RD&E 2012–17

GRAPE AND WINE RESEARCH AND DEVELOPMENT CORPORATION

*From vine to glass: supporting a competitive Australian wine sector*

# STRATEGIC RESEARCH, DEVELOPMENT AND EXTENSION PLAN

# 2012–17

Australian Government
Grape and Wine Research and Development Corporation

# FOREWORD

*Over the next five years, the Grape and Wine Research and Development Corporation (GWRDC) will potentially make new investments of $100–125 million in research, development and extension (RD&E) to support a competitive Australian wine sector.*

Our investments will be guided by the strategic research priorities of the Australian Government and the Australian grape and wine sector. To identify these priorities, the Corporation conducted extensive consultations with all of our stakeholders.

Our primary stakeholders, the Australian Government, Wine Grape Growers Australia and the Winemakers' Federation of Australia, have worked very closely with us to identify their strategic research priorities and I would like to thank them for their commitment and contribution.

Other stakeholders with whom we consulted included regional representatives, graduates of the Future Leaders program, the National Wine Research Network and the National Wine Extension and Innovation Network, Australia's top 20 wine producers and Wine Australia. I sincerely thank all of our stakeholders for taking the time to participate and for their considered contributions.

How we will invest in and direct this research is outlined in this *Strategic Research, Development and Extension Plan 2012–17* and I commend this plan to you.

As our stakeholders have requested, over the next five years GWRDC will place a greater emphasis on directed research and on ensuring that research outcomes can be adopted by our stakeholders.

GWRDC looks forward to working with our stakeholders over the next five years to help achieve an Australian wine sector that is profitable, competitive and sustainable through innovation.

**Hon Rory McEwen**
CHAIR

# EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

## GWRDC

The Grape and Wine Research and Development Corporation (GWRDC) is an Australian Government statutory authority that was established in 1991 under the *Primary Industries and Energy Research and Development Act 1989* (PIERD Act). We are governed by a Board of Directors, and our national operations are directed from our Adelaide office.

## Our vision

An Australian wine sector that is profitable, competitive and sustainable through innovation.

## Our objective

Our objective is to invest in and direct research, development and extension (RD&E) that supports a competitive Australian wine sector.

Our RD&E investments are guided by the strategic research priorities of the Australian Government and the Australian grape and wine sector.

# What we do

We support a competitive Australian wine sector by investing in and directing RD&E programs along the whole value chain 'from vine to glass'.

Our RD&E revenue comes from levies on the annual winegrape crush and matching contributions from the Australian Government.

We collaborate with our key stakeholders to coordinate and direct our investments to best address the sector's RD&E priorities.

The Winemakers' Federation of Australia (WFA) and Wine Grape Growers Australia (WGGA) are our representative organisations under the PIERD Act.

Our research providers include the Australian Wine Research Institute (AWRI), the National Wine and Grape Industry Centre (NWGIC), the Commonwealth Scientific and Industrial Research Organisation (CSIRO), universities and state agencies.

Our governance and operations seek the best possible return on the investment of the RD&E funds.

# How we operate

GWRDC focuses on extracting the full value of our investments in RD&E for the benefit of our levy payers, the Australian Government (co-contributor) and the wider community.

Our investments are guided by the sector's strategic priorities, which are detailed in this *GWRDC Strategic Research, Development and Extension Plan 2012–17* (Strategic Plan) and our Annual Operational Plans.

As a joint lead agency for the implementation of the Primary Industries Standing Committee (PISC) *National Primary Industries Research, Development and Extension Framework – Wine Sector Strategy*, we have embedded the framework into the sector's RD&E processes.

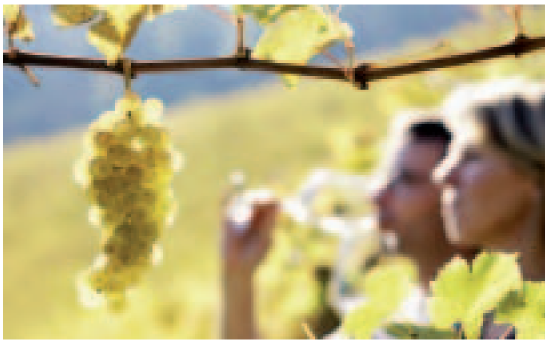
We use evidence-based decision making to guide our investments. This includes conducting reviews of existing research to identify opportunities for future research, independently assessing proposals through external review panels, and commissioning research to address specific knowledge gaps or requirements.

## Cross-sectoral research

We invest with other Research and Development Corporations (RDCs) in cross-sectoral collaborative research to deliver RD&E benefits to the broader community.

Over the next five years, we expect to continue our investments in cross-sectoral research in the following strategic areas, which closely align with the research priorities of our representative organisations:

- climate change and climate variability
- plant biosecurity
- water use in agriculture
- soil
- the efficacy of inputs, and
- education.



# OUR GOVERNANCE FRAMEWORK

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## PIERD Act

The PIERD Act sets out GWRDC's objectives as:

- increasing the economic, environmental and social benefits to members of primary industries and to the community in general by improving the production, processing, storage, transport and marketing of the products of primary industries
- achieving the sustainable use and sustainable management of natural resources
- making more effective use of the resources and skills of the community in general and the scientific community in particular
- improving accountability for expenditure on R&D activities in relation to primary industries.

Research and development is defined in section 4 of the PIERD Act as:

systematic experimentation and analysis in any field of science, technology or economics (including the study of the social or environmental consequences of the adoption of new technology) carried out with the object of:

- acquiring knowledge that may be of use in obtaining or furthering an objective of that primary industry or class, including knowledge that may be of use for the purpose of improving any aspect of the production, processing, storage, transport or marketing of goods that are the produce, or that are derived from the produce, of that primary industry or class, or
- applying such knowledge for the purpose of attaining or furthering such an objective.

R&D activity in relation to a primary industry is defined in section 4 of the PIERD Act as:

a) an R&D project in respect of that industry or class, or

b) the training of persons to carry out research and development in respect of that industry or class, or

c) the dissemination of information, or the provision of advice or assistance, to persons or organisations engaged in any aspect of:

   i. that industry or class, or

   ii. the production, processing, storage, transport or marketing of goods that are the produce, or that are derived from the produce, of that industry or class

   for the purpose of encouraging those persons or organisations to adopt technical developments designed or adapted to improve that aspect of the industry or class, or that production, processing, storage, transport or marketing, or

d) the publication of reports, periodicals, books or papers containing information that is related to research and development in respect of that industry or class, or

e) an activity incidental to an activity referred to in paragraph (a), (b), (c) or (d).

The PIERD Act requires GWRDC to develop a five-year Strategic Plan that includes GWRDC's objectives and priorities, and an outline of the strategies GWRDC intends to adopt in order to achieve its objectives.

# Corporate governance

**GWRDC recognises the value of strong corporate governance. As a statutory corporation, GWRDC must meet certain corporate planning and reporting requirements.**

Through its Board, GWRDC is accountable to the Australian Parliament through the Minister for Agriculture, Fisheries and Forestry. Table 1 provides an outline of GWRDC's corporate governance framework and planning and reporting approach.

