

Review of the National Innovation System - Submission
Secretariat to the Expert Panel,
Review of the National Innovation System,
Department of Innovation, Industry, Science and Research,
GPO Box 9839,
CANBERRA, ACT 2601

Review of the National Innovation System - Submission

I have prepared this submission on behalf of the Winemakers' Federation of Australia (WFA). WFA is the peak national body representing wine enterprises of all sizes across Australia. Voluntary membership represents in excess of 95% of wine production in Australia. I would be happy to elaborate on any of the information within the submission or provide additional details to the Review.

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Submission to the Review of the National Innovation System

Introduction

The Winemakers' Federation of Australia (WFA) is the peak national body representing wine enterprises of all sizes across Australia. Voluntary membership represents in excess of 95% of wine production in Australia. It develops policies and programs for the whole industry on a range of political, social, environmental, trade and technical issues with both a national and international dimension.

The Australian wine sector is a major contributor to the economic and social fabric of Australian life responsible for employing more than 60,000 Australians and fostering the prosperity of many regional communities. In several regions direct employment in grape growing and wine production constitutes more than 20% of total employment. When supported employment is included the contribution of the wine industry to these regions would be significantly higher.

The Australian wine sector is an Australian success story. In 2006-07 the value of domestic sales reached \$1.9 billion and the value of export sales \$3.0 billion. Furthermore, Australia is the third largest wine exporter in the world by value and the fourth largest wine exporter by volume.

The strong growth seen in the wine sector has been particularly important for regional communities in Australia. The number of wineries has more than doubled in 10 years, to exceed 2,100 in 2007. The vast majority of wineries are small and located in regional areas, and around 70% have an annual crush of less than 100 tonnes. This increase in wineries and growth of the sector has contributed significantly to regional employment, infrastructure and tourism.

Despite its success, the wine sector faces a number of challenges. Increasing competition from other beverages and imports, a continuation of drought conditions, retail consolidation with the trend to discounting and the impact of climate change, are all issues that the industry will need to overcome if it is to continue to maintain strong growth.

In May 2007, the Australian wine sector launched *Wine Australia: Directions to 2025*, an industry strategy for sustainable success. *Directions* was developed to reassess the priorities and challenges facing the industry.

Directions identified the potential for the Australian wine sector to sell an extra \$4 billion worth of wine over the next five years – lifting cumulative domestic and exports sales for the period to \$30 billion.

Effective research and development has been a critical element in the successful growth of Australia's wine industry over the last decade and the Australian wine industry has become a world leader in viticulture and oenology research.

The Australian Wine Sector

In May 2007, the Australian wine sector launched *Wine Australia: Directions to 2025* as an industry strategy for sustainable success. Following a decade of unprecedented change in global wine trading conditions, *Directions* was developed to reassess the priorities and challenges facing the industry. It is founded on the firm conviction that Australia must become a more significant participant in the regionally

distinct and fine wine market, and its target is to increase the value of Australian wine trade over the next five years by a cumulative \$4 billion.

Directions recognised that Australia's wineries require more than a vision, and provides a series of practical tools and information which is currently being rolled out to industry through a series of national workshops under the *WineSkills* banner. These training modules have received the backing of the Australian Government through the Department of Agriculture, Fisheries and Forestry (DAFF).

Altered global trading conditions also bring new pressures and responsibilities to the environmental and social aspects of the sector. As the industry has expanded, so too has the policy and regulatory framework within which it operates. The Australian wine sector seeks to achieve positive environmental and social results for the industry, and the broader community as a whole, in a financially sustainable business environment. This can, and must be, achieved in partnership with the Australian Government through shared policy and program priorities.

a. Background and importance to Australia

Wine is an important industry in Australia, contributing significantly to a number of regional economies and directly employing some 28,000 people in both winemaking and grape growing (2006 Census), with further downstream employment in retail, wholesale, hospitality and tourism industries. The Australian wine industry is comprised of approximately 8,000 wine grape growers supplying over 2,000 wineries. In 2007, the total vineyard area reached almost 164,000 hectares. Wine grapes are grown in all states of Australia, with South Australia, New South Wales and Victoria accounting for the majority of production.

Table 1: Snapshot of the Australian Wine Industry

(2007 figures unless otherwise indicated)		
Wineries (2007)	number	2,299
Direct Employment (2006)		
Grape Growing	number	11,003
Wine Making	number	16,956
Wine Grape Crush	'000 tonnes	1,397
Wine Production	million litres	978.4
Domestic Sales - Volume	million litres	449
Domestic Sales - Value (2005/06)	\$A million	1,899
Exports - Volume	million litres	787.2
Exports - Value	\$A million	2,878.6
Imports - Volume	million litres	34.2
Imports - Value	\$A million	307

Sources: Australian and New Zealand Wine Industry Directory 2008 ABS and AWBC

The rapid expansion of wine production in Australia over the last decade combined with a small domestic market has seen the Australian industry become increasingly export oriented. Australia exports wine to 104 countries, and has an eight per cent volume share of global wine exports. In 2007 wine exports totalled a record 787 million litres with an estimated value of \$2.9 billion and accounted for around 10 per cent of Australia's agricultural exports. These wine export volumes currently represent almost 60 per cent of Australian wine sales and make Australia the world's fourth largest wine exporter. This is despite Australia's wine production accounting

