeded guideline levels for N and P and that increasing nutrient loads to estuaries was a problem 'building up for the longer term'. Sediment loads and turbidity are other features of concern in some horticultural catchments.

The Audit did not include information on chemicals such as weedicides and pesticides in its analysis and more localised information

must be sought to assess their importance to horticulture. CSIRO has tested programs such as the Pesticide Impact Rating Index (PIRI) in the Ord River (and will be used by apple and pear growers in the Adelaide Hills) to assess the pollution potential of different biocides and land uses. More information about PIRI can be found at <http://www.cmis.csiro.au/envir/Research/PesticideRisk/index.htm>. Endocrine disruptors are an emerging issue, with some global evidence appearing that links chemicals like organochlorine pesticides with lower fertility and some cancers (see www.epa.gov/endocrine for more information).

Conclusions

Industry needs to understand how the management of farms and different practices can contribute to changes in the local environment.

The movement of chemicals (in the air and water), nutrients and sediments will be of particular priority. In some regions the interaction between industry and biodiversity (e.g. clearance, fauna population dynamics and environmental flows) will also be important.

Mechanisms are needed to promote communication and collaborative planning between industry, catchment managers and environmental regulators. Successful collaboration should result in beneficial programs for growers and good environmental outcomes.



Sustainable supply

It is difficult to get reliable, up-to-date information on the production of many horticultural commodities – especially for annual crops where growers may change production from year to year. Coupled with seasonal variations (e.g. the incidence of frost) there can be volatility in supply and subsequently prices. Industry Development (and in some cases, Regional Development) Plans seek to generate more clarity and confidence for producers and markets.

Establishing orchards of some commodities is popular with corporate investment companies, where profit may be influenced more by the taxation provisions available to investors than by the normal supply and demand equations governing traditional production businesses. Oversupply can affect existing producers and intensive plantings can drive up the cost of water. Data on developments such as these are important for all producers and their business plans.

Production relies on access to the critical natural resources of water and land. Under the Council of Australian Government's (COAG) water reform policies the trend is to ensure water allocation or water sharing plans are prepared for significant water resources and to provide individuals with rights to water in accord with such plans. Ideally, such rights are transferable. The aim is to ensure that sufficient water is retained for environmental purposes and to maintain the quality of the resource, and to permit water that has been allocated for use to migrate to its 'highest and best use' via market forces. In some cases water may be withdrawn from productive use and re-allocated to the environment, to address previous over-commitment and ensure ongoing use is sustainable.

In many areas there is also a requirement for irrigators to show that they are using water efficiently in order to retain, or gain, access rights and justify their allocations. The development of 'land and water' or 'irrigation

CASE STUDY – THE HORTICULTURE WATER INITIATIVE

The Horticulture Water Initiative is about achieving ongoing access to water by being more proactive in:

- demonstrating the economic and social benefits of horticultural water use;
- demonstrating the environmental credentials of horticulture; and
- investing in projects that will enhance the industry's sustainability.

Its focus for activities includes:

- demonstrating the economic and social contribution made by irrigated horticulture to water policy makers;
- developing and assisting the implementation of management systems that produce more 'crop per drop' and lower environmental risk;
- providing information for drought affected horticulture;

- defining water service levels and security needed for horticulture and ensuring water suppliers account for these; and
- communicating with industry and 'change agents' on water issues and developing programs in response to strategically important needs related to water access.

The past year has seen the preparation of brochures on water trade and risk management and fact sheets summarising relevant information from water conservation and hydroponics research projects for growers. The initiative has also organised meetings between horticultural representatives and the National Water Commission.

More information is available at the Initiative's website (<http://www.rmccg.com.au/HAL1.html>).



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and drainage' management plans may give authorities confidence as well as helping growers design, install and manage efficient and productive irrigation systems. Irrigators in some districts are also developing district-wide monitoring and reporting mechanisms to ensure the resource remains available for them (i.e. is of suitable quantity and quality) and to demonstrate their sustainable use of it.

Horticulture is an efficient user of water and the industry is competitive under COAG water policies. It generates some of the highest returns per Megalitre (ML) of water used. Water is often only a small part (1-2%) of total input costs for fruit and vegetable production.

However, it should be noted that firm data on these matters is often hard to come by. There is generally a lack of consistent industry-wide data (and often different definitions, or groupings, of industries) that presents problems in aggregating data. Furthermore, there is considerable real variability in water use between regions and seasons. Where possible, it best to present a range (rather than just an average) to provide more insight. The following two tables are indicative of the data available for horticulture.

If horticulture is to expand, it may do so in existing irrigation areas by competing for water currently used for other forms of production or it may consider new developments, e.g. in the Ord River (WA) or Northern Territory where significant potential for growth exists – subject to production, marketing, environmental and native title issues being addressed.

Access to land for new horticultural developments is generally not a problem

	Water used (GL)	Returns (\$/ML)	Av. water use – high demand yr (ML/ha)	Av. water use – low demand yr (ML/ha)
FRUIT				
Pome fruit	112	4,040	12	1
Summer fruit	162	1,643	12	1
Bananas	94	440	13	3
Mandarins	35	2,664	10	4
Other fruit	231	1,433	14	4.6
Avocados	25	2,783	18	2.8
Tropical fruit	118	1,558	14.5	1.5
Dried vine fruit	30	3,153	9	4
Kiwi fruit	2	5,782	12	1
Berry fruit	2	66,450	7	0.5
TOTAL	811			
VEGETABLES				
Asparagus	19	3,486	14	4
Beans and peas	100	846	8	2
Brassicas	63	2,630	7	2
Cucurbits	24	3,950	5	2
Leaf vegetables	41	3,379	12	3
Melons	19	6,896	6	1
Onions and garlic	40	4,853	8	4
Peppers	15	4,423	8	4
Potatoes	228	2,132	10	4
Root vegetables	27	8,781	5	1
Sweet corn	42	1,263	14	4
Tomatoes	20	11,780	10	2
TOTAL	638			
NUTS	119	1,079	16	1
NURSERY	28	15,369	16	3

Source : Thompson & Kelliher (2005)

	Water used (GL)	Water used as a % of all irrigation (\$/ML)	Returns (\$/ML)	Av. water use (ML/ha)
Fruit	665	4.4	1,276	7
Vegetables	392	2.6	1,295	3
Tree nuts	140	0.9	507	6

Source : NLWRA 2002 (Data not available for Nursery production)

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for industry. However, as the scale of developments and ancillary activities increases, local governments may look to introduce guidelines to locate developments in sites that optimise their local economic, social and environmental contributions and minimise any adverse impacts. A related issue is the clearance of native vegetation to provide additional land for horticultural production (e.g. the removal of trees to install centre pivot irrigators or perennial plantings). All States now have some form of clearance control to safeguard biodiversity.

A more common land-related problem for horticulture is urban encroachment and the resultant pressure on growers to modify, or cease, management practices that generate noise, dust and other 'nuisances'. Sound local development controls can help reduce the likelihood of subdivisions and the consequent risk of new residents being introduced to unfamiliar activities. In regions undergoing a transition, where horticultural and residential properties co-exist, growers need to be particularly conscious of air, noise, farm chemical and waste management issues and to have ready means of communication with nearby residents to avoid misunderstandings, complaints and the prospect of litigation. Ideally, growers and new neighbours will develop mutually acceptable solutions, but they may need support to do so.

Conclusions

Horticultural industries need to continue striving for better, more timely, information on production and the promotion of industry development plans.

Industry plans will need to encompass environmental issues like access to water and land (including urban-encroachment), and to provide a means for industry to engage with local governments and water resource administrators. Programs such as the Horticulture Water Initiative will be important in positioning horticulture to retain access to the water resources it needs for production.