**Table 1: GWRDC's corporate governance framework and planning and reporting approach**

| Element | Description |
|---|---|
| Enabling legislation | The PIERD Act sets out the legislative framework and rules for the establishment and operation of the GWRDC. |
| Governance legislation | As well as its responsibilities under the PIERD Act, GWRDC has accountability and reporting obligations set out in the *Commonwealth Authorities and Companies Act 1997* (CAC Act), the Commonwealth Authorities and Companies (Report of Operations) Orders 2005 and annual Commonwealth Authorities and Companies Orders (Financial Statements). |
| Environmental management | GWRDC reports annually on its performance in relation to ecologically sustainable development and other matters outlined in the *Environment Protection and Biodiversity Conservation Act 1999*. |
| Financial control | GWRDC maintains accounts and records of transactions and affairs in accordance with the Finance Minister's Orders made under the CAC Act, including the Australian Accounting Standards, and with other legislative requirements. |
| Audit process | Independent internal and external audits are applied to financials, risk, fraud, quality and RD&E. |
| Fraud and risk management | GWRDC's fraud and risk management framework includes processes for project-, program- and portfolio-level risk management, general compliance and operational risk management and financial risk management, and prudential guidelines for business ventures. |
| Monitoring performance | GWRDC monitors, measures and evaluates its performance to continually improve its effectiveness and efficiency. |
| Reporting to stakeholders | GWRDC reports regularly to stakeholders, including through formal reporting to WGGA, WFA and the Australian Government, publication of annual reports, R&D newsletters, e-newsletters and final research reports, and participation in conferences, workshops and other activities. |
| Planning and reporting | GWRDC's corporate planning and reporting approach includes:<br>• a Strategic Plan that sets out GWRDC's high-level goals, strategies and performance measures for a five-year period, developed in consultation with stakeholders and approved by the Minister<br>• an Annual Operational Plan that outlines the annual budget, resources and research priorities that give effect to the Strategic Plan during a given financial year. It also provides the opportunity for GWRDC to respond to external drivers and changing priorities during the life of the Strategic Plan by providing revised emphasis on research themes<br>• a Portfolio Budget Statement – as part of the Australian Government budget process – that summarises the planned outputs, outcomes, performance information and financial statements for a given financial year, and<br>• an Annual Report that provides information on RD&E activities and their performance in relation to the goals set in the Annual Operational Plan and Portfolio Budget Statement for a given financial year. |

# STAKEHOLDER CONSULTATION

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In developing its new Strategic Plan, GWRDC has conducted extensive consultations with its stakeholders.

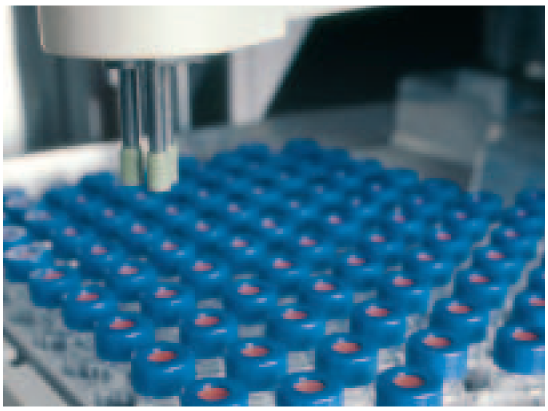
GWRDC prepared the following documents, which were circulated to stakeholders and are available from the GWRDC website:

- *Developing the new GWRDC Five-year Research and Development Plan 2012–17*, which asked where participants thought the Australian wine sector should be in 2017, and how could RD&E help it get there?
- *The Australian wine sector at a glance*, which provided an overview of the size and nature of the Australian wine sector, and how it had changed in the previous decade.

## Primary stakeholder group

GWRDC's primary stakeholders are WGGA and WFA, the representative organisations of our levy payers, and the Australia Government. Our primary stakeholders were each invited to identify what they believe to be the research priorities for the period 2012–17.

WGGA's Board and Executive and the Department of Agriculture, Fisheries and Forestry participated in facilitated workshops to help identify key research priorities. WFA and WGGA provided written submissions from their Boards, outlining the priorities they saw for RD&E over the next five years.



## Regional stakeholder group

The regional stakeholder group is made up of the GWRDC Regional Program representatives and the industry organisation in each wine region. The eleven regions contracted to deliver the Regional Program were invited to participate in a facilitated workshop, and GWRDC's Chair wrote to the Chairman or President of each of the 72 industry organisations inviting their input.

## Global focus stakeholder group

A small, focused group of people who engage in and observe the global wine sector were invited to provide their views on international drivers, including opportunities and threats, that will impact on the Australian wine sector from 2012 to 2017.

## Future Leaders stakeholder group

Graduates of the Future Leaders Program and GWRDC-sponsored graduates of the Australian Rural Leadership Program were invited to participate in a facilitated workshop.

## Top 20 wine producers

GWRDC also invited Australia's top 20 wine producers to identify their key researchable questions. Some conducted internal workshops and provided the outcomes to GWRDC. Others provided written submissions.

## Wine sector RD&E stakeholder group

A further workshop was held with co-investors in wine RD&E, represented by the Australian Government, the National Wine Research Network (NWRN) and the National Wine Extension and Innovation Network (NWEIN). NWRN and NWEIN bring together wine sector leaders, funders, government agencies and research and extension providers. Within these two networks there is representation of all major wine RD&E providers, including AWRI, NWGIC, CSIRO, Wine Australia, universities and state agencies.

## Wine Australia Corporation

Wine Australia Corporation (WAC), GWRDC's partner statutory authority in the wine sector, was invited to identify its key researchable questions.

# KEY THEMES

KEY THEMES

Through this consultation, GWRDC's stakeholders identified the themes shown in Figure 1 as priorities for RD&E over the period 2012–2017. There was significant overlap in certain areas and this has been portrayed by presenting the priorities in the form of a word cloud to provide a visual representation of the relative importance of each theme to GWRDC's stakeholders.


**Figure 1: Stakeholder priorities for RD&E for the period 2012–17**

# CONTEXT FOR THIS PLAN

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The Australian Government and grape and wine sector drivers set the context for the GWRDC planning environment, and the GWRDC's strategic RD&E themes are developed to respond to these drivers (see Table 2).

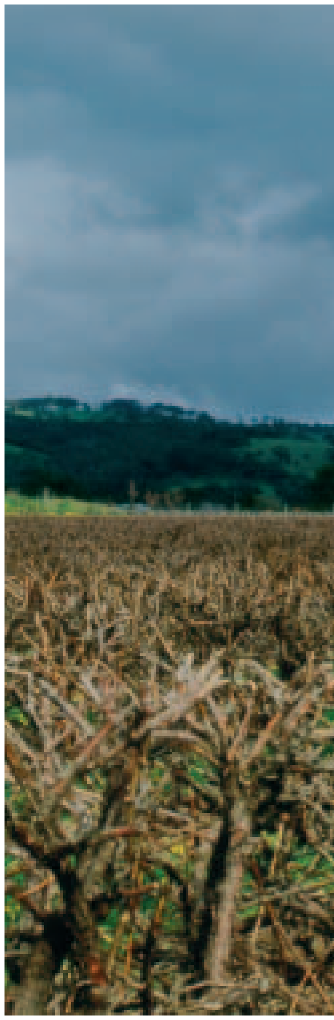

**Table 2: Drivers of GWRDC's planning environment**

| PIERD Act objectives | National Research Priorities | National Rural R&D Priorities | PISC RD&E Framework: Wine Sector Strategy | Grape and wine sector plans |
|---|---|---|---|---|
| Use and manage natural resources sustainably | An environmentally sustainable Australia | Natural resource management | Boost the competitiveness and sustainability of the sector across the value chain by:<br>• facilitating greater coordination among all stakeholders to work together effectively<br>• supporting a strong culture of collaboration<br>• focusing RD&E resources so they are used more effectively, efficiently and collaboratively | RD&E priorities of the GWRDC's representative organisations, plus priorities identified during consultation with the sector |
| | | Climate variability and climate change | | |
| Use human resources and skills more effectively | Safeguarding Australia | Biosecurity | | |
| Increase economic, environmental and social benefits | Promoting and maintaining good health | Supply chain and markets | | |
| | | Productivity and adding value | | |
| Improve accountability for expenditure on R&D | Frontier technologies for building and transforming Australian industries | Technology | | |
| | | Innovation skills | | |
| **Government and grape and wine sector drivers** | | | | |

| Grape and wine value driver analysis | GWRDC RD&E programs | | GWRDC strategic RD&E themes | GWRDC objective | GWRDC outcome |
|---|---|---|---|---|---|
| Revenue | **Program 1:** Environment and sustainability | **Program 4:** Extension and adoption – working across the value chain | Climate change and adaptability | Invest in and direct RD&E that supports a competitive Australian wine sector | An Australian wine sector that is profitable, competitive and sustainable through innovation |
| Costs | **Program 2:** Consumers and markets | | Vineyard profitability | | |
| Capital | **Program 3:** Improving products and processes | | Biosecurity | | |
| Resources | | | Germplasm | | |
| Market viability | | | Pest and disease management | | |
| | | | Consumer insights | | |
| | | | Market access | | |
| | | | Vineyard characteristics | | |
| | | | Objective measures of quality | | |
| | | | Process efficiency | | |
| | | | Extension and adoption | | |
| | GWRDC implementation | | | GWRDC objective and outcome | |

The RD&E priorities of the GWRDC's representative organisations are strongly influenced by the structure, competitiveness and profitability of the grape and wine business in Australia (see Table 3).