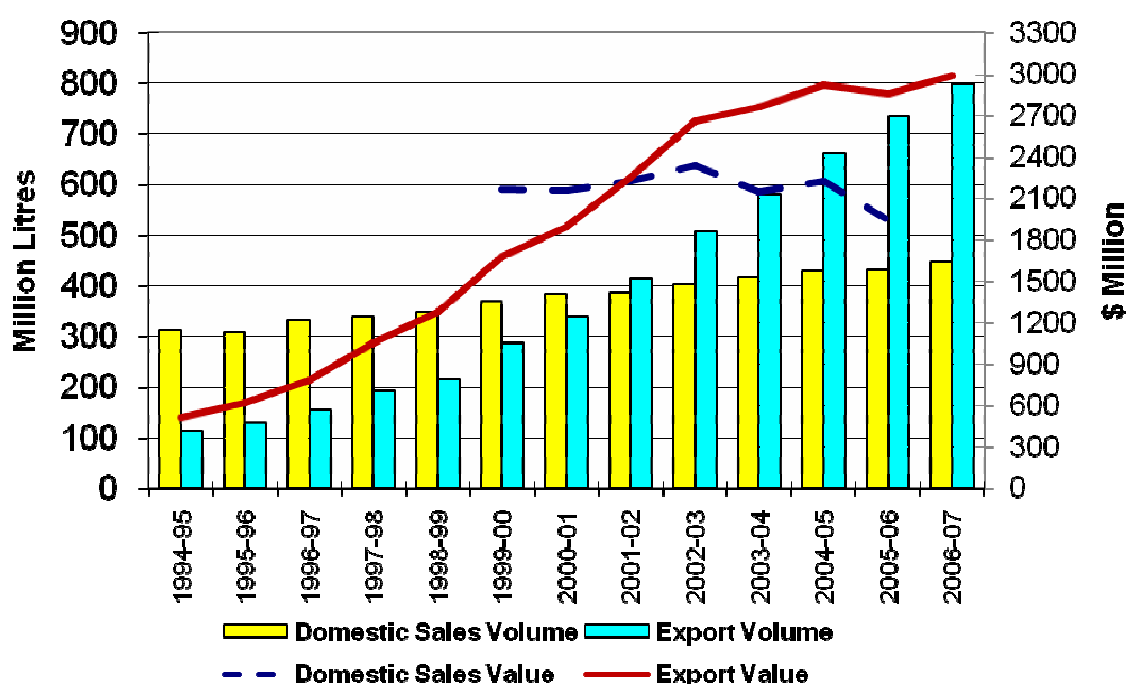
for only four per cent of total world production. Approximately half of Australia's wineries currently export to overseas markets.

Wine production and exports have also been expanding from other "new world" wine producing countries including: Argentina, Chile, South Africa, and the United States. This growth has led to global wine production expanding faster than demand and has resulted in a significant decline in world wine prices.¹ As a result, the profit margins for Australia's winemakers has declined in recent years, exacerbated by the increased number of competitors in the market as well as the capital intensive nature of the industry. Accordingly, the Australian wine industry is facing the challenge of maintaining profitability in a global market characterised by flat demand, increasing supply and declining prices.

b. Rapid growth

Export volumes have increased five fold over the past decade, while the export value has almost quadrupled. Meanwhile, domestic sales of Australian wine have grown 35% by volume over the same period.

Figure 1: Domestic Sales of Australian Wine and Wine Exports



Note: Domestic Sales and Export Sales values are 2006-07 real prices Sources: ABS Catalogue No: 8504.0 Sales of Australian Wine & Brandy by Winemakers & Catalogue No: 1329.0 Australian Wine & Grape Industry, AWBC Wine Export Approval Report via WINEFACTS Statistics.

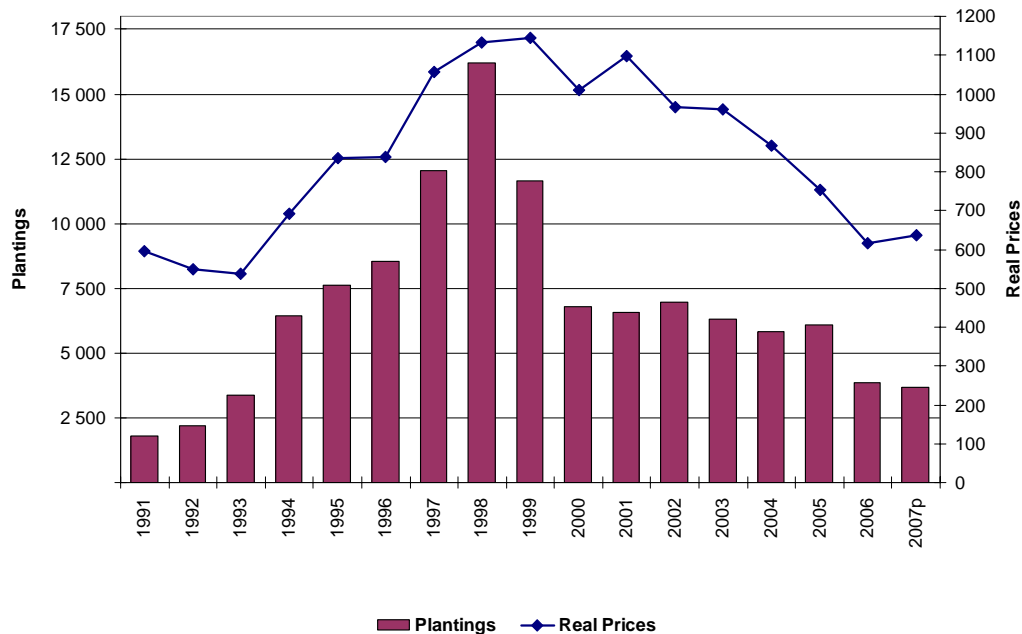
Much of the growth in Australian wine production was driven by the surge in plantings in the late 1990s, which was in turn stimulated by high grape prices. However it is important to note that a significant proportion of the new plantings were 'speculative', and not necessarily backed by a winery contract.

Between 1993 and 1999, real average grape prices more than doubled to almost \$1,120 per tonne. In reaction to this price growth, annual vineyard plantings increased from less than 3,000 hectares per year up to 1993, to almost 17,000ha in

¹ Sheales, T., Apted, S., Dickson, A., Kendall, R., and French, S. 2006, *Australian Wine Industry: Challenges for the Future*, ABARE Research Report 06.16, Canberra, October.