The management of strategic risks like disease and pest incursions, as well as climate change, should be part of the forward thinking that informs industry development goals. Similarly, prospects for growth in northern Australia need consideration in light of potential market demand and production costs.



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CASE STUDY – PERI-URBAN DEVELOPMENT

Many horticultural industries are located near urban centres for ready transport to markets and distribution nodes. The growth of cities and their encroachment into rural lands poses numerous problems for producers.

New neighbours may be attracted by visions of rural landscapes but unaware of the smells and noises they will find. In some regions (e.g. Yarra Valley) it is now obligatory for new residents to be informed of such matters. Good communication is needed between growers and their neighbours – but special skills and innovative measures can be required as the number of neighbours in rural-living or housing developments can rapidly escalate.

Outcomes-based regulations (with ‘best practice’ as a fall-back) give industry some flexibility to change as technology, etc, does, but the continual complaining from neighbours is an added stress for growers and can result in them having to deal with Environment Protection Agency staff following up complaints – regardless of whether they are frivolous or not. Access to independent experts can be important in dealing with any matters that become litigious. Some industries (e.g. mushrooms) maintain strong links with international researchers and ensure the world’s best are able to contribute to debates within Australia.

Some regions may zone horticultural areas as ‘rural’ to prevent premature subdivision for housing or to maintain a ‘green belt’ around an urban area. Such zones often become a ‘straight-jacket’ for growers. Those wanting to sell and retire or relocate find land prices constrained due to strict subdivision controls, while those wanting to expand find it hard to justify an expensive investment in an area with caveats upon operations and questionable long term viability. ‘Lifestyle’ or ‘rural living’ blocks can also pose a biosecurity risk to producers, harbouring pests and diseases. ‘Rural’ zonings generally do not introduce any policies

directed at making the area a thriving zone for dynamic primary production – rather they tend to concentrate on maintaining a historic rural landscape or retaining options for urban development at a later date.

Grower attitudes to subdivision, etc, can vary depending upon their long-term plans. Those wanting to retire from the area appreciate rising land values, those wanting to stay and grow do not – nor do they want increased numbers of neighbours, etc. Zoning policies need to appreciate that ‘winners and losers’ are likely from any changes and that measures are needed to ensure the beneficiaries in a community help offset any losses suffered by individuals.

Introduced diseases and pests pose a threat to continued supply, and to the profitability and quality of supply. As an example, a recent occurrence of citrus canker near Emerald (Qld) resulted in the removal of 200,000-300,000 trees and losses estimated at \$150 million, including temporary closure of some markets to Australian citrus. Biosecurity measures are a community issue and will remain important to the future of Australian horticulture, as will on-farm programs (such as Integrated Pest and Disease Management) and measures to control potential hosts of pests and disease (e.g. weeds and abandoned horticultural plantings).

In some regions, locally increased populations of native animals (e.g. fruit bats or parrots) can be a problem. Their numbers can rise due to the fruit itself feeding a larger population or urban development reducing their habitat and concentrating them around orchards.

In the longer term, horticultural production may also be affected by climate change and its influence on the incidence of events like frosts and cold spells required to break dormancy, as well as on rainfall and storms. There is little understanding what such impacts could be or of the genetic modifications that could help alleviate them.



Market demand

The major supermarket chains are the prime avenue to market for most Australian fresh produce. They are involved in international food industry programs (e.g. the Global Food Safety Initiative – a mutual recognition scheme to benchmark food safety and farm assurance standards) and give considerable attention to managing supplies. The tendency is to fewer, larger, direct suppliers (who may co-ordinate produce from other suppliers) and to the use of standard bar-coded crates for delivery (rather than grower-branded packaging). Certified suppliers must comply with nominated food safety standards. These standards may include some environmental measures, such as chemical storage, where the measure is both an environmental and food safety hazard.

Australia's main export markets in Asia do not generally impose environmental assurance requirements, unlike Europe with EurepGAP (commodity specific certification for fruit, vegetables and flowers covering food safety, employee and animal welfare, and some aspects of environmental management – e.g. irrigation scheduling, soil conservation and the development of a conservation management plan). See www.eurep.org for more information. A number of individual

supermarket chains in the UK also have their own specific assurance programs.

A small percentage of horticultural produce is sold via farmer markets and the like. Grower branding can have value in these markets and there is likely to be demand for organic or environmentally sustainable production.

The processing sector has explored aspects of environmental certification, e.g. through international food companies and the Sustainable Agriculture Initiative (see www.saipatform.org), but no measures are currently in place.

The nursery (or 'green life') industry has developed accreditation schemes, for growers and retailers, which include an environmental component. Operation in accordance with the schemes will help companies avoid risks from regulation but, apart from some large corporate, State and Local Government buyers, there is little interest from consumers in the environmental credentials of production systems behind their purchases.

Australian producers are increasingly facing the prospect of competing with imports to Australia. Growth in production from some



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low cost countries (e.g. China) and displaced produce from other exporters (e.g. New Zealand) heightens the need to be conscious of the cost of production. It also raises questions for Australians about the standard of employee welfare, environmental care and food safety in the producing countries. The risk of quality Australian produce being undermined on price in Australian markets does not create a positive business environment for producers.

Conclusions

The cost of production and quality (especially food safety) will remain as critical determinants of market demand. Efficiencies in the use of inputs (e.g. water, fertilisers and chemicals) will help optimise gross margins and returns on assets managed.

European markets require assurance regarding some environmental aspects of production. In the future, Australian retailers could also require similar assurance so producers are not disadvantaged by imports that are cheaper due to lower environmental production standards. The introduction of such requirements would need environmental assurance measures to be adopted or, alternatively, other industry plans and strategies, as a precursor.

Niche markets are likely to remain where grower branding and environmental credentials are valued.

CASE STUDY – HORTICULTURE ENVIRONMENTAL ASSURANCE PROJECT

Under the banner of 'Horticulture for Tomorrow' the Horticulture Environmental Assurance Project (funded by the Australian Government under the Natural Heritage Trusts Pathways to Industry EMS Program) aims to increase awareness and ownership of environmental management, while also providing growers with the tools to prove their environmental credentials.

It positions horticulture to be able to rapidly introduce a practical and effective environmental assurance program,

should it be required, and also provides the opportunity for immediate application by those wanting such certification now.

The project has developed a 'Vision and Strategic Statement for Environmental Management', along with a product for on-farm use, *Guidelines for Environmental Assurance in Australian Horticulture*. The guidelines are being tested via extensive grower trials and are available from the website, <http://www.horticulturefortomorrow.com.au/>.



Australia's horticultural industries are aware of environmental issues likely to affect their future and are active in addressing them.

Sustainable production

Industry Advisory Committees develop Strategic Plans and Annual Investment Plans for individual industries. The Investment Plans establish the current R&D program and generally include issues such as:

- Pest, disease and weed management – including chemicals (reduction in use and access to chemicals with short with-holding periods), spray-drift, biological controls, Integrated Pest & Disease Management Plans, residues, breeding and GMOs, and biosecurity. Fruit fly is a threat to several industries.
- Water – especially allocations and access, but also Water Use Efficiency (WUE), salinity & drainage, waste-water management, and (in the case of turf and nursery industries) water restrictions for consumers and providing drought tolerant plants.
- Certification – the development of Codes of Practice and Environmental Assurance or Environmental Management Systems (EMS),

CASE STUDY – GROUNDCOVER FOR MACADAMIAS

In 1996, the Australian Macadamia Society and HAL began investigating potential groundcovers to grow under macadamia orchards. It was found that orchards with bare ground were eroding at rates from 18 tonnes/ha/yr (on steep land) to 2 tonnes/ha/yr, but a well-grassed orchard cut that rate to 0.002 kg/ha/yr (a 99.9% reduction) (Reid, 2002).