**Table 3: A snapshot of the grape and wine business in Australia, 2010–11**

| Variable | Measure (rounded estimates) |
|---|---|
| Total grape production | 1.6 million tonnes (2011 vintage)[1] |
| Total grape bearing area | 154,000 hectares[2] |
| Wine production | 1.07 billion litres[2] |
| Winemaking business | 325 winemaking facilities crush 50 tonnes or more; about 2400 companies make wine[3] |
| Grapegrowing | 6679 commercial grape growers[2] |
| Geographic range | From about 27°S to 42°S and from maritime to inland locations across Australia |
| Sales | Domestic: 456 million litres[4]<br>Export: 727 million litres[5] |
| Top 2 export markets (UK and USA) | 495 million litres[5] |
| Top 10 markets (about 90%) of market | 657 million litres[5] |
| Number of consumers | At least 73 million international consumers[6] |
| Value of industry | $8.3 billion (direct) and $43 billion (indirect)[7] |
| People in the industry and its value chain | 28,000 direct and 56,000 indirect[8] |
| RD&E investment | $116,000,000 in contracted projects[9] |

Sources:

1 Winemakers' Federation of Australia *Vintage Survey*
2 ABS *catalogue 1329.0*, 7 December 2010
3 *The Australian and New Zealand Wine Industry Directory*, 2011
4 ABS *catalogue 8504.0*, 24 November 2011
5 Wine Australia *Export Approval Database*
6 Wine Intelligence reports, 2011
7 Euromonitor International, 2011 and Wine Australia
8 *ABS 2006 Census*
9 GWRDC

# The Australian wine sector: a changing landscape

Over the last 10 years, the size and nature of the Australian wine sector have changed dramatically.

In the period from 2005 to 2010, the number of grapegrowers dropped by 20 per cent to 6679, while the average vineyard holding grew by 15 per cent to 23 hectares.

From 2000 to 2010, the area of vineyards bearing fruit increased by 16 per cent, while the number of wine companies doubled and the number of wine producers who export wine grew by 86 per cent. While these statistics suggest that there has been tremendous growth over the previous decade, it is important to note that the industry is now in a contraction phase. Plantings began to decline towards the later part of the decade and crush continues to fluctuate as a function of plantings and seasonal variability (see Figure 2).

A strong influence on the wine sector's profitability is the value of the Australian dollar compared with the currencies of key export markets. Over the 10 years to December 2011, the Australian dollar appreciated by 84 per cent against the US dollar, 76 per cent against the pound sterling and 26 per cent against the Euro.

From 2000–01 to 2010–11, the volume of Australian domestic wine sales grew by 18 per cent and exports grew by 115 per cent. While the value of exports rose from A$1,614 million to A$1,957 million, the average value of exports fell from $4.76 per litre to $2.69 per litre over the same period. Imports grew 458 per cent by volume, 443 per cent by value and to A$7.30 per litre.

Total exports to the UK and New Zealand fell in value by 32 per cent and 16 per cent respectively, while exports to the US and Canada rose by 18 per cent and 127 per cent respectively. However, the value per litre of the wine exported dropped in each of the four markets.

In 2010–11, Australia was the world's fourth largest wine exporter in value and volume (see Table 4 on page 14). The strongest growth in exports has been in the sub A$2.49 per litre free on board (FOB) price segment (see Tables 5 and 6 on page 14).

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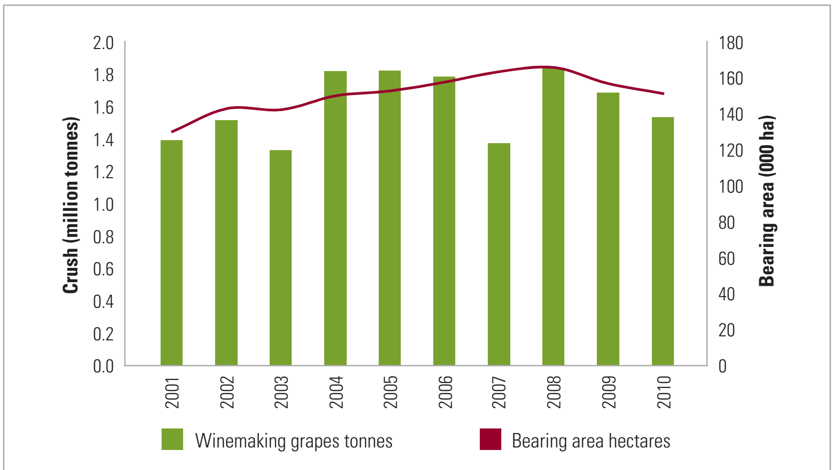
**Figure 2: Vineyard bearing area and winegrape production, 2001–10**




Source: ABS *catalogue 1329.0*, 7 December 2010

### Table 4: Top 10 global wine exporters by volume (ML) in 2010–11

| Country | 2010–11 | 2000–01 | Change (%) |
|---|---|---|---|
| Italy | 2279 | 1669 | 37% |
| Spain | 1920 | 966 | 99% |
| France | 1384 | 1530 | –10% |
| Australia | 727 | 339 | 115% |
| Chile | 669 | 293 | 128% |
| USA | 419 | 292 | 43% |
| Germany | 395 | 240 | 64% |
| South Africa | 374 | 164 | 128% |
| Argentina | 281 | 89 | 216% |
| Portugal | 269 | 165 | 63% |

Source: *Global Trade Information Services – Global Trade Atlas*, January 2012

### Table 5: Volume of Australian wine exports (ML) by price segment

| Price segment | 2011 | 2001 | Change (%) |
|---|---|---|---|
| <$2.49 | 375 | 73 | 416% |
| $2.50–4.99 | 256 | 155 | 65% |
| $5.00–7.49 | 43 | 113 | –62% |
| $7.50–9.99 | 14 | 21 | –33% |
| >$10.00 | 15 | 14 | 8% |

Source: Wine Australia Corporation – Export Approval Database, January 2012

### Table 6: Percentage of volume of Australian wine exports by price segment

| Price segment | 2011 | 2001 | Change (pp) |
|---|---|---|---|
| <$2.49 | 53% | 19% | +34 |
| $2.50–4.99 | 36% | 41% | –5 |
| $5.00–7.49 | 6% | 30% | –24 |
| $7.50–9.99 | 2% | 6% | –4 |
| >$10.00 | 2% | 4% | –2 |

Source: Wine Australia Corporation – Export Approval Database, January 2012

## International drivers of change 2012–17

Based on consultations with those of its stakeholders that have a global focus, GWRDC has identified the following international drivers of change.

Strong opportunities are provided by the Chinese and other East Asian emerging markets, where demand for fine wines is likely to keep growing steadily and Australia has a strong foothold. Five of the top 10 importers of bottled still wine, in terms of price, are East Asian countries. The Chinese markets for commercial premium and non-premium (including bulk) wines may continue to grow rapidly, notwithstanding China's expanding domestic production capability.

Increasingly, consumers and customers will look for authenticity and integrity – both of the product and the brand story behind it. New products with novel flavours, reduced alcohol etc. will play an important role, particularly with Gen Y. Wine will need to be produced in the styles to meet demand.

Challenges in the international context include the Australian dollar remaining high relative to the currencies of our key wine markets and of key competitors in those markets and in the Australian domestic market. Demand in export markets has fallen by $1 billion in sales value since 2006–07 because of a change in competitiveness. Other New World exporters will continue to upgrade the quality as they expand the quantity of their wine exports, and France is expected to continue to dominate the Chinese market for imported fine wine.

Another challenge is the trend towards protectionism; it will be essential for Australia to continue working to reduce trade barriers in new and emerging markets.

The risk of exotic grapevine diseases entering Australia continues.

Both internationally and domestically, supermarkets will continue to squeeze supplier margins and develop their own wine brands to compete aggressively with popular premium brands.