1998 – equivalent to 145 million litres (over 16 million cases) in additional annual wine capacity. Figure 2 demonstrates the close tracking of planting to winegrape prices.

Figure 2: Real Grape Prices and Plantings



Source: Australian Regional Winegrape Crush Survey via AWBC WINEFACTS Statistics & ABS Catalogue No: 1329.0 Australian Wine & Grape Industry. Note: 2007 Plantings and wine grape price preliminary

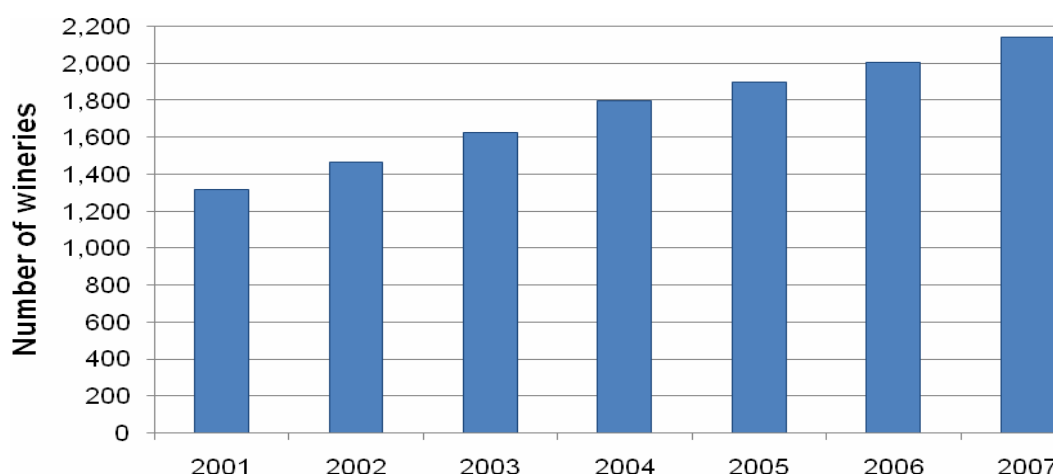
In hindsight, it becomes clear that the rapid vineyard plantings in the late 1990s were not sustainable, and nor were the high wine grape prices that prompted them. Grape prices have in fact progressively declined since their 1999 peak. Despite a slightly reduced crush in 2006, average grape prices were still slightly above those received prior to the planting boom (in real terms).

c. Regional impacts

The strong growth seen in the wine sector has been particularly important for regional communities in Australia. This is indicated by the following trends:

The number of wineries has more than doubled in 10 years, to exceed 2,100 in 2007. The vast majority of wineries are small and located in regional areas, and around 70% have an annual crush of less than 100 tonnes. In excess of 800 wineries have been added since 2000, and around 640 of these have been small, again with a crush of less than 100 tonnes. In contrast, Australia’s largest wine businesses crush more than 300,000 tonnes annually and the 5 largest accounted for 61% of the total crush in 2007.

Figure 3: Growth in winery numbers - 2001- 2007



Source: Winetitles – www.winetitles.com.au

Employment in grape growing and wine manufacturing rose by 60% between 1991 and 1996, yet in the subsequent five year period to 2001, it doubled again, from almost 15,750 to over 30,100. Since 2001, overall employment has declined slightly to around 28,000.

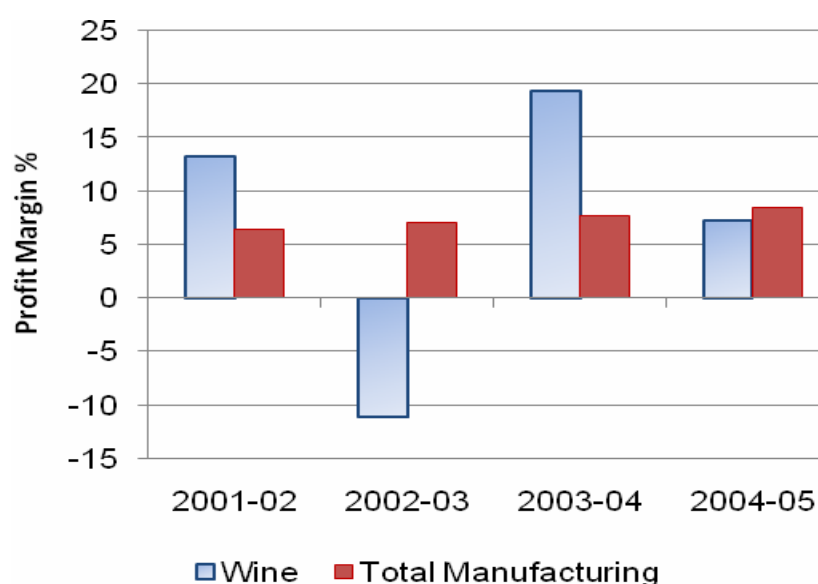
There has also been a strong rise in regional investment in infrastructure. Around \$1.8B was invested in new vineyard development in the 1990s and \$1.1B in the first 7 years of this decade. There was around \$1.6B of capital investment in winery infrastructure between 2001 and 2005.

Wine tourism has also seen healthy growth. Between 2000 and 2006, the number of domestic overnight wine visitors increased at an annual average rate of 6%, while domestic and international day visitors increased 5% and 8% respectively. In 2006 there were approximately 5.6 million international and local visitors to Australian wineries. During the June and September quarters of 2006, \$335M of wine was purchased, resulting in an estimated spend of \$666M by winery visitors in 2006. (Tourism Australia).

d. Winery viability

An indication of the profitability of Australian wineries is provided by the ABS Manufacturing Survey. Figure 4 shows that since 2001 the profit margin of wineries varied between -11% in 2002-03 and +19% in 2003-04. Over the same period the average profit margin for total manufacturing enterprises varied between 6.5% and 8.5%. Between 2003-04 and 2004-05 the profit margin for wineries declined 12.1 percentage points.