Sweet smother grass (*Dactyloctenium australe*) was determined to be the most suitable cover, being able to grow under the shady canopies and still permitting nuts to be harvested from the ground.

With funding support from the Northern Rivers Catchment Management Authority, the NSW Department of Primary Industries was able to develop a turf planter specifically suited to the task at hand. A local source of the turf was also developed. Since then, growers have been establishing smother grass as rapidly as seasons, and turf and equipment availability, permit – with the planter booked months in advance. While the turf reduces the loss of harvestable nuts by water flow traditional harvesters are not designed to operate on grass, and work is proposed to further adapt harvesters to operate at peak efficiency on smother grass.



INDUSTRY ACTION

promotion of currently recommended Best Management Practices (BMPs), and image promotion.

They also make reference to:

- nutrients – fertilisers, nutrient leakage (pollution), and contamination (cadmium);
- soils – soil health and erosion;
- biodiversity – e.g. fruit bats and native parrots;
- climate change and variability; and
- urban encroachment – and impacts such as odour.

IPDM has been supported by research resulting in the development and introduction of ‘softer’, more targeted, chemicals and management programs like **drumMUSTER** that help deal with wastes (see www.drummuster.com.au for more information).

The National Residue Survey (which is partly funded by growers from participating industries to monitor any residues in food) is another example that demonstrates the high management standards of growers and gives confidence to consumers and communities. For more information, see www.nrs.gov.au.

Conclusions

Ongoing research is required to develop and adjust management options for growers that reduce production costs and optimise contributions to the environment (which may be a reduction in negative impacts and an enhancement in positive ones).

CASE STUDY – NUTRIENT MANAGEMENT IN TOMATOES

Adopting an approach developed in Europe and successfully implemented by Victorian tomato growers, a National Landcare Programme involving horticulture is getting underway in northern and north-west Tasmania, applying the ‘Nmin method’ of nitrogen monitoring. The approach assesses nitrogen concentrations in local waters, maps the intensity of local nutrient applications via fertilisers etc, and prepares crop nitrogen budgets (incorporating crop uptake and removal figures, combined with soil and plant analyses) to estimate the exact quantity of fertiliser needed.

Nitrogen is a significant factor in the pollution of waterways and estuaries, as well as being important to crop production and a cost of production. The N-check™ test (Australia’s version of ‘Nmin’) offers a way to minimise the movement of nitrogen from agricultural activities into waterways, protecting downstream water quality and ecosystem health. It also provides a valuable crop management tool – helping growers understand and manage crop nutrient needs to optimise production and reduce production costs, by reducing fertiliser expenses (Blaesing, D – pers comms).



Capability and action

Industry, through HAL, has investigated the common elements of good environmental management practices, issues that affect the capacity of growers to adopt them and means to capture and make available suitable information to assist. Two valuable documents record some key features, *Understanding the elements and adoption of environmental best practice in horticulture* and *A strategy for horticulture to best capture, store and make available relevant information on environmental management* – by Andersen (2002) and Lane et al (2002) respectively.

They present an ‘Adoption Process’ based upon helping growers through five steps:

- seeing the problem;
- accepting the problem;
- owning the problem;
- owning the solution; and
- changing behaviour.

Tools aimed at raising awareness support the earlier steps (e.g. newsletters, fact sheets, media and meetings), while ‘adoption tools’ assist the latter ones (e.g. field days and demonstrations, tours, training and technical advice). Important motivating factors (drivers) were identified as economic sustainability, cost savings / profit, and compliance with regulations.

Industry-wide surveys have revealed that growers are overwhelmed by an ‘information overload’ – but at the same time lack ready access to tailored, locally relevant information. There is confusion about where to go for information. Growers faced with a plethora of confusing (sometimes conflicting) advice and information may be numbed into inaction as a response.

It has been suggested that horticulture should further develop its capacity to provide a ‘one-stop-shop’ for authoritative information (e.g. via a website), to enhance it with locally compatible information, and to drive it via industry programs and networks. The Environmental Assurance Guidelines are an example of this approach.

A recent, more locally based, survey (from the Burnett catchment) echoed those findings and added some detail (Hockings et al, 2005). It noted that markets, profit margins, and pest and disease control were the main influences on management.

In regard to the environment, different growers were motivated by different factors. They ranged through a desire for confidence about the management of environmental issues and the avoidance of disruptions to production due to regulations or incidents (i.e. risk management), improved profit and efficiency through better management of inputs (e.g. water, fertilisers and chemicals), and (a smaller group) sensitivity to the environmental impact of their farming systems.

The farmers generally had little confidence in current NRM information sources – except those associated with a water-use efficiency program that had well-packaged locally relevant information, delivered as part of a program including financial incentives to support on-farm change. The report recommended better co-ordination between industry, advisers or consultants, and regional NRM bodies for increased effectiveness of NRM programs. The role of advisers and input suppliers may be worth further consideration to strengthen the ‘information supply chain’ to growers.



INDUSTRY ACTION

Many industries have developed training programs for growers dealing with matters such as irrigation, chemical management, and weed control. Industry programs permit general information to be tailored to grower needs in highly relevant formats. However, they can face real difficulties in consistent delivery across State borders due to different State Government approaches. Even access to support (which is generally required in some form) through Australian Government programs (like FarmBis) will vary between States.

Industry specific plans often include measures to develop the capacity of growers through leadership programs, etc. However, there is no equivalent for building capacity to manage NRM issues across horticulture as a whole – and some are of the view that better forums are required for the sharing of ideas and information, and to develop industry-wide NRM policy and initiatives.

Conclusions

Programs to promote on-farm change need to incorporate several components, at different scales, for example:

- agreed plan and management targets, between industry and relevant NRM Bodies,
- an extension program, e.g. on-farm research, trials and demonstrations, field days and shed talks ('seeing is believing'), training,
- assistance to change, e.g. access to expert on-farm advice, funding for works or equipment, or labour and materials; and
- industry Leadership, project champions or farmer advocates who can talk about practical matters to growers and also let governments and NRM bodies know about the good things growers are doing.

Developing a central warehouse (and perhaps common branding like 'Horticulture for Tomorrow') may help growers and advisers more easily find suitable, reliable information.

There may be scope to enhance cross-industry learning within horticulture and to negotiate standard approaches across State borders with the assistance of the Australian Government.



Environmental health and NRM

The diversity of horticultural industries and their location is matched (and surpassed) by the diversity of environmental regulations and management bodies they must contend with. Managing this ever-changing complexity is one of industry's major challenges.

For any location there can be four effective levels of administration to deal with Federal, State and Local Governments plus a regional NRM body. There is ongoing structural change within each, typified by the rapidly developing regional NRM bodies – but also common with State agencies changing roles and structures as well. Within each organisation there is often a compounding turnover of staff – and of political representatives and Ministers. This ongoing change and the differences that can exist in regulations, processes and attitudes, make it difficult for any industry seeking to form a relationship with environmental administrators and managers.

Some industries have been able to appoint liaison officers that include among their tasks the co-ordination of industry activities with NRM bodies and State agencies (e.g. the Natural Resources Networks Co-ordinator [growcom] and the AUSVEG Environment Manager). In addition, some regional NRM bodies are appointing industry liaison officers to work with industry (e.g. the Condamine Alliance Industry Co-ordinator) – but examples of both are still the exception rather than the norm and maintaining continuous funding and appointments is a challenge. Formal stakeholder reference groups (including Industry) have also been formed in some regions, e.g. the Ord River.