## Impact of operating environment on levy-funded investment activity

The changed wine sector environment makes it essential to realise the return on investment in RD&E in a more timely manner.

The primary sources of the GWRDC's annual revenue are levies collected from grapegrowers and winemakers. The amount of levy revenue received each year depends on a number of risks, including drought or other weather events and pest or disease outbreaks.

One possible driver for change in GWRDC's investment activity over the next five years would be if a change in the taxation regime or restructuring of the industry for another reason caused winegrape production to fall significantly.

# SIGNIFICANT ACHIEVEMENTS 2007–12

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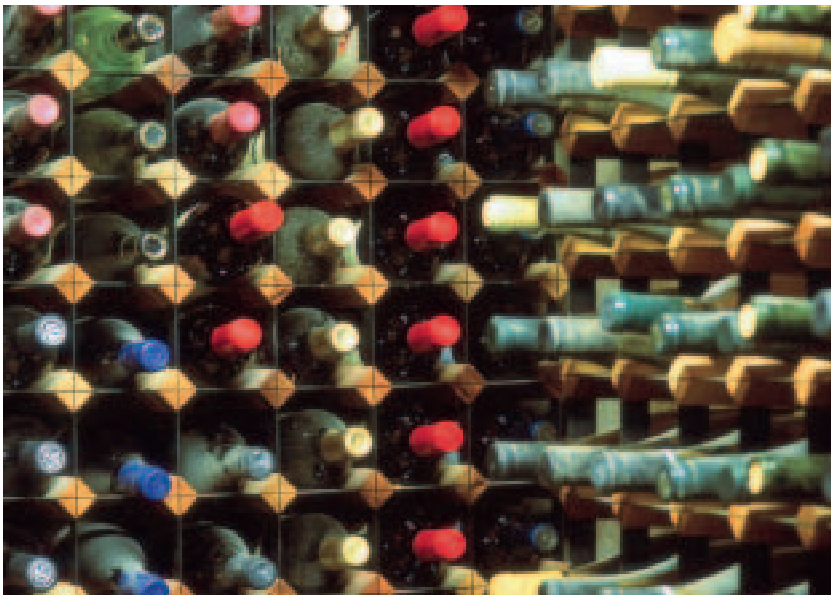
The *GWRDC Five Year R&D Plan 2007–12* aimed for sustainable consumer-driven innovation. Three priorities were that:

- the grape and wine sector have more information about new market opportunities and the preferences of consumers in those markets
- winemakers have more tools so that they could tailor wines to meet the needs of these new markets, as well as existing markets, and
- grapegrowers have production methods that would allow them to grow grapes to meet these markets' needs.

As well as meeting market needs, the plan aimed for these innovative tools and methods to be environmentally sustainable and to allow the sector to be socially responsible. The plan recognised that research and development only makes a difference when it is adopted. Following are some of the significant achievements from the last five-year plan.

## Greater knowledge of consumer preferences and new markets



Wine marketers better understand the decision influencers along the wine industry supply chain in Australia, China and the USA, and how these differ between on-premise and off-premise businesses, and high- and low-margin distribution businesses. The challenges and opportunities for future Australian wine exports into China have also been clarified, and where Australia and its competitors are placed has been captured in *Global Wine Markets, 1961 to 2009: a statistical compendium* (The University of Adelaide Press 2009).

The drivers of consumer preference are better understood. A study of Chinese consumers identified those attributes of wines that these particular consumers value. The major impact of price on consumer liking was also quantified, and this information allows the sector to make decisions about marketing as well as wine taste attributes in order to meet consumer needs. It was also confirmed that off flavours identified and strongly disliked by winemakers and wine experts, such as medicinal, oxidised, bandaid and sulphide aromas, are also perceived negatively by consumers.

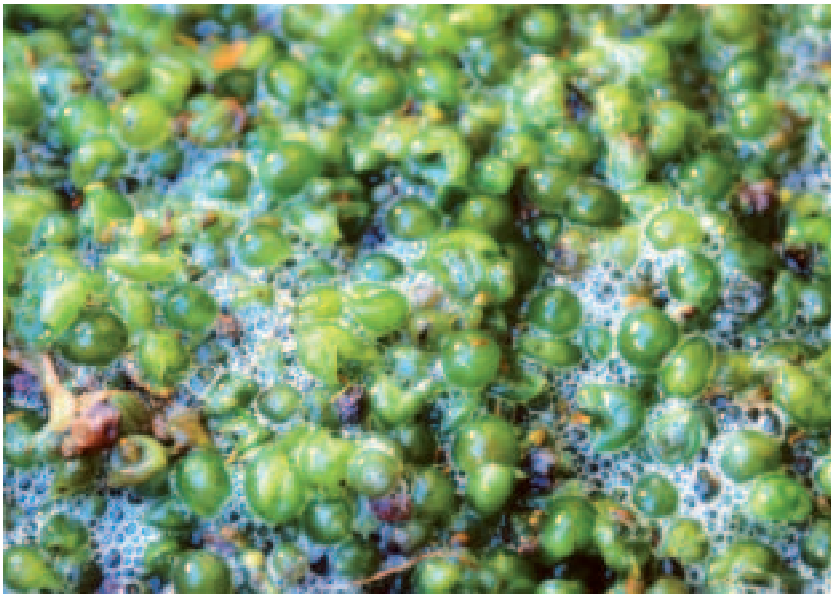
## Improved winemaking tools

Winemakers now have access to a range of new commercially available yeasts with different flavour profiles and improved fermentation capabilities. This very practical outcome is complemented by the sequencing of the genome of a wine yeast, a world first. This will help us understand how yeasts work and allow the continuing development of novel yeasts with better fermentation capabilities. Likewise, development of improved strategies to manage the spoilage yeast *Dekkera bruxellensis* (*Brettanomyces*) will be facilitated though our knowledge of its genome sequence.

As well as improved and expanded choices for fermentation management, winemakers also have more information about protein stabilisation technologies and wine packaging, allowing them to optimise these elements for their business needs and to meet consumer demands.

New analytical tools are available to detect oxidation and confirm the integrity of bottled wines non-destructively, measure tannin in grapes and wines, and determine the levels of smoke taint in wines. How to manage and minimise smoke taint issues in wines is also better understood.

## Improved understanding of the drivers of grape and wine quality



The biosynthesis of pigments and tannins in grapes, compounds that are essential for wine quality, and their extraction during red wine fermentation, are better understood. Further research aimed at managing biosynthesis and extraction to ultimately meet consumer needs will occur in 2012–17.

The compound responsible for the pepper aroma, a key regional characteristic of Australian Shiraz, has been identified and we now have greater capacity to measure and manage this attribute. Work on precursors to the compounds responsible for typical Sauvignon Blanc aroma has delivered a greater understanding of the impact of grape harvesting, transport and fermentation on the expression of these varietal flavour compounds in wine.

## Enhanced grapegrowing for purpose

The sector is now significantly closer to having mildew-resistant grape vines suitable for commercial wine production. A Stage 1 field trial of over 1000 mildew-resistant grapevines developed through conventional breeding programs is under way to assess plant performance traits and berry attributes. This work builds on previous and long-standing investment by GWRDC into research on the genetic basis for both the resistance and susceptibility of vines to fungal diseases.

Other breeding programs have also made good progress on developing rootstocks with drought tolerance, nematode resistance, appropriate vigour potential, and low-to-moderate transport of potassium.

The sector now has a better understanding of how grapes ripen, following research that demonstrated the effectiveness of plant growth hormone application in delaying ripening and ensuring that more of the berries within a bunch ripen at the same time. This knowledge may lead to better management of harvest timing and reduced variation of quality within grape lots.

The sector has also gained a greater understanding of the complex interactions between vines, soil, water and environment drivers such as heat stress through the Soil and Water Initiative. The outcomes of this research initiative are available to the sector through 15 technical information modules, tailored to meet the viticultural management needs of specific regions. Formal evaluation feedback demonstrates on-ground impact and practice change throughout the sector.

## Improved sustainability of the sector, the environment and communities

Best-practice winery wastewater treatment, reuse and recycling are within reach of all in the sector through an online resource kit that pulls together the outcomes of several years of research.