Figure 4: Profit Margin (percentage) : 2001-02 to 2004-05



Source: ABS Catalogue No: 8221.0 Manufacturing Industry 2001-02 to 2004-05

Note: Profit margin percentage = operating profit before tax as a percentage of sales and service income.

The Australian wine industry derives a further indication of the financial performance of wineries from the annual Deloitte Financial Benchmarking Survey.

The following table shows the proportion of loss making wineries, expressed as a proportion of respondents in the Deloitte survey, in each size category.

Table 2: Proportion of Loss Making Wineries by Size Category, 2003 to 2006 (as a proportion of respondents in the Deloitte annual survey)

Winery Size	2003	2004	2005	2006
\$0m-\$1m	40%	33.3%	12%	63%
\$1m-\$5m	52.9%	40.0%	32%	38%
\$5m-\$10m	16.7%	44.4%	23%	17%
\$10m-\$20m	37.5%	40.0%	38%	0%
\$20m+	22.2%	42.9%	25%	25%

Source: Deloitte Annual Financial Benchmarking Survey for the Australian Wine Industry

From table 2 it can be seen that in 2006, of those wineries in the \$0-1M category that participated in the Deloitte survey, 63% reported that they had recorded a loss.

Factors that have been driving this fall in margins and profitability include increasing domestic and international competition and the stronger Australian dollar. High and generally rising domestic taxation was also a major impost until the introduction of the Wine Equalisation Tax Federal Producer Rebate in 2004 which was extended in 2006, although further reform of wine tax is still a major issue. The capital intensive nature of the winery business, combined with strong production growth in recent years, has resulted in a high dependence on debt to fund growth, particularly for wineries whose revenue falls between \$1M and \$10M.

High gearing and lower margins, particularly when combined with poor cash flow, can have a crippling effect on business, with employment and investment plans shelved to

meet debt commitments. Unfortunately, these factors are likely to constrain future growth in the wine industry.

e. Today's challenges

The wine industry faces a number of interlinked challenges and issues that it will need to overcome, if it is to maintain strong growth and continue to increase the substantial contribution it makes to the Australian economy and society in general. These challenges and issues, as identified in *Wine Australia: Directions to 2025*, include:

- a structural imbalance between the cost of production and the price opportunity;
- grape and wine supply and demand fluctuations;
- retail consolidation driving downward pressure on pricing and margin;
- slow domestic growth and a tougher market for export growth;
- a resurgent Old World and better resourced New World competitors;
- greater environmental and sustainability challenges and responsibilities, particularly exacerbated by climate change;
- changing social concerns; and
- changing demographics and consumer expectations.

As the rapid plantings of the late 1990s came online in the five years leading up to 2006, the industry faced growing pressure from the challenges of oversupply. Prior to the 2007 vintage, the Australian wine sector was in a situation of significant surplus of grapes and wine, which in turn put significant downward pressure on prices.

The 2008 winegrape crush is estimated between 1.55 and 1.65 million tonnes, above the 2007 harvest of 1.397 million tonnes but still almost 13% lower than the 1.9 million tonne crush of 2006. As this follows a period of lower grape prices, many grape growers will experience further financial pressure. The wine industry will be moving from a surplus situation to one of balance or shortfall in the short-term as a result of these reduced tonnages. It is likely that a period of adjustment will occur and this may ultimately involve some producers (wineries and grape growers) exiting the industry. There is also a continued drive towards consolidation as companies try to achieve economies of scale, access key distribution channels and cut costs.

The global wine industry is becoming increasingly competitive. There has been strong production growth in the New World wine producing regions, including Argentina, California, Chile and South Africa. Meanwhile, Old World wine areas such as France and Italy are responding to such growth by improving marketing, adjusting production methods and making regulatory changes to increase their efficiency, supported by an annual budget of €1.3 billion. These trends have resulted in more intense competition, an oversupply of some wine varieties, and a consequent downward pressure on prices for wine.

Retail consolidation, the desire of retailers to reduce the number of suppliers they deal with and the growth of retailers' own-brands are causing difficulties for some winemakers. Small producers in particular are facing an increased challenge to find a route to market and maintain margins. Many are relying more heavily on cellar door, mail order and internet sales than their larger counterparts, with the smaller wineries (\$0M-\$10M) selling over 20% of their wine through these means, compared to just 7% for wineries with revenues in excess of \$10M (Deloitte Financial Benchmarking Survey 2006).

Table 3: Distribution by cellar door, mail order or website by winery size

Winery Size	Cellar door, Mail Order, Website
\$0m-\$1m	24%
\$1m-\$5m	19%
\$5m-\$10m	11%
\$10m-\$20m	7%
\$20m+	<1%

The strong appreciation of the Australian dollar has contributed to slower growth in export earnings, and has hurt international competitiveness. The export unit value for wine in real terms, fell from a peak of A\$5.61 per litre in 2000-01 to A\$3.86 per litre for the year ending March 2008, representing the sixth consecutive year that the average price for Australian wine has fallen.

Environmental issues also play a major role in the future of the wine industry. Security of access to, and the quality of, water supplies are major issues for all Australian rural-based industries. Reforms to the water supply industry may have a major impact on the future growth potential of the wine industry, particularly if access to water is restricted, or if the price of water rises substantially. Other environmental issues that the industry will have to tackle include: waste management and recycling, chemical use and disposal, biodiversity and energy use.

The role of R&D

The Australian grape and wine sector is innovative. This means that companies and individuals have used human resource abilities, technological factors and business acumen to drive and build the sector. To achieve this position, Australia has had to focus on continuous quality improvement and efficiency in production, as the industry did not have the history or prestige of the traditional European producers. This focus has delivered a competitive advantage not to be taken for granted. In particular, the product quality improvements flowing from R&D coincided with the expansion of grocery retailers in off-trade channels and their need for larger volumes of wines with consistent quality.

People, ideas and reputation are central to success in a global market for wine and all of these aspects are integral to R&D and innovation. In a rapidly changing domestic and global market it is clear that continued innovation will safeguard and deliver more jobs, successful businesses, better wines and services for customers and consumers, and new, more environmentally friendly processes.