The importance of good relationships and understanding between industry and NRM programs is matched by the difficulty in establishing and maintaining them.

Programs such as the Industry NRM Groups (established by the Horticulture NRM Initiative) are an attempt to develop processes for industry to bridge the gaps between itself and NRM bodies, e.g. testing the suitability of the 'Targets for Change' process to convert environmental targets into management practice targets and supportive programs for growers.

In Queensland, all primary industries have developed an understanding with the State Government that farmers who have adopted a 'Farm Management System' will be deemed to be complying with relevant State legislation. The Horticulture Environmental Assurance Guidelines would qualify growers in that regard.

Conclusions

Industry, governments and Regional NRM Bodies need to engage more closely, ensuring there is mutual understanding and more effective relationships. Consideration is required of the processes (e.g. Targets for Change) and structures (e.g. Industry NRM Co-ordinators) that could contribute to better communication and co-ordination, at regional, State and national levels.



INDUSTRY ACTION

Sustainable supply

Many growers and industry groups are involved in State, regional and district initiatives to ensure sufficient land and water resources are available to meet future production demands. The diversity of these approaches can help ensure suitable local solutions are developed to local problems, but may also detract from the ability of horticulture overall to learn from individual experiences and to apply consequent knowledge.

The Horticulture Water Initiative is an example of a whole-of-industry approach. It has been well supported by individual Industry Advisory Committees (who manage industry R&D funds). Through it, HAL is a member of the National Program for Sustainable Irrigation (NPSI) and gains access to Australia's leading irrigation research and considerable additional co-investment from other partners.

The Water Initiative is one of a number of 'Across Industry Programs' managed by HAL upon recommendations from an Industry Management Committee. The IMC provides

advice to the HAL Board and the horticulture industry on 'big picture', strategic projects and programs. The committee is comprised of representatives from the eight largest HAL member industries (based on HAL R&D and marketing income) together with both HAL and HAC representatives, and is charged with providing leadership on investments and approaches that address across-industry issues that would otherwise not be dealt with in a cohesive way through individual industry programs.

Plant improvement programs, marketing, pesticides (chemical use) and integrated pest control are other topics to be given attention by the IMC.

Conclusions

Consideration is required of the most suitable industry structures to manage natural resource issues and 'Horticulture for Tomorrow' as it evolves and grows in stature and influence.



Market demand

Individual industries are in frequent contact with their markets and retailers. Industry bodies and HAL have been proactively discussing supply issues with supermarkets and governments, and integrate the outcomes into industry development plans.

The Horticulture Environmental Assurance project is an example of such industry action. Its guidelines are written to permit any industry to adopt them and add specific information – ensuring a consistent horticulture-wide approach tailored to individual circumstances. Given the diversity of horticulture, this is an outstanding achievement. It should help address the confusion among growers caused by alternative (competing) approaches and appease concerns about the potential costs (in time and money) to be faced if having to comply with numerous different programs.

An Industry Leadership Group (ILG) and Technical Steering Committee (TSC) were established by Horticulture Australia Council and HAL to oversee the Environmental Assurance project. It was delivered under the banner 'Horticulture for Tomorrow', which is now evolving as an umbrella for all industry-wide natural resource programs.

While the Environmental Assurance Guidelines are presented as a voluntary self-assessment styled program, there is scope to reformat them into a code that can be audited by third parties.

The vegetable industries' Enviroveg program is an example of an industry-based self-assessment approach (through 'FreshCare Plus', 'Green Code' or 'FreshCare Environment', whichever term is eventually chosen) that can be used for third-party audit and be compatible with the broader Environmental Assurance Guidelines.

Some regional approaches have also been developed. An example is the *Green Book* (Hutchinson, 2003) by the Murrumbidgee Horticultural Council (and NSW EPA), which helps growers recognise and manage their impact on the environment. It includes objectives such as to 'increase awareness of the environmental obligations of horticulturalists, and the potential impact of perennial horticulture on the environment' and sets out best management practices that could complement the guidelines.

Sometimes it is best to combat environmental issues at a district level rather than on a property-by-property basis. The Ord River irrigation area (in WA's Kimberley) requires all irrigators to adhere to a local irrigation management plan. In 2004, the 'assurance' provided by that district plan was sufficient for all growers affected by it to be accepted as equivalent to meeting relevant EurepGAP requirements, in order to gain access to a major UK supermarket chain.

Conclusions

The Environmental Assurance approach should continue to be developed within horticulture with an effort to map out a delivery and adoption pathway within individual industries or regions. It will help promote sound management practices, provide the environmental credentials required for any individuals seeking such endorsement and position the industry should it wish to promote a producer-by-producer assessment of produce sold in Australia.

District or industry level options should also be investigated, both in Australia and as a means of assessing the credentials of imported produce, e.g. life cycle assessments (LCA), producer surveys or industry/regional reports for produce sourced from outside Australia.

Strategy overview

Vision

A profitable horticultural industry based on environmentally sustainable production.

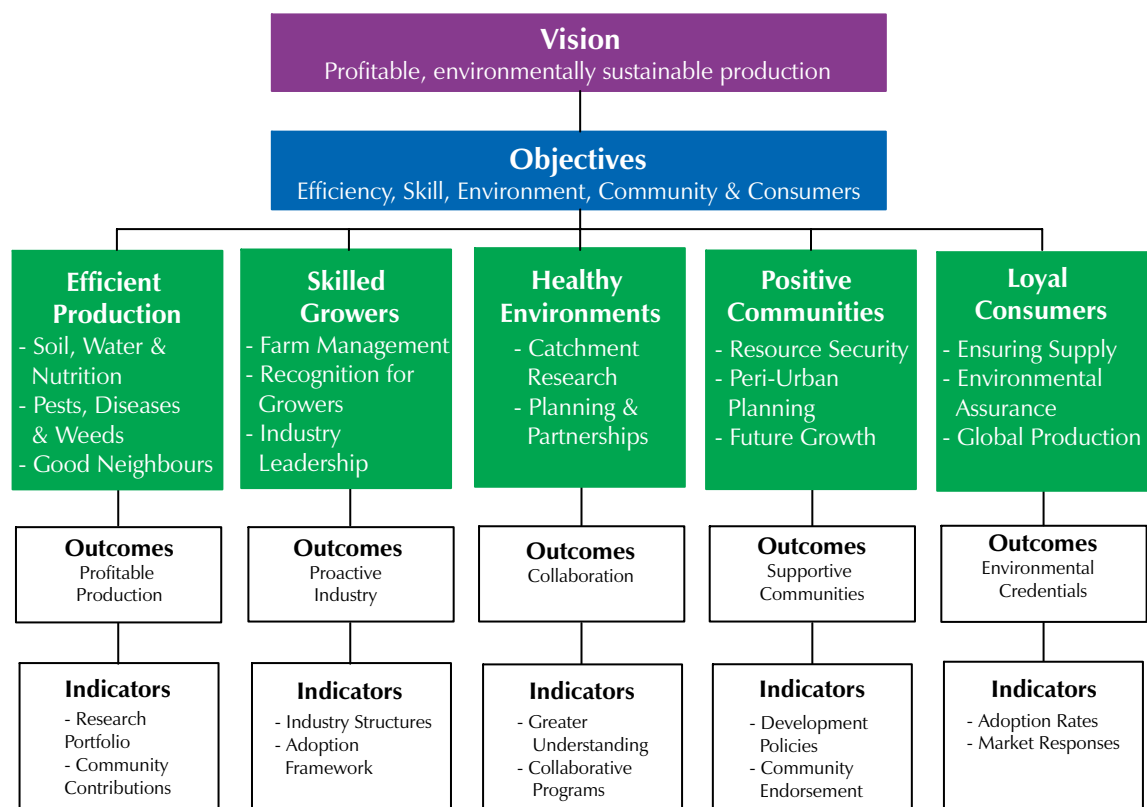
Objectives

- 1 Efficient Production:** Advancing efficient and sustainable production systems for profitable and environmentally sound produce.
- 2 Skilled Growers:** Building the capacity and confidence of growers to understand and manage sustainable production systems and environmental issues.