A winery refrigeration handbook is available to help the wine sector improve its refrigeration efficiency and decrease electricity usage and costs, as is a tool to calculate carbon budgets for wine production, which enables the sector to participate in overseas markets with greenhouse gas requirements, such as the United Kingdom.

More wine sector personnel have formal leadership training and some are already contributing through board and committee positions, while others are poised to take on leadership roles.

## Improved extension strategies

Winemakers and grapegrowers were encouraged to take up new tools and research findings through:

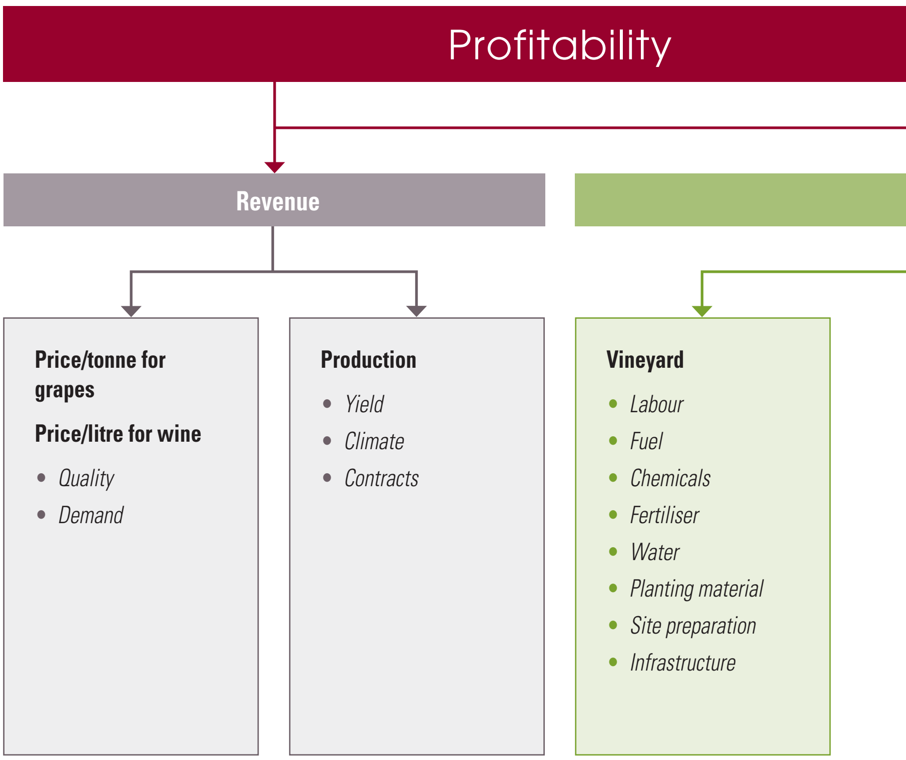
- 19 factsheets and Q&A documents, in addition to 15 Water and Vine modules, that encourage adoption by making new knowledge and practices from research available to grapegrowers
- the Innovators' Network, a network of people actively engaged in winegrape production in the Australian wine sector who want to stay across the latest information and tools. The sector was provided with relevant and practical information and support through Innovators' Network workshops, e-newsletters, factsheets and information modules.
- the Regional Program, in which GWRDC partners with 11 regional wine clusters to meet each cluster's specific information needs through extension and adoption activities
- AWRI seminars and workshops and NWGIC Spring Vine Health Field Days.

## VALUE DRIVERS

VALUE DRIVERS

The RDC model is designed to advance innovation in rural RD&E, particularly where there is market failure, through industry and government investment. Each RDC has a significant focus on translating research outputs into practical outcomes that provide economic, environmental and social benefits to the RDC's industry and the Australian people. To help determine where investment should be focused for the best possible impact, GWRDC analysed the grape and wine value drivers (see Figure 3).

**Figure 3: Grape and wine value driver analysis**



## Sustainability Competitiveness

### Costs

**Logistics**
- *Transport*
- *Storage*
- *Handling*

**Winery**
- *Labour*
- *Additives*
- *Power*
- *Packaging*
- *Processing*

### Capital

**Machinery, plant and equipment**

**Land**

**Working capital**

### Resources

**Environment**
- *People*
- *Soil*
- *Water*
- *Biodiversity*
- *Biosecurity*
- *Communities*
- *Climate*

### Market viability

**Consumer satisfaction**

**Consumer preference**

**Success of competitors**

**Market access**

## Alignment with Australian Government priorities

Table 7 demonstrates the alignment of GWRDC programs with the Australian Government's Rural R&D Priorities and National Research Priorities.

**Table 7: Alignment of GWRDC programs with Australian Government priorities**

| GWRDC RD&E Programs and Strategies | GWRDC Strategic RD&E Themes | Rural Research and Development Priorities | National Research Priorities |
|---|---|---|---|
| **Program 1: Environment and sustainability** | Climate adaptability<br>Vineyard profitability<br>Biosecurity<br>Germplasm (grapevine)<br>Pest and disease management | Natural resource management<br><br>Climate variability and climate change | An environmentally sustainable Australia |
| | | Biosecurity | Safeguarding Australia |
| **Program 2: Consumers and markets** | Consumer insights<br>Market access | Supply chain and markets | Promoting and maintaining good health |
| **Program 3: Improving products and processes** | Objective measures<br>Process efficiency<br>Vineyard characteristics<br>Germplasm (yeast and bacterial) | Productivity and adding value | |
| **Program 4: Extension and adoption** | Adoption<br>Developing people<br>Evaluation | Supporting the Rural Research and Development Priorities:<br>• Innovation skills<br>• Technology | Frontier technologies for building and transforming Australian industries |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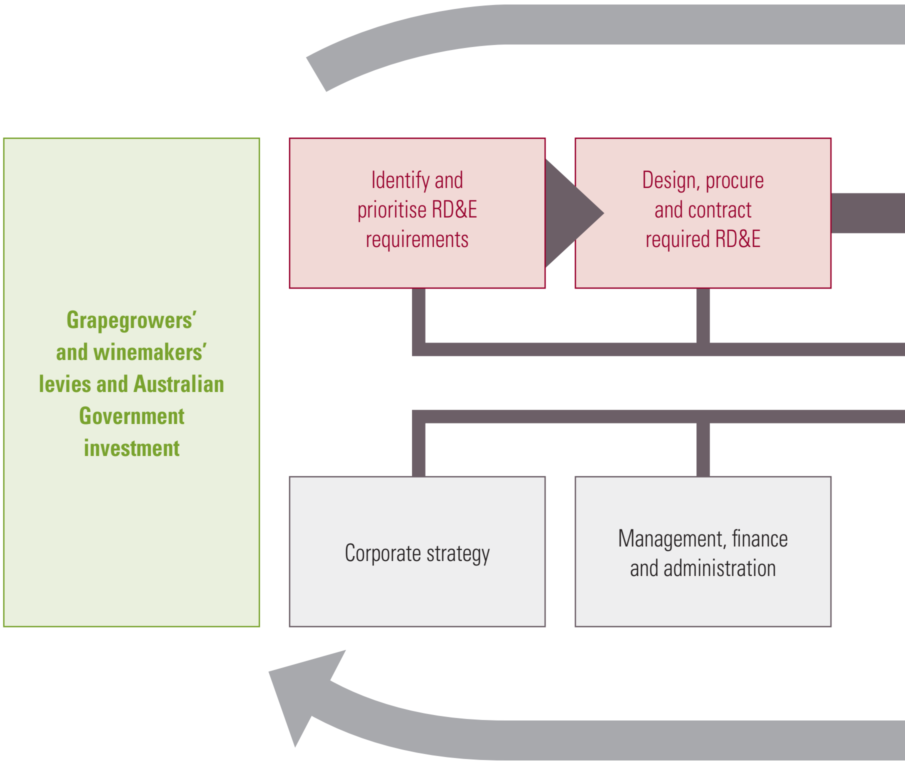
# VALUE CHAIN

VALUE CHAIN

The GWRDC value chain (see Figure 4) illustrates how we implement our strategies to create value for our stakeholders, through five enabling activities and four core business processes. The starting point of the value chain is the grapegrowers' and winemakers' levies and investment from the Australian Government, and the end point is ensuring, through RD&E, that the Australian wine sector effectively competes in global wine markets.