Defining an appropriate amount for R&D investment will always be difficult. Individuals and companies will have their own objectives. But if we acknowledge that we are in a global consumer business that is notoriously fickle, then we also need to invest to secure our future. Knowledge will connect the wine sector to its consumers in all markets, deliver new ideas to improve our competitive position, and inspire people in all areas to provide the innovation that will ensure profitability and sustainability.

While individuals and companies will have their own methods for determining business success, general analyses of the grape and wine sector demonstrate a return of about \$8 for every \$1 invested in R&D. This is a strong return but it is also useful to reflect on the quantum of Defining an appropriate amount for R&D investment will always be difficult. Individuals and companies will have their own

objectives. But if we acknowledge that we are in a global consumer business that is notoriously fickle, then we also need to invest to secure our future. Knowledge will connect the wine sector to its consumers in all markets, deliver new ideas to improve our competitive position, and inspire people in all areas to provide the innovation that will ensure profitability and sustainability.

In order to tackle the challenges the industry faces today and to maintain Australia's competitiveness, the Federation remains convinced that additional research is needed.

In 2004, the wine industry boosted its R&D funding to the Grape and Wine Research Development Corporation (GWRDC), with winemakers agreeing to increase the R&D levy from \$3 per tonne to \$5 per tonne. The Commonwealth Government has demonstrated a commitment to rural R&D Corporations and R&D in the wine sector, by matching such industry contributions up to a maximum of 0.5% Gross Value of Production.

This commitment to Rural Research and Development Corporations (RRDCs) recognises the significant market failure typical of rural industries. Most rural enterprises have insufficient capacity to commission research on their own behalf, and/or are unable to exclude "free riders" from also sharing in the benefit of the research. Consequently, without Government intervention, there would be substantial under-investment in rural related research.

In addition, rural industries have a substantial impact on Australia's natural resources and much of the research portfolio of the RRDCs is directed towards ways of better managing these resources to minimise harmful environmental impacts. Indeed, RRDCs typically apply considerable resources towards research priorities and objectives that fit within those defined by the Australian Government.

The benefit to Government, and the broader economy, accrues through the improved international competitiveness of Australian rural industries, and the resulting impact on trade, regional investment and taxation, as well as the social impact on regional communities and better management of Australia's natural resources. R&D by the RRDCs has generated average returns of about \$7 for every \$1 invested (*Innovating Rural Australia*, AFFA, 2001). It is worth noting that there are substantial intangible benefits that are not picked up through this approach but which serve to provide even greater returns on the investment.

The wine industry's commitment to Research and Development

The Federation's vision for the industry is to ensure that returns from R&D activities are maximised and driven by industry demands, to encourage a high level of industry participation in setting the R&D agenda and to expand the funding base for R&D through the attraction of new investors and a broader range of research participants.

The Federation has a number of strategies that it is committed to in the development of R&D policies:

- Ensure that WAF provides clear policy advice to the government on R&D issues on behalf of the wine industry;
- Ensure that the wine industry's research priorities are clearly stated and that they meet national and regional needs;
- Ensure adequate funding;

- Dissemination and extension of the outcomes/results of R&D must ensure an efficient and effective system in line with industry expectations;
- Intellectual property management must give priority to the timely dissemination of research results and uptake of research by the Australian grape and wine industry; and
- A cooperative research approach between industry, researchers, funding bodies and government needs to be fostered.

Effective research and development has been a critical element in the successful growth of Australia's wine industry over the last decade, especially in fields of viticulture, but also in areas of oenology and market development. Much of this R & D has been funded through industry levies, supported by matching Government contributions and private sector partnerships, which either directly or indirectly have supported work of bodies such as the Grape and Wine Research and Development Corporation, Australian Wine Research Institute and Cooperative Research Centre for Viticulture.

In Strategy 2025 it was estimated that R&D will contribute around half the competitive gain required for the strategy to achieve its 2025 vision. Wine industry research has been characterised by a large number of small improvements aimed at reducing cost through either improved management practices in the vineyard and / or winery, minimising problems in viticulture and oenology and / or improving the cost per quality unit ratio. In addition to these R&D benefits, there have been the large ticket items which have to date been mostly in the form of engineering solutions, particularly mechanical harvesting and pruning and in irrigation techniques.

Clearly as the international and domestic market becomes more competitive, reducing cost through the ability to grow grapes and make wine to pre-determined specifications (through reducing intra-vineyard variability and understanding quality attributes in grapes and wine) will be critical in maintaining a competitive edge.

The contribution made by R&D to national wine industry success, is not always obvious. Consider, for example, the role played by scientists decades ago in selection of better clones and rootstocks. And at the other end of the line consider the part wine research has played in maximising winemaking attributes, as well as the value of market R&D to the economic outlook. Results of R&D can be seen in all regions and extend from the skills and knowledge winemakers bring when they enter the workforce to techniques applied in the vineyard and winery. All our major regions have gained enormously from irrigation research and extension. Techniques like regulated deficit irrigation (RDI) and partial rootzone drying (PRD) were developed and refined with the R&D levy, while GWRDC investment in programs for grower groups has improved irrigation management generally. More recently there have been such activities as grape quality seminars to help producers correlate results with practices.

In 2004, the Winemakers Federation of Australia (WFA) adopted new policies on Research & Development (R&D) in response to a comprehensive review of Wine Industry R&D. The impetus for the review was that WFA unsuccessfully sought agreement from its members to increase the R&D levy. Members initially rejected the proposed increase on the grounds that they were not convinced of the benefits from research, did not believe that research was targeted toward their needs and were uncomfortable with the current research purchaser/provider model.

The Review was undertaken to provide recommendations and advice to enable WFA to help maximise the returns from industry and government contributions to R&D. As the peak industry body representing wineries, WFA has an obligation to ensure that research is undertaken that will increase benefits to the industry and to the population as a whole. The Review focused on the industry's R&D priority setting processes, research uptake strategies, R&D capability and Intellectual Property policies.