3 Healthy Environments: Planning environmentally healthy and productive regions through joint programs that engage industries and resource management agencies at all levels.

4 Positive Communities: Providing positive business environments for growers through informed planning and policies to help growers invest wisely and add value to regions and communities.

5 Loyal Consumers: Maintaining ongoing consumer demand for Australian produce with informed purchasers, confident in the availability and quality of produce, and the farming systems that grow it.



HORTICULTURE NRM STRATEGY



OBJECTIVE 1: EFFICIENT PRODUCTION

Strategy 1.1: Soil, water and nutrients R&D – efficient use and resource protection.

Strategy 1.2: Pests, disease and weeds R&D – effective, environmentally sound, pest and disease control.

Strategy 1.3: Good neighbour R&D – good relations with nearby residents.



OBJECTIVE 2: SKILLED GROWERS

Strategy 2.1: Farm management program – excellence in extension and capacity building programs.

Strategy 2.2: Recognition for growers – recognition and reward for environmentally sound growers.

Strategy 2.3: Industry leadership – appropriate structures and processes to lead industry NRM programs.



OBJECTIVE 3: HEALTHY ENVIRONMENTS

Strategy 3.1: Catchment research – solid understanding of the interactions between farms and catchments.

Strategy 3.2: Planning and partnerships – strong relationships between industries and regional NRM groups.



OBJECTIVE 4: POSITIVE COMMUNITIES:

Strategy 4.1: Resource security – ongoing access to suitable land and water resources.

Strategy 4.2: Peri-urban planning – land development controls to support dynamic horticultural enterprises.

Strategy 4.3: Future growth options – sound information for new and expanding businesses and industries.



OBJECTIVE 5: LOYAL CONSUMERS

Strategy 5.1: Ensuring supply – confidence in regions and industries to maintain the supply of quality produce.

Strategy 5.2: Environmental assurance – confidence in the environmental credentials of Australian produce.

Strategy 5.3: Global production – understanding the environmental issues with overseas production and markets.

Timeframe

This strategy is for a five-year term. As it is the first of its type for horticulture, it should be reviewed annually and thoroughly revised after three years.



HORTICULTURE NRM STRATEGY

1: Efficient Production



Objective

Advancing efficient and sustainable production systems for profitable and environmentally sound produce.

This will promote profitable on-farm management with an emphasis on increased input efficiency (lower cost) and environmental health for sustainable production.

Strategies

Strategy 1.1: Soil, Water & Nutrients R&D. Investigating farming systems to optimise production (through the sustainable management of nutrients, soil and water resources), maintain (or improve) property condition (in a variable climate) and meet agreed regional environmental targets.

This may involve participative on-farm research with growers and researchers sharing knowledge, while liaising with regional environmental interests. The emphasis may be on systems research with scientists from different disciplines collaborating, e.g. soils, entomology and irrigation. Modelling may be important to test systems under different seasonal conditions (e.g. drought or storms) and to assess potential off-farm consequences. Studies into climate variability and event forecasting may also be beneficial.

Some value chain investigations could be undertaken, e.g. understanding and influencing the use of water in gardens, translating industry knowledge for the users of nursery products.

Strategy 1.2: Pests, Disease & Weed R&D. Investigating integrated management solutions to pests (both native and introduced), disease and weed problems.

This may involve insect, virus and disease control and also the management of native

fauna (such as fruit bats or parrots). It may include the use of native (and non-native) plants within or adjacent to horticultural plantings to exploit their potential for multiple-use, e.g. suppressing exotic diseases and promoting native fauna. Biodiversity research could also be promoted to better understand the population dynamics, behaviour and ecology of over-abundant native species, and the services provided by native animals and insects (e.g. pollination).

Strategy 1.3: Good Neighbour R&D. Investigating means to help growers and their neighbours contribute to the social, economic and environmental future they aspire.

This may involve developing alternative management practices (e.g. to combat noise or odour complaints) as well as innovative means to foster good dialogue and local relationships to avoid conflict. It could draw upon pest and disease research and contribute solutions to issues addressed under peri-urban planning. The program should also foster links with international experts and forums dealing with similar matters.

Outcome & Indicators

Outcome: Profitable Production. Growers will be responding to global pricing and increasing environmental scrutiny through continuous improvement in the efficiency of resource and energy use.

- **Indicator 1.1: Research Portfolio.** Horticulture Australia Ltd is able to present an impressive research portfolio, from across numerous industries, that generates sustainable farming systems (with lower production costs) and informed growers.
- **Indicator 1.2: Community Contributions.** Horticulture will be continuously reducing any negative impacts from operations on the environment and community, and increasing its positive contributions.

HORTICULTURE NRM STRATEGY 2: Skilled Growers



Objective

Building the capacity and confidence of growers to understand and manage sustainable production systems and environmental issues.

This will help growers be proactive in developing and implementing new approaches to production.

Strategies

Strategy 2.1: Farm Management Program.

Raising awareness and understanding, and providing knowledge and other support (e.g. NRM incentives or 'one-to-one' advice where appropriate) to promote the adoption of sustainable management practices.

This may involve a structured approach to capacity building involving a mixture of tools and activities to help growers through the 'adoption process'. It would be best if aligned with regional NRM programs and industry R&D to optimise the assistance to growers and their 'ownership' of it, along with their potential to generate sound environmental outcomes and increased profit or production.

The program could develop a standard framework for industry (e.g. agreed targets, priority setting, extension products and activities, assistance and recognition), and a central warehouse for NRM information. Tools like the Environmental Assurance Guidelines may help raise awareness, identify priorities, initiate on-farm action and increase grower confidence in their enterprise's sustainability. There may also be scope to work with advisers and input suppliers to strengthen their contributions to the 'information supply chain'.

Strategy 2.2: Recognition for Growers.

Honouring the achievements of growers who excel in running sustainable businesses and production systems.

This may include providing opportunities for study tours, seeking their involvement as case studies or sites for field days and farm walks, assisting with the preparation of Landcare or Banksia award entries, or rewarding growers who achieve a certain level of performance in Farm Management Programs with 'Horticulture for Tomorrow' gate-signs or bumper stickers.

Strategy 2.3: Industry Leadership.

Developing appropriate industry NRM structures and leaders to manage, and periodically review, this strategy (including communications, monitoring and evaluation) and other environmental issues.

This may involve a review, and modification, of existing industry structures to ensure broad consideration and endorsement of industry NRM initiatives is maintained and that clear responsibilities are allocated for the delivery of all the strategy's components ('actions'). It could also include a growers' NRM conference, hosted in a different region each year.

Outcome & Indicators

Outcome: Proactive Industry. The horticulture industry will continue to be proactive in addressing environmental issues – incorporating them into profitable production systems and achieving high levels of adoption of sustainable practices on farms.

- **Indicator 2.1: Industry Structures.** The evolution of industry structures and processes to ensure diverse horticultural industries collectively plan and manage their responses to common environmental issues.
- **Indicator 2.2: Adoption Framework.** The development, and implementation, of an 'adoption framework' that records capacity building tools and activities (including environmental assurance); links them with broader (catchment) NRM planning, assistance programs and industry research and development; and monitors grower management actions.