Figure 4: The GWRDC value chain



## Investing

GWRDC's role is to ensure that returns on RD&E investment are optimised, that they fulfil stakeholder priorities, and that the values of the resultant economic, environment and community benefits are assessed and disseminated.

We objectively assess funding proposals using a fair and equitable process. We use clear and objective criteria and exclude any individuals with a conflict of interest from the assessment. The criteria include:

- alignment with the wine sector's strategic research priorities, as described in this Strategic Plan and Annual Operational Plans
- the feasibility of the proposed work and the quality of the research plan
- how the outcomes will add value to the wine sector. This may include a cost–benefit analysis and consideration of the value of the proposed outcomes to industry in light of the scale of the total proposed investment
- a clear pathway to adoption that outlines how the benefits will be delivered, or are capable of being delivered, to the wine sector. Adoption pathways include through the NWEIN, GWRDC Innovators' Network and GWRDC Regional Program.

Proposals are assessed and scored numerically on how well they meet these key criteria.

The GWRDC Program Managers individually assess and score the proposals and use the aggregated scores for all criteria to rank proposals. Rankings from individual Program Managers are compared across the group to confirm that consistent assessment has been made.

When it is agreed that additional expertise is needed for assessment, independent experts are contracted to provide a confidential assessment of the proposals, using the same key assessment criteria.

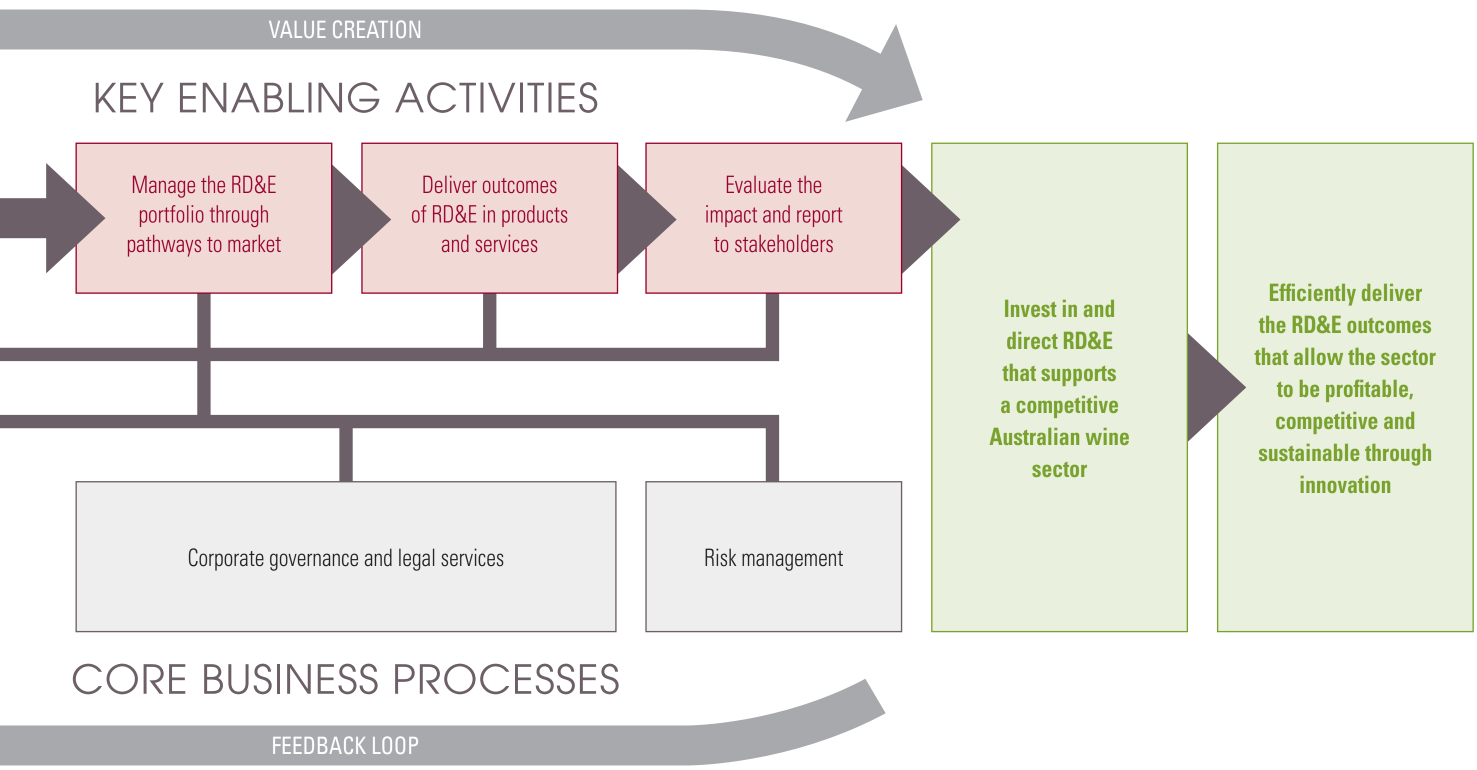
A recommendation from the Program Managers is provided to the R&D Committee of the GWRDC Board, which, in the case of Final Project Applications and Expressions of Interest, makes recommendations to the GWRDC Board about whether or not to fund a research proposal based on the proposal's ranking and funding availability.

More information about these procedures is available on our website www.gwrdc.com.au/webdata/resources/files/Assessment_criteria.pdf

In 2012–17, GWRDC will place a stronger emphasis on the pathway to market for RD&E than in earlier years, in part by considering acting as a clearing house for research undertaken domestically and internationally.

In the same vein, GWRDC will actively embrace its research brokerage role to ensure that we build on existing research in Australia and overseas, and don't duplicate what has already been done.

We expect to place an increasing emphasis on seeking expressions of interest or directly commissioning research in high-priority areas.



# Program 1: Environment and sustainability

GWRDC'S PROGRAMS

GWRDC'S PROGRAMS

This program is focused on wine sector environmental stewardship and sustainability. This program will build on past achievements through new knowledge, tools and planting material.

The goal of this program is to ensure that the sector is resilient in the face of:

- a variable and changing climate
- production challenges posed by pests and diseases
- increased pressure on and scarcity of natural resources
- a need to demonstrate and adopt production practices that minimise our environmental footprint.

## 1.1 Climate adaptability

This strategic theme aims to provide the sector with the information and tools it needs to remain resilient to the challenges posed by a continually variable and changing climate. Such challenges include extreme events of heat, rainfall, frost, hail and smoke. Research under this theme will also aim to provide strategies to reduce the use of energy, water and other resources and mitigate greenhouse gas emissions.

| Objectives | Strategies | Measures of success |
|---|---|---|
| Wine regions are able to adapt to climate challenges, making them more resilient | Develop knowledge and tools for the wine sector on ways to manage extreme heat events and reduced water availability | Reduced annual yield variation from extreme heat events and lower water availability, compared to that pre-2012 |
| Reduction of the environmental footprint of wine production | Develop ways to optimise wine production inputs and minimise waste | Improvement in key indicators (agreed by WFA and WGGA) of the wine sector's environmental footprint |

## 1.2 Germplasm (grapevine)

Planting material is the foundation of the wine sector. Planting decisions require high-quality germplasm that is resilient to future climate challenges while being able to deliver desired wine quality and styles. This program focuses on evaluating and identifying rootstocks, varieties and clones that produce desirable wine styles, while possessing a number of other essential properties such as tolerance to drought, heat, salt, soil-borne pests and diseases. This theme will interact strongly with the *Process efficiency* theme (3.3).

| Objectives | Strategies | Measure of success |
|---|---|---|
| Resilient, clean and superior planting material available to the sector | Identify, develop, evaluate and trial clones, varieties and rootstocks that possess desirable viticultural and winemaking properties | Clones, varieties and/or rootstocks from GWRDC-funded R&D make up an increasing proportion of new plantings by 2017 |

### 1.3 Vineyard profitability

Managing an efficient vineyard in a sustainable way is essential to ensure that it remains viable in the longer term. This program is focused on identifying environmentally sustainable inputs into the vineyard and technologies that will allow reductions in vineyard labour and input costs. It also aims to facilitate technology transfer to ensure efficient use of resources in the vineyard, such as water and nutrients. Maintaining and improving soil quality and managing the impacts of salinity build-up in the root zone are an ongoing focus. Coordination with research in the *Objective measures of quality and assessment systems* and *Process efficiency* themes (3.1 and 3.3) will ensure that grape quality is not compromised by gains in efficiency.