The review identified the need to improve the way that research priorities for the wine industry are determined by examining the whole product chain from consumers back to growers for opportunities to add value. It was essential to also ensure that the industry priorities are taken up in research applications to a range of investors including, but not limited to, the Grape and Wine Research and Development Corporation (GWRDC).

The review recommended wider engagement of industry in determining R&D priorities, leading to greater ownership (and uptake) by industry of the results. The need to attract more investment into R&D from beyond the 'traditional' sources was also recognised. The review reported:

“Industry’s role in coordinating R&D priority setting is critical, as it will provide the necessary leadership and importantly, will encourage stronger industry ownership. Irrespective of any proposed changes to structures and systems, the most fundamental change that is required is a process of engagement by industry in priority setting and a commitment to ensure that R&D delivers the maximum benefit to industry in general”.

Priority setting

The new WFA R&D policy proposed that a single independent body be responsible for reviewing and proposing R&D priorities at the national level, thus avoiding duplication and potential misalignment of priorities. It should have a broad membership, consult widely with all sectors and regions of the industry, and its reports should be open to industry and public scrutiny.

In January 2005 the Winemakers Federation of Australia (WFA), the Grape and Wine Research and Development Corporation (GWRDC) and Wine Grape Growers Australia (WGGA) established a Strategic Directions Group (SDG), with a skills-based membership drawn from across the industry. Wine industry suppliers, through their peak body the Wine Industry Suppliers Australia Inc (WISA) also contribute to the work of the SDG.

The Terms of Reference for the SDG are as follows:

- ⇒ To assess the best information available on the current and future directions of the industry, and to collate national priorities;
- ⇒ To set specific R&D priorities to maximise investment, avoid duplication and achieve the greatest potential returns;
- ⇒ To define R&D priorities in the form of a triennial Prospectus which recognises the above information and which is aligned with industry needs;
- ⇒ To provide an annual update of priorities in the form of an addendum to incorporate new opportunities and priorities
- ⇒ To suggest R&D projects to address these priorities;
- ⇒ To identify appropriate sources of funding, including the GWRDC;
- ⇒ To encourage collaboration between the industry and researchers;
- ⇒ To provide industry input into the GWRDC planning process including the Five-Year Research and Development Plan and Annual Operational Plan.

The SDG has four principal responsibilities:

1. The preparation of a R&D prospectus every three years that establishes R&D priorities for the Wine industry and interacts with research providers, funders and potential investors organisations.
2. In keeping with its defined role of setting priorities for validation by the GWRDC and agencies, the SDG will meet outside of the triennial priority setting process to address the specific needs of the GWRDC and other bodies. This will give the SDG a direct role in assisting the GWRDC in the development of its 5 year plan and annual operational plan.
3. To determine relative priorities for currently identified priorities of any potential, new or emerging R&D issues.
4. To engage the industry at regional, state and national levels to maximize the opportunity for industry input into the priority setting process and ensure that priorities from the full diversity of the Australian wine and grape industry are represented in the process.

The SDG does not engage in short listing research projects submitted to the GWRDC (the former role of the GWRDC Priorities Reference Group). This will be retained within the GWRDC, which will remain accountable to the industry, including WFA, the state wine industry associations and the government.

In early 2006 a Research Prospectus for the Australian Wine Industry was released and identified 11 topics where the SDG considered that more R&D is required, and opportunities for co-funding to grow the total wine industry R&D effort.

The SDG remains concerned that the overall level of expenditure on wine-related R&D in Australia is too low for an industry that increasingly depends on research and innovation to maintain its competitive position. A comparison with like industry sectors both within and outside Australia suggests they support at least twice the R&D effort (based on R&D expenditure as a proportion of value of sales). This highlights another challenge for our industry, to involve suppliers and other service providers much more closely in our R&D effort and to tap into the many 'external' sources of support for R&D much more effectively than we have in the past. These include government programs to support industry innovation, taxation concessions for R&D, and R&D funding programs. The effective communication of research results and outputs throughout the industry is another area that needs further attention and resources.

The SDG released an update of the 2006 R&D Prospectus in early 2008, to address the changed circumstances of the industry. During 2008 the SDG will further refine these priorities and help to identify sources of funding within and external to the industry. In addition, a revised R&D Prospectus document will be prepared for release in 2009. During 2008, individuals, regional associations, State associations, national associations and research agencies will be requested to present their R&D priorities to the SDG for consideration for the 2009 Research Prospectus. The SDG will draw on all of the submissions to prepare a draft Prospectus for dissemination, followed by presentation and discussion at an industry workshop with stakeholders. Following the workshop, the SDG will finalise and release a further Prospectus which would operate for the three years 2009 to 2012.

The topics listed below are in order of priority based on attractiveness, feasibility and adoptability were added (priority 1= highest). They are all considered to require urgent action, either to be dealt with in the short-term (eg. the Risk Assessments to be addressed over the coming year) or in the longer-term through R&D.

Priority 1: Environmental sustainability

R&D to develop practical ways to measure and enhance the environmental sustainability of the Australian wine industry. This topic includes a full life-cycle analysis of the energy and carbon footprint of wine (including sequestration) from vineyard to consumer, management of waste streams, input/output analyses in vineyard and winery, and linking of these to emission trading, certification and other marketing and regulatory programs.

Priority 2: Climate change

Research to identify the potential impacts of climate change, ways in which the wine industry could respond and their relative costs and benefits. It will build on existing predictions and probabilities about temperatures, rainfall and water storage, and translate them into information relevant to the industry. This would include regional scenarios for water availability and price and where grapes might be grown in future, competition for arable land, matches of variety to future regional climate, changes in risk of salinity, frost, flood and fire/smoke, implications for processing infrastructure (eg refrigeration demand, where wineries might be located), and biosecurity issues where the preferred range for pests is likely to change with climate.