HORTICULTURE NRM STRATEGY

3: Healthy Environments



Objective

Planning environmentally healthy and productive regions through joint programs that engage industries and resource management agencies at all levels.

This will help define the relationships between farms and catchments, and develop models for better understanding and co-operation (i.e. processes and structures). It will work closely with Strategies under Objectives 1 and 2 and result in agreed approaches to management and healthy catchments.

Strategies

Strategy 3.1: Catchment Research.

Investigating contributions from different production practices to catchment condition, e.g. sediment loads or chemical levels.

It may involve collaborative projects between growers, industries, community groups and regional NRM bodies to establish benchmarks and understand nutrient, chemical and sediment movement between farms and catchments and how it can be affected by management options. Catchment projects may test and support management practices promoted via the Environmental Guidelines and link with Sustainable Production R&D and Farm Management programs. It will promote risk assessment and may involve enhancing processes and structures to encourage exchange of information and ideas between industry, community groups and NRM bodies.

Strategy 3.2: Planning and Partnerships.

Developing sound relationships with regional NRM bodies, community groups and all tiers of government, as shown by joint programs for on-farm change (i.e. the adoption of sustainable practices) and catchment management to generate agreed outcomes.

This may involve building on and consolidating the outcomes from Catchment Research and enhancing structures and processes for industry and communities to agree on environmental targets (outcomes). The work may culminate in agreements to revise catchment condition targets, establish farm management targets and jointly develop new programs (e.g. Environmental Assurance) to assist growers with any consequent changes in management. It may also result in new positions being established (e.g. Industry NRM Co-ordinators) or in the negotiation of new partnership programs between industry and governments at various levels and across State borders.

This work will also involve consultation between industry and the Australian Government about industry NRM initiatives and the joint industry-government programs that offer the best prospects for success.

It should result in a greater appreciation of horticulture by the wider community and true 'two-way' partnerships between industry, governments at all levels, and regional bodies.

Outcome & Indicators

Outcome: Collaboration. Agreement between industry, governments and NRM bodies on appropriate horticultural management practices and programs to help deliver them.

- **Indicator 3.1: Greater Understanding.**

Published articles explaining grower attitudes and the interaction between production systems and the environment.

- **Indicator 3.2: Collaborative Programs.**

More programs between industry, governments and NRM bodies to assist growers with on-farm change (e.g. water-use efficiency measures, soil conservation and the area wide management of pests), resulting in improved natural resource condition and production outcomes.

HORTICULTURE NRM STRATEGY

4: Positive Communities



Objective

Providing positive business environments for growers through informed planning and policies to help growers invest wisely and add value to regions and communities.

This will help reduce any adverse impact from production and to buffer industry from adverse regional changes (e.g. reduced water availability, salinity or urban encroachment).

Strategies

Strategy 4.1: Resource Security. Exploring options to balance growers' stewardship ethic ('duty of care') with rights to access, use and manage land, water and vegetation resources by ensuring producers understand their rights and responsibilities and that community authorities understand producers' needs.

This may involve working with other groups in social research programs to understand the differing values attributed to natural resources, the beneficiaries and costs of alternative resource management options, and the effectiveness of alternative 'delivery models' in different circumstances (e.g. regulation versus awareness and assistance). The research would provide information for industry to incorporate in its policy development processes.

Strategy 4.2: Peri-urban Planning. Exploring institutional and policy options to address issues about the right to continue applying current farming practices in peri-urban locations.

This may involve working with governments at all levels (and other commodity groups) to explore planning and development control options that accommodate and promote the interests of primary producers. It could include concepts like 'reverse buffers' (to prevent new residents being unaware of potential agricultural nuisances), and profiling

growers to understand their likely future needs for land (economies of scale), new management practices and infrastructure.

Strategy 4.3: Future Growth Options.

Exploring the environmental issues likely to affect future growth in horticultural industries, e.g. the impact of climate change and increasing climate variability; development issues in northern Australia; better data on the size and distribution of production, the inputs driving production and management practices adopted; and the impact of water restrictions and lifestyles on demand for nursery products.

This may involve several small strategic projects to address the different issues, e.g. collaboration with other stakeholders in assessing the issues that would influence sustainable developments in northern Australia and expansion of the Ord River area, assessing the potential impact on different regions and industries of increasing climate variability and change, and liaison between the Australian Government and industry groups to generate timely, accurate data on production.

Outcome & Indicators

Outcome 4: Supportive Communities.

Regional communities will understand, accept and support horticultural industries in their business enterprises.

- **Indicator 4.1: Development Policies.**

The development, and incorporation, of planning principles designed to promote dynamic horticultural industries in the land development controls administered by State (Territory) and Local Governments.

- **Indicator 4.2: Community Endorsement.**

An appreciation of the wider community benefits of sustainable horticultural practices and willingness to support growers, as evidenced by the incentives and assistance available to promote on-farm change.



HORTICULTURE NRM STRATEGY

5: Loyal Consumers



Objective

Maintaining ongoing consumer demand for Australian produce with informed purchasers, confident in the availability and quality of produce, and the farming systems that grow it.

This will help maintain demand for Australian produce from retailers and consumers.

Strategies

Strategy 5.1: Ensuring Supply. Profiling the industry, supply chains (including by-products) and regions to give markets confidence that quality produce will continue to be available.

This may involve examining regional issues likely to affect industries maintaining or increasing their production (e.g. access to suitable land and water) and developing local plans to deal with any risks identified.

Strategy 5.2: Environmental Assurance. Adopting ways to accredit the sustainability of farm management and production practices (e.g. promotion of the Guidelines for Environmental Assurance) and assure consumers of the sustainability of production systems behind all Australian produce.

This may involve confirming a framework for the delivery of Environmental Assurance Guidelines with different industries or regions (e.g. as an optional – certifiable – component of industry quality assurance programs or as a means to raise awareness and rating of individual priorities in a Farm Management Program). The framework would include:

- encouraging the adoption of Environmental Assurance through user-friendly Guidelines that harmonise with Quality Assurance and Food Safety systems;
- establishing a business case for the adoption of Environmental Assurance; and
- addressing impediments to adoption of Environmental Assurance by identifying incentives, training and funding programs needed to facilitate uptake.

It may also involve district level processes, e.g. surveys of current farm management practices to showcase and monitor high levels of environmental management. Food safety programs and the National Residue Survey would be continued.

Strategy 5.3: Global Production.

Understanding the environmental issues associated with global trade in horticultural produce, and sharing the information with policy shapers and consumers. This could include strategic projects, or Life Cycle Assessments, to compare the environmental impact of Australian and selected overseas horticultural production and supply chains. It could compare production, processing and transport for efficiencies in the use of natural resources and energy, their impact on the environment and any impacts on produce quality, as well as the costs of complying with environmental regulations. It could also identify the segments of the value chain (e.g. producers, distributors, retailers or consumers) to benefit from any savings.

Outcome & Indicators

Outcome 5: Environmental Credentials.

By 2010, Australian horticulture will have embraced a systematic approach to environmental management that underpins the economic, social and environmental sustainability of the industry.

- **Indicator 5.1: Adoption Rates.** The percentage of industries, growers and retailers who adopt approaches consistent with the Environmental Assurance Guidelines.
- **Indicator 5.2: Market Responses.** Informed markets that understand, and value, the sustainability of supply from Australian horticulture, as evidenced by ongoing demand for Australian produce.



Implementation

The successful implementation of this Strategy will require strong partnerships. It will rely on contributions and co-operation from many different stakeholders, besides growers, their industry leaders and value chain managers. Governments, regional NRM bodies and community groups have much to contribute to, and gain from, the Strategy – and industries must be open and innovative in the measures used to facilitate their involvement. Some of the major partnerships are highlighted below.