| Objectives | Strategies | Measures of success |
|---|---|---|
| Improve profitability in the vineyard without compromising sustainability, productivity or quality | Identify ways to improve efficiency in the vineyard through enhanced technology and altered processes | At least two enhanced technologies and/or processes that improve vineyard efficiency are widely understood and available for adoption by 2017 |
| | Combat soil and salinity constraints through improved management | Establish a national soil benchmarking program that allows growers to assess key soil indicators, identify constraints and provide strategies to combat any soil limitations by 2017 |

### 1.4 Pest and disease management

The prevention and control of endemic pests and diseases cause significant economic cost to the grapegrowing community in terms of labour, chemicals, fuel and lost productivity. This program aims to minimise those costs by developing best-practice spray programs as part of an integrated pest management (IPM) strategy. The program also aims to demonstrate the benefits that result from focusing on maintaining and improving biodiversity in and around the vineyard, and to minimise any potential environmental and social impacts that could be caused by pest and disease control.

| Objectives | Strategies | Measures of success |
|---|---|---|
| Reduce the impact of pests and diseases in Australian viticulture | Develop IPM strategies that grapegrowers can adopt | Economic impact of pest and diseases on Australian viticulture in 2017 is significantly lower than estimated impact in 2009 |
| | Better understand how to manage and control grapevine pests and diseases | Improved pest and/or disease management practices are available for uptake by 2014 |
| | Develop best-practice spray programs | Best-practice spray programs and IPM strategies widely promulgated |
| | Minimise any off-target impact of spray programs by increasing use of drift reduction technologies | Spray management strategies used by growers in 2017 are significantly improved compared with 2011 |
| | Collaborate with other RDCs to reduce spray drift impacts outside viticulture | Information resource on drift reduction technologies widely available by 2015 |

### 1.5 Biosecurity

Biosecurity is a vital consideration for Australian agriculture. GWRDC will contribute to ensuring the sector is prepared in the event of an exotic pest incursion, in particular the high-priority ones. Work will focus on reviewing the Industry Biosecurity Plan, developing diagnostic tests and ensuring adequate training for field identification. The program may also focus on relevant research on selected non-ubiquitous endemics on a case-by-case basis.

| Objectives | Strategies | Measures of success |
|---|---|---|
| Wine sector is prepared for any prioritised exotic pest incursion | Liaise closely with WGGA, Plant Health Australia and other RDCs as appropriate to ensure that the grape sector has a plan as well as the appropriate tools, protocols and resources ready to deploy in case of an exotic incursion | Industry Biosecurity Plan has been reviewed by 2014 and is maintained as an up-to-date resource<br>At least one diagnostic protocol developed and ready to be used to diagnose key exotic pests by 2015<br>Preparedness, as demonstrated by successful incursion simulation exercises |

Program 2:

# Consumers and markets

The Australian wine sector will be competitive if it produces the wines consumers want, if those wines are produced in a profitable and sustainable manner, and if those wines are accessible.

## 2.1 Consumer insights

This theme is focused on understanding what wine consumers and purchasers want to buy and why.

The aim is to develop a better understanding of what attributes consumers and potential consumers of Australian wine, domestically and internationally, find desirable or, more simply, why consumers choose (or don't choose) Australian wine.

Research in this area will focus on pre-competitive insights and will be closely linked with the work of *Program 3: Improving products and processes*. GWRDC will also investigate the need to act as a clearing house for research done by third parties (such as packaging companies), thereby providing access to research done by a range of sources.

| Objectives | Strategies | Measures of success |
| --- | --- | --- |
| Understand what wine consumers want to buy and why | Investigate the impact of wine styles, wine attributes and/or packaging on consumer decision making | An increased understanding of how consumer purchasing decisions are affected by three elements by 2017 so that the sector can develop tools to deliver what consumers want |
| | Investigate consumer and trade perceptions about Australia and competitor countries | The sector is able to better inform route-to-market partners as the information becomes available |

*The aim is to develop a better understanding of what attributes consumers and potential consumers of Australian wine, domestically and internationally, find desirable or, more simply, why consumers choose (or don't choose) Australian wine.*

## 2.2 Market access

This theme is focused on ensuring that market access is maintained and improved for Australian wines in the domestic and overseas markets.

| Objectives | Strategies | Measures of success |
| --- | --- | --- |
| Maintain market access in existing markets<br>Improve market access in developing markets | Collaborate with other sector bodies to identify and manage current and potential trade barriers | No reduction in market access over the period 2012–17 because of technical or regulatory issues |
| | Maintain a capability to support responses to technical and regulatory issues as they arise | Initiatives to improve market access have ongoing and appropriate R&D support |
| | Analyse competitor country performance in market | Improved market access in two developing markets by 2017 |

Program 3:

# Improving products and processes

**Enhancing the value proposition for the consumer and the producer will require a set of new tools as well as changes in practice by the grape and wine sector. This program aims to improve products and processes along the value chain.**

In the vineyard, establishing objective measures of grape quality will make it easier to define the relationship between grape quality and vine yield, and to develop viticultural practices that achieve vine balance while optimising quality and yield. These same quality measures are also required for more precise specifications for supply arrangements and more streamlined processing of fruit at the winery.

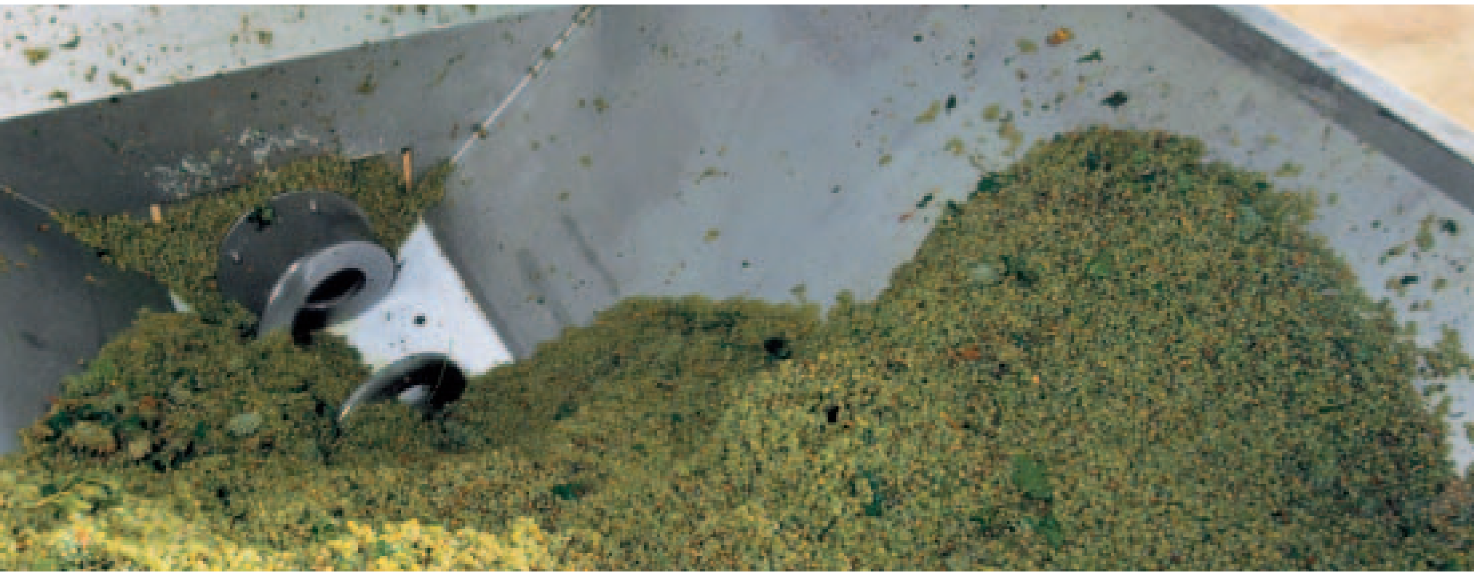
New winemaking practices and processes and improved packaging and transport strategies that achieve the wine sector's aim to meet consumer demands for wine quality also require a greater understanding of the drivers of wine quality. Improved productivity and profitability will also flow from identifying product innovation that unlocks new demand or taps unrealised value.