Priority 3: Winery innovation

This topic was included in the 2006 Prospectus, and remains a high priority. Additional R&D is required to increase the efficiency of processing while also adding value. Efficiency improvements will come principally from a reduction in processing costs, product losses and unproductive time – critical areas at the individual winery level may be identified through benchmarking and flow chain analysis. There is potential for improvement in producing wine styles according to consumer demand by developing rapid measuring techniques for changes in wine components; the enhancement of wine flavour through enzymes; new ways of controlling fermentation (other than only temperature); and greater understanding of the role of Nitrogen in fermentation and flavour development (both positive and negative).

Priority 4: Germplasm

Maintaining an adequate supply of tested and disease-free planting material, including new material that may be required to respond to climate change, is a continuing priority. The current system is not working effectively and needs to be overhauled. There is current research being undertaken on resistance to pests and disease, and tolerance to temperature, salinity and drought. This research may need to be expanded to include testing of new rootstock combinations and new variety/region combinations in the face of climate change. It is recognized that this priority has elements of organizational change required as well as additional R&D.

Priority 5: Risk assessments

There is an immediate need for the industry to undertake risk assessments to determine the potential impacts of:

- continuing drought and increased drought frequency and intensity, including effects on irrigation water availability, quality, price and water market arrangements
- land salinisation

- pest and disease incursion, particularly in the face of climate change
- market and regulatory changes, including labelling, allowed additives and maximum residue limits
- reduced levels of labour and skills available to the industry
- effects of the industry on regional biodiversity

These areas have close links with other priorities, especially climate change. However, this priority requires a series of immediate assessments that would involve participation by industry personnel, rather than long-term research.

Priority 4: Vineyard innovation

This topic is also continued from the 2006 Prospectus. It aims to take a systems approach to vineyard management, and to improve efficiency while adding value through quality of the grapes delivered. Key aspects include elements of benchmarking best practice, reducing and recapturing inputs and reducing off-target effects (eg use of tunnel and charged-droplet sprayers), reducing the loss of juice during mechanical harvesting, and the potential for improved mechanization, eg for pruning. Improved objective measures of grape quality, to allow matching of like with like batches of grapes, is required, as is better methods of managing vines post-harvest and in drought.

Priority 6: Packaging and transport

The SDG believes that changes in the way that wine is packaged are being driven by the marketplace at a speed much faster than R&D can influence immediately, but that these changes are likely to give rise to new questions for research. Understanding and managing the risks associated with long distribution chains (especially heat and contamination) remains a high priority for the industry, as discussed in the 2006 Prospectus. This requires engagement with companies involved in distribution, especially for the export market, and is a high-priority for action in 2008.

Priority 7: Markets and regulations

The SDG suggests that to build on the platform of market intelligence established under the *Wine Australia: Directions to 2025* initiative requires an assessment of which companies have used the information generated in this study, whether it is in the appropriate form, and whether it is adding value to the industry. There is also a policy issue that needs to be resolved by the peak bodies as to what is pre-competitive 'market' research and what research should be a company responsibility. This recognizes that most large wine companies undertake this type of research and information-gathering for themselves. While the rest of the industry could benefit from such work, the starting point for further R&D in this topic must be identifying the beneficiaries and the type of information that will assist them.

Priority 8: Alternative production systems

This priority involves a comparative analysis of conventional, organic and biodynamic systems of grapegrowing and wine production. It will examine differences in the final products as well as input/output balances in the production process and relative cost structures. As well as the results of the comparative analysis, it will help to identify opportunities to enhance the environmental sustainability of conventional systems.

The SDG prospectus takes into account the full range of needs across the grape and wine industries, starting with consumers and working backwards along the supply change.

This perspective led the SDG to adopt the principle that 'there is little to be gained from growing the best grapes or making the best wine in the world if it does not meet consumer requirements or cannot be delivered to consumers in good condition or at a competitive price'.

The initial prospectus identified the top eleven research areas which demonstrate a focus on research to deliver improvements in: market access; competitive advantage; increased profitability, environmental sustainability and risk management.

The key weaknesses in the operations of the SDG are in attracting a strong membership of expertise across industry sectors and in gaining a two way communication with the grass roots industry. The second issue can be addressed through the GWRDC initiative of establishing a national extension network and the employment of national extension coordinators by NWGIC and GWRDC. In addition, there is an opportunity for AWRI and Provisor to directly feed back to the SDG issues that are being raised with them through their service delivery models. The formalisation of these feed-back loops is a priority.

In addition, the SDG should not see its role as the pure delivery of research priorities, but should look at extension opportunities and gaps in technical innovation.

Collaboration in research, development and innovation

A critical element in the development of R&D is a commitment to a collaborative approach between all levels of government, industry and key stakeholders.

The Wine Industry together with its State and Australian government partners has already invested significantly into developing its research capability and infrastructure for example, the Wine Innovation Cluster (WIC) brings together five of the best grape and wine research groups in the world, including the CSIRO, University of Adelaide, AWRI, South Australian Research and Development Institute and Provisor. This provides a cross-disciplinary centralised centre of excellence for wine related research. Other significant research nodes also exist in NSW, WA and Victoria in particular, providing a strong internationally recognised research base.

This research capability will allow the Australian grape and wine industry to partner with the Australian government to develop long term strategies to enhance the ability of the wine industry to benefit the Australian community for years to come.

For example, the WIC has identified the area of climate change has one of the most significant areas of long-term impact on the Australian wine industry. The Australian Government is investing \$126 million in climate change adaptation policies, programs and research through the Department of Climate Change (the Department). The Australian wine industry research capability will enable the Australian grape and wine industry to partner with the Australian government to develop strategies to insulate, mitigate and adapt to the pending environmental and resource impacts of climate variability to minimise adverse impacts on natural resources, assure product supply (especially wine grape production) and limit future economic and job losses.