Key ingredients for a successful implementation of the Strategy include:

- industry leadership;
- strong grower involvement and ownership;
- wider reference within industry and other stakeholders;
- resources for administration and co-ordination (at national and regional or industry levels);
- opportunities for horticultural regions and industries to share their experiences;
- opportunities to liaise with other industries and community groups,
- ongoing support and liaison from Governments; and
- continual performance evaluation, revision and public reporting.

Implementation will rely on collaboration across the breadth of all horticultural industries. The Strategy will need specific resources to co-ordinate and evaluate its implementation, and to communicate at a whole-of-industry level. Effective implementation will also rely very heavily on work by individual industries and regions. They will be most effective in driving the regional partnerships it envisages and in engaging and supporting growers – the key resource managers. The Strategy will provide a framework for their actions and a common language to promote shared learning between regions and industries, to the advantage of all.

Appropriate structures and communication processes within horticulture will be critical to the effective implementation of the Strategy. Without these, it will be difficult for horticultural industries to effectively collaborate or engage with governments and the other partners that must be involved for a successful outcome.

	Research providers	Extension services	Agri-business	NRM Bodies & Funders	Policy agencies	Supply chain managers	Local Gov't development planners	Industry leaders (Regions & Aust)
Strategy 1	X	X	X	X			X	X
Strategy 2	X	X	X	X				X
Strategy 3	X			X	X			X
Strategy 4	X		X		X	X	X	X
Strategy 5			X		X	X		X



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GLOSSARY



Biodiversity. Biodiversity is the variety of life: the different plants, animals and micro-organisms, their genes and the ecosystems of which they are a part. The term may be used to refer to native vegetation and fauna with connotations of nature conservation but applies to all living things – and the associated ecological, economic and ethical aspects of their use and management.

Ecosystem Services. Ecosystem services are processes by which the natural environment produces resources useful to people, akin to economic services. They include: provision of clean water and air; pollination of crops; mitigation of environmental hazards; and pest and disease control. The concept is similar to that of 'natural capital'.

Environmental flows. The term refers to the flows of water required in a stream to maintain ecological processes and associated native biodiversity. It is not just the amount of water flowing in a stream but includes considerations such as the timing, height and duration of floods and low-flows and the temperature of water – which can all be important in triggering breeding events etc.

Greenhouse gases. Greenhouse gases are components of the atmosphere that contribute to the greenhouse effect – the trapping of radiation and warming of the earth. The major natural greenhouse gases are water vapor, carbon dioxide and ozone. Other greenhouse gases include, but are not limited to, methane, nitrous oxide, sulphur hexafluoride, and chlorofluorocarbons.

Life Cycle Assessment (LCA). A life cycle assessment is the assessment of the environmental impact of a given product or service throughout its lifespan. The goal of LCA is to compare the environmental performance of products and services. The term 'life cycle' refers to the notion that the raw material production, manufacture, distribution, use and disposal (including all inputs and intervening transportation steps) need to be assessed. This is then the 'life cycle' of the product. The concept can also be used to optimize the environmental performance of a single product (ecodesign) or to optimize the environmental performance of a company.

Natural Resource Management (NRM). Natural resource management considers the use and management of natural resources (such as soil, water and native vegetation) in an economic and social context.

Nutrients. A nutrient is any element or compound necessary for, or contributing to, an organism's metabolism, growth, or other functioning. It has a more limited meaning when used in discussion of water quality, referring to plant fertilizers (especially nitrogen and phosphorus) that can have an adverse impact on water quality because of their ability to promote plant and algae growth. Nutrients can enter water-ways dissolved in surface water solution, attached to particles of soil or sediment, or as 'leachate' draining through the soil.

Regional NRM Bodies. The Australian, State and Territory governments have established 56 regional bodies across the nation, to help deliver major natural resource management programs like the National Action Plan for Salinity and Water Quality and the Natural Heritage Trust. Each has an integrated natural resource management plan (including environmental targets) and an investment strategy. In some States the bodies are supported by legislation (e.g. the Catchment Management Authorities – CMAs – in Victoria). See www.nrm.gov.au for more information.

Riparian. Riparian areas or zones are the interface between land and water, and the adjacent land if frequently inundated with water. They are the areas adjacent to water courses that are prone to flooding. Riparian zones are an important matter in civil engineering due to their significance for managing erosion control, their ecologies and the large effect they have on aquatic ecosystems. Riparian strips refer to riparian lands and the vegetation growing there. Research has shown that riparian ecosystems are vital to the health of all other aquatic ecosystems as they help filter out pollutants from land runoff, prevent erosion, and provide shelter and food for many aquatic animals.

Source: The primary (but not exclusive) source for the definitions above is 'Wikipedia – The Free Encyclopedia'. See http://en.wikipedia.org/wiki/Main_Page for more information, or other definitions.

ACRONYMS

BMP	Best management practice
COAG	Council of Australian Governments
CSIRO	Commonwealth Scientific & Industrial Research Organisation
EMS	Environment management system
EPA	Environment Protection Authority
GMO	Genetically modified organism
HAC	Horticulture Australia Council
HAL	Horticulture Australia Ltd
ILC	Industry Leadership Group
IMC	Industry Management Committee
ISO	International Organisation for Standardization
NAP	National Action Plan for Salinity & Water Quality
NHT	Natural Heritage Trust
NLP	National Landcare Programme
NRM	Natural resource management
R&D	Research and development
WUE	Water use efficiency

APPENDIX 1



Summary of NRM issues for horticulture

Trade & Economics	Environment	Social
Global <ul style="list-style-type: none"> • Market access • Biosecurity • Fuel (and alternative energy) prices 	<ul style="list-style-type: none"> • Climate Change & Greenhouse • International environmental agreements (e.g. Ramsar) 	<ul style="list-style-type: none"> • Population growth • Wealth & living standards • Demand for food
National & Industry-wide <ul style="list-style-type: none"> • Consumer driven accreditation • Industry development plans • Supply chain management and supermarket buying policies • Plant breeding and GMOs 	<ul style="list-style-type: none"> • COAG Water Reforms • Environment Protection & Biodiversity Conservation Act 	<ul style="list-style-type: none"> • Self-sufficiency for food • Safe & healthy foods – and chemical residues • Lifestyle choices – recreation areas, urban landscapes, etc • Consumer expectations • Industry leadership, structures and processes
State & Regional <ul style="list-style-type: none"> • Regional (& industry) development plans • Value chains and multipliers • Infrastructure, e.g. energy & transport • New irrigation schemes, reservoirs and water harvesting 	<ul style="list-style-type: none"> • Environmental protection & regulations, e.g. native vegetation • Regional NRM plans & environmental targets • Water allocation plans and environmental flows • Water quality, e.g. salinity, chemical contaminants, nutrients and sediments • Climate variability, e.g. drought, storms and frosts • Biodiversity impacts (e.g. introducing weeds, sustaining wildlife populations) • Potentially invasive species (e.g. olives) and garden escapees 	<ul style="list-style-type: none"> • Labour supply & regulations • Urban encroachment, rural living and zoning controls • Produce markets • Water restrictions and urban 'conservation measures' • Community groups and NRM bodies
Local & On-farm <ul style="list-style-type: none"> • Certified production and accredited programs • Risk management • NRM incentives and assistance, e.g. materials, labour, funds or expert advice 	<ul style="list-style-type: none"> • Pests (including native animals) weeds and disease control (including farm chemicals) • Water availability, salinity, price water use efficiency • Soil health (physical, chemical and biological), fertilisers, contamination (e.g. cadmium) and erosion • Wetland management and restoration; revegetation (wind-breaks, IPDM, wildlife habitat) • Farm chemicals and waste management • Energy efficiency 	<ul style="list-style-type: none"> • Nuisance issues, e.g. noise, odour, and spray-drift and light • Education and training • Extension and capacity building • Recognition & support • Industry networks, grower groups and advisers