Genetic techniques and biotechnology will continue to play an important role in understanding the basis for quality markers and in accelerating conventional breeding for new rootstocks, grapevines, yeasts and bacteria.

## 3.1 Objective measures of quality and assessment systems

Being able to objectively define and measure grape and wine quality, beyond the basic parameters of sugar, acid and colour, is essential to being able to manage and improve products and processes in a timely manner. Significant efforts in the past have shown that defining and measuring quality is not a simple exercise and suggest that focusing on selected key measurable attributes and developing a matrix approach to assessment is more likely to be successful than attempting to broadly define quality in a single measurement.

| Objectives | Strategies | Measures of success |
|---|---|---|
| To produce fruit and make wine of known and desirable composition | Understand the genetic, chemical and biochemical basis for wine quality attributes related to colour, aroma, taste and texture<br>Specify and develop broadly relevant and objective measures of grape and wine quality, including desirable and undesirable attributes<br>Identify viticultural and winemaking practices that deliver fruit and wine with desirable characteristics | At least two new objective methods of assessing grape and wine quality are used by the grape and wine sector by 2017 |



### 3.2 Germplasm (yeast and bacterial)

Fit-for-purpose yeast and bacterial germplasm will be a key ingredient in the efficient production of superior wine at a range of price points. Conventional breeding will be accelerated using genetic techniques and biotechnology.

This theme will be closely linked with and complement the consumer research undertaken in *Program 2: Consumers and markets*.

| Objectives | Strategies | Measures of success |
|---|---|---|
| To produce wine of enhanced quality at a range of price points in the most efficient manner | Develop new and enhanced fit-for-purpose yeast and bacterial germplasm | New and enhanced germplasm from GWRDC-funded R&D is released for commercial uptake from 2015 |

### 3.3 Process efficiency

This theme will build on the knowledge generated in theme 3.1 to develop novel and improved practices and processes from the vineyard through to the point of sale. This theme will be closely linked with and complement the consumer research undertaken in *Program 2: Consumers and markets*.

| Objectives | Strategies | Measures of success |
|---|---|---|
| To produce fruit and wine of enhanced quality at a range of price points in the most efficient manner | Develop novel and improved viticultural and winemaking practices to deliver higher-value products | At least one viticultural and one winemaking process or practice that would lead to improved profitability are widely promulgated by 2017 |
| To package and distribute wine products to the market in the most efficient manner and with same or superior perceived quality | Develop novel and improved packaging, logistics and distribution practices | Demonstrable improved route-to-market strategies with potential for enhanced market share and sales for the wine sector available by 2015 |

### 3.4 Vineyard characteristics

Assisting and encouraging informed decision making by grapegrowers and winemakers through access to high-quality and objective national and international statistics and analysis.

| Objectives | Strategies | Measures of success |
|---|---|---|
| Sector has access to supply-side information to assist sector planning | Contract with appropriate organisations to undertake or supply the research | Information is available in a timely manner, including from the GWRDC website and other wine sector stakeholder communications |

# Program 4: Extension and adoption

As a competitor in the global wine market, the Australian wine sector is faced with the challenge of capturing comparative advantage through constant innovation in grape and wine production techniques, packaging technologies and various route-to-market strategies.

In the period 2012–17, GWRDC will place an even stronger emphasis on the pathway to market for R&D than it has done in earlier years. To ensure that value is captured for our funders, the research GWRDC invests in must be able to be used by our levy payers for innovation.

A key area for GWRDC is to build wine sector skills and capabilities to accelerate the adoption of R&D outcomes through the grape and wine value chain, and we will use a range of strategies to encourage the adoption of R&D by our stakeholders.

While GWRDC will continue to invest in longer-term strategic research, the changed wine sector environment makes it essential to realise the return on investment in R&D through its adoption by our stakeholders in the shortest possible time.

## 4.1 Adoption

The value of GWRDC's investments is only truly realised when R&D outcomes are taken up and effectively implemented.

GWRDC will focus on supporting a clear pathway to market for R&D, from the initial project design to the extension of the results of the R&D. We will build on our existing extension and adoption strategies to support a range of delivery channels and programs that deliver GWRDC investment outputs and help achieve best practice.

GWRDC will also investigate the need to act as a clearing house for research undertaken domestically and internationally.

| Objectives | Strategies | Measures of success |
|---|---|---|
| Increase the rate of adoption of R&D outcomes in the Australian wine sector | Develop and package RD&E outcomes for stakeholders<br>Use a range of delivery networks and programs to deliver GWRDC outputs and encourage adoption of new technologies and practices<br>Identify and work with key enablers to enhance the adoption of R&D outcomes within the Australian wine sector | Outputs from GWRDC-funded R&D are available in a timely manner on the GWRDC website and through other channels<br>GWRDC delivery networks and programs are strongly supported, as demonstrated by user feedback<br>Levels of understanding and adoption of R&D outcomes are regularly measured and reported |

## 4.2 Developing people

Building and securing the skills and knowledge of individuals, organisations and enterprises throughout the value chain is essential to sustaining Australia's productivity and competitive advantage internationally.

GWRDC will play a pivotal role in guiding the implementation of the *National Primary Industries Research, Development and Extension Framework – Wine Sector Strategy*, which aims to support the development of the 'next-generation' researchers and future industry leaders.

| Objectives | Strategies | Measures of success |
|---|---|---|
| The *National Primary Industries Research, Development and Extension Framework – Wine Sector Strategy* is implemented<br>Capacity of the next-generation researchers is developed<br>The next generation of wine sector leaders are trained in leadership skills | To collaborate with key national and state RD&E agencies and the sector bodies on the delivery of future wine sector RD&E<br>Support high-calibre candidates to undertake relevant leadership, PhD, Masters by research and Honours studies<br>Work with other RDCs on developing the broader research capacity | Phase 2 of the PISC Wine Sector Strategy is endorsed by stakeholders and implemented by 2014<br>At least 60 Honours and postgraduate students supported through GWRDC scholarships by 2017<br>At least 30 individuals in the wine sector receive leadership training by 2017 |

## 4.3 Evaluation

Evaluating the impact of RD&E investments and reporting to stakeholders on performance are part of GWRDC's core business. We will continually assess the performance of programs and projects against our strategies and stakeholder priorities, and report regularly to our primary stakeholders.

This continual assessment will also allow GWRDC to improve the efficiency and effectiveness of future investments.

| Objectives | Strategies | Measures of success |
|---|---|---|
| Measure the impact of RD&E investments<br>Report to stakeholders on the impact of RD&E investments | Evaluate each program against its measures of success<br>Undertake a cost–benefit analysis of certain projects to measure the impact of the RD&E investment<br>Provide an annual briefing to the Australian Government (through the *GWRDC Annual Report*), WGGA and WFA on outcomes | Regular internal and independent evaluations demonstrate positive economic, environmental and/or social returns on investment<br>Stakeholders regularly informed of the impact of RD&E investments |

GLOSSARY

# GLOSSARY

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|---|---|
| AWRI | The Australian Wine Research Institute |
| CAC Act | *Commonwealth Authorities and Companies Act 1997* |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation |
| DAFF | Department of Agriculture, Fisheries and Forestry |
| NWGIC | National Wine and Grape Industry Centre |
| NWEIN | National Wine Extension and Innovation Network |
| NWRN | National Wine Research Network |
| PIERD Act | *Primary Industries and Energy Research and Development Act 1989* |
| PISC | Primary Industries Standing Committee |
| RDC | Research and Development Corporation |
| RD&E | research, development and extension |
| R&D | research and development |
| WAC | Wine Australia Corporation |
| WFA | Winemakers' Federation of Australia |
| WGGA | Wine Grape Growers Australia |

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The Grape and Wine Research and Development Corporation is a partner of, and jointly funded by, the Australian Government and the Australian grape and wine sector.

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**Printed version:** 978-0-9871444-4-7
**Electronic version:** 978-0-9871444-5-4

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