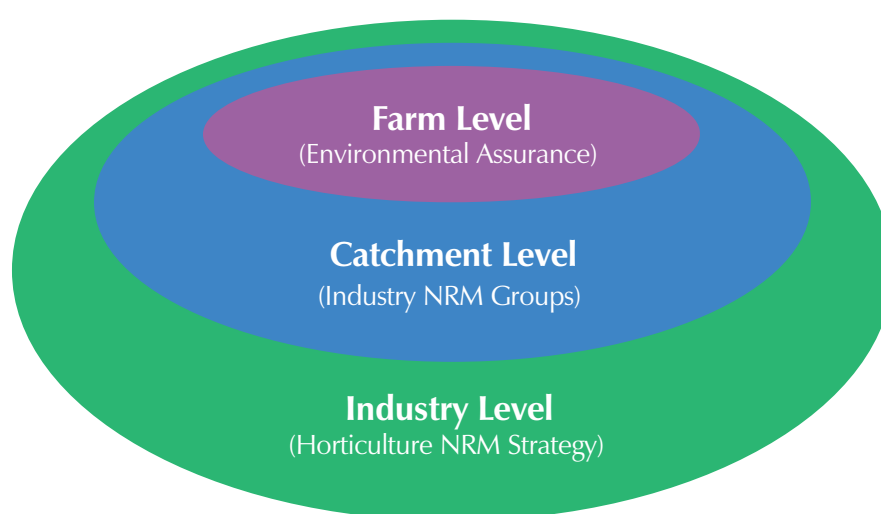
Summary of 'Horticulture for Tomorrow' initiatives

Developing a whole-of-industry platform for natural resource management

The challenge

Australia's horticulture industries are tackling a broad range of environmental issues on a series of levels – from the challenges facing individual growers managing water resources, chemical use and native vegetation to regional or catchment scale issues like salinity targets or sediment and nutrient loads in streams to the impact of global factors such as greenhouse, market access and consumer expectations.

Individual growers and their industry organisations are responding with various approaches but it is becoming increasingly clear that a co-ordinated whole-of-industry approach is needed to help the horticulture sector maximise resources and deal with these challenges in a cohesive way.



APPENDIX 2



The solution

Horticultural industries need to be active at different levels and to work with a wide range of stakeholders, in order to be effective.

‘Horticulture for Tomorrow’ provides an umbrella to cover a range of initiatives and partnerships. Two current exercises (the **Horticulture Natural Resource Management (NRM) Initiative** and the **Horticulture Environmental Assurance Project**) are managed by Horticulture Australia Ltd (HAL, an industry-owned research and marketing company) and supported by the Australian Government.

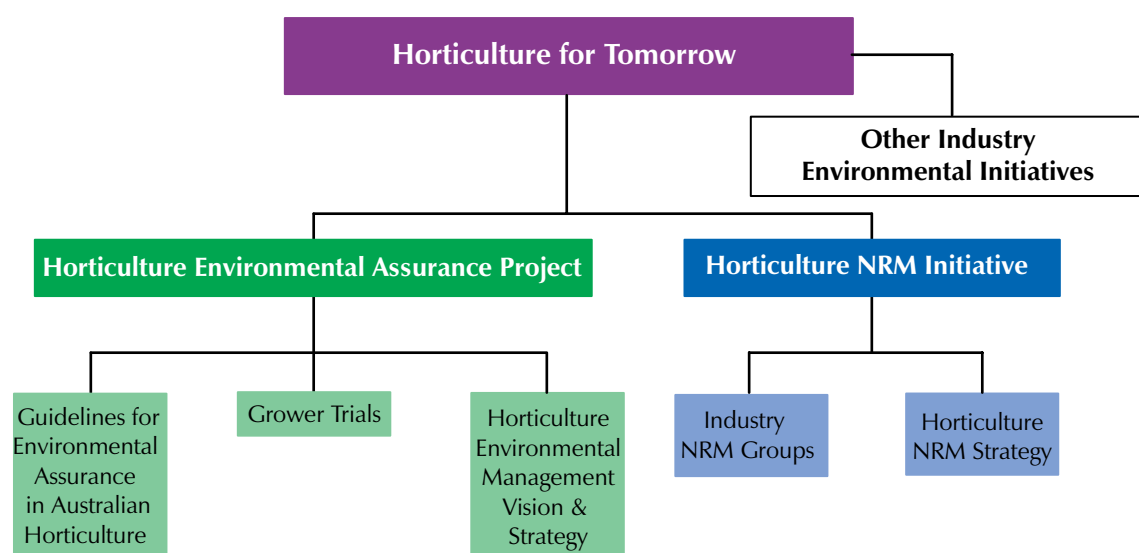
Horticulture Natural Resource Management Initiative

The Horticulture Natural Resource Management Initiative works at the regional or catchment level and the whole-of-

industry level. The two-year initiative (funded through the National Landcare Programme – Sustainable Industries Initiative) started in April 2005 and will:

- Develop a national strategy, or framework, for natural resource management in the horticulture sector, to be known as the **Horticulture NRM Strategy**, to guide future planning and promote a co-ordinated approach. It will be a vehicle for communication between industry and governments.
- Work with **Industry NRM Groups** to test various approaches that will best link growers and their industries with regional (or catchment level) natural resource management planning and assistance, ensuring industry is engaged in regional NRM programs.

A common theme will be better targeted programs for continual on-farm improvement to help achieve agreed catchment outcomes. Regional NRM bodies are of increasing





APPENDIX 2

importance to the management and allocation of natural resources and it is imperative that industries are able to communicate, plan and act in cohort with them to promote sustainable, profitable industries and healthy catchments. The projects will build on existing links and test and establish new ones.

The initiative will:

- Provide a solid platform from which the horticulture sector can plan future activities and communicate regarding natural resource management issues critical to their future.
- Give government, communities and industry confidence about the management of environmental issues.
- Promote targeted, on-the-ground assistance for growers to generate positive environmental outcomes and enhance the environmental credentials of industry.

Horticulture Environmental Assurance Project

The Environmental Assurance Project is a whole-of-industry approach to develop guidelines and document sustainable management practices for individual growers at the farm level. The program was first set up in early 2004 to produce a set of practical guidelines for environmental assurance. Growers are now testing a draft version before the final guidelines are produced in early 2006. A vision statement and strategy have been prepared to promote adoption of the guidelines by growers.

The project is funded through the Natural Heritage Trust and the Pathways to Industry EMS program.

The environmental assurance guidelines will be an important part of the Horticulture NRM Strategy.

How does 'Horticulture for Tomorrow' work?

Horticulture for Tomorrow receives strategic direction from the Horticulture for Tomorrow Industry Leadership Group, which was formed in 2004 to, along with a Technical Steering Committee, oversee the Environmental Assurance Project.

The addition of the Horticulture NRM Initiative marks a further step in the development of Horticulture for Tomorrow and other industry environmental initiatives will progressively be included. The expansion may be fuelled by incorporating existing projects and / or the development of new approaches at farm, catchment or industry level. The linkages between individual projects will add value to Horticulture for Tomorrow as a whole.

More information

If you would like more information about Horticulture for Tomorrow in general, contact Alison Turnbull at HAL on (02) 8295 2300 or Alison.turnbull@horticulture.com.au;

or visit the program website at www.horticulturefortomorrow.com.au.