Solving an industry-wide problem such as climate change requires a collaborative, industry-wide approach. It requires action across the value chain of grape and wine production and the dedicated involvement of Australia's industry and research organisations. The wine industry research capability can be used to maximise the benefits of climate change research across a number of industries.

International as well as national collaboration is important in a number of areas. The Federation has been proactive in this area. It has collaborated with New Zealand, South Africa and the United States to develop an International Greenhouse Gas Accounting Protocol for the global wine industry. A greenhouse gas calculator consistent with the protocol has also been released for wineries to assess their own greenhouse gas emissions from their total wine operations.

Despite the strong profile Australia enjoys in research into oenology and viticulture, other research institutions internationally are also producing world quality research. In other research disciplines related to the wine industry Australia does not enjoy the same international profile. The relatively small size of the Australian industry means that the resources available for research are relatively small.

The nature of the wine industry does mean that the practical results of research diffuse quickly to other producing countries, either through formal company links, flying winemakers and viticulturalists or through researcher interaction.

Collaboration is a two-way process. Australia must be able to contribute to international research if we are to be acknowledged as participants in the global research community and leverage funding from international partners.

Commercialisation of IP is not the key driver for wine industry research. From the industry perspective, the critical issue surrounding R&D is to make sure that any policy does not prevent the timely dissemination of research results. It is critical that potential IP be identified at the beginning of the research project and that the owners of such IP also are identified and that that IP be available to Australian industry.

It should also be recognized that the ability to collaborate internationally can add to the skills base of Australian researchers and add to their incentives to remain in Australia.

The Imbalance between Technical Innovation and Research

According to the Productivity Commission² the most important rationales for public funding support of science and innovation are:

- the need for government to use research and innovation for those activities in which it has a central role (such as reducing environmental degradation);
- spillovers from innovation that cannot be captured by the innovator and that cannot be realised without support. The spillovers may arise through high quality human capital development, the development of basic knowledge capabilities, and diffusion of new ideas among firms and others. They arise from research undertaken in universities, businesses and public sector research agencies;
- intangible factors, such as national identity, moral obligations and national prestige, may also potentially justify some public support, subject to some substantiation for any large projects that the supported activities are likely to have these benefits. They relate mostly to scientific research in universities and public sector research agencies; and
- the asymmetric tax treatment of highly risky investments, which mainly relate to R&D undertaken in businesses.

² Productivity Commission 2007, *Public Support for Science and Innovation*, Research Report, Productivity Commission, Canberra.

Classic wine/vine R&D which has always been aimed to address market failure, is pre-competitive, and is mostly about increasing scientific knowledge (the R in R&D). The D of R&D traditionally has been the poor cousin and is traditionally interpreted as extension – that is taking the results of the R to the practitioner.

However, it can be argued that technical innovation which in the hands of the wine producers and grapegrowers has yielded the major part of the cost savings, efficiency gains and quality guarantees for Australian grapes and wine (the D in R&D).³

Publicly funded research and levy funded research remains focused on the growth of scientific knowledge (R) of grape growing and winemaking. Recent initiatives from GWRDC in funding extension positions in the National Wine and Grape Industry Centre and internally in the GWRDC have increased the capacity to extend the results of R to the industry, but will not deliver an increased capital spend on D. Under the current model D will largely remain the province of individual companies.

Past informal industry attempts to direct levy monies away from academic based research and into technical innovation have been, in the main, unsuccessful. This potentially leaves a real gap between the R investment and the gains which could accrue from effective D.

If the past gains made in technical innovation in the commercial side of the industry are increasingly subject to the pressures of the law of diminishing returns, it can be argued that so far we have taken the easier gains. Given Australia's size in the global wine industry, it can be argued our best individual corporate gains will be via the mechanism of limited commercial, pre-competitive collaboration focused on technical innovation rather than additional investment in classic R&D.

Industry generated structural change in forming the Strategic Directions Group (SDG) has moved part way to refocusing the research agenda towards industry priorities and away from researcher generated directions, but still has a way to go before it meets its stated objectives. Although it is fair to say that researchers have welcomed this sharpened industry focus on priorities there is still a gap on the D side.

This does not mean that the current research funding for research in the classical model is too high.

There is also a strong argument that the current key research providers – the AWRI, CSIRO, NWGIC, Adelaide University, SARDI and the State Departments should not try and fill this gap in D, but concentrate on their fields of expertise.

Is there a threat to the current system?

The Australian wine industry is one of our country's major success stories. Over recent decades, the sector has enjoyed strong production and export growth, substantial investment, high levels of innovation and increased employment, particularly in regional communities. The wine industry provides enormous indirect benefits to the Australian economy, through income and employment particularly in regional areas, as well as through multiplier effects to other industries (including tourism and retail) and the balance of payments in major export earning. The direct benefits through taxation revenues are also significant.

³ *Innovation* is commonly described as “creating value by doing things differently” or as “creating value through doing something in a novel way”. There are three inherent facets to innovation: the origination of new knowledge and ideas – knowledge production; the deployment of ideas within a real world context – knowledge application; and the diffusion of this applied knowledge and its adaptation in use – knowledge diffusion and absorption. These elements combine to form an open-ended cycle of learning and responsiveness to new inputs (Cutler, 2008).

The view that the industry benefits from independent CSIRO expenditure and independently gained ARC, NCRIS and other Federal and State R&D, funding ignores these benefits and the direct taxation revenue collected at a State and Federal level from the commerce of wine. These benefits are many hundreds of times these expenditures and which provide the revenues which fund them.

Current economic conditions including softening consumer demand due to decreased discretionary spending power; a strong Australian dollar; increasing difficulty in maintaining margins as the distribution channels aggregate; and a rise in global competition have increased scrutiny on the ~\$50M spend (even the levy and direct components of it) by many wine companies.

Arguably, a better balance between R and Technical Innovation will improve returns to industry, focus spending on Research by the classic provider mode, preserve existing research spending and attract additional funding.

Is there an effective alternative process?

The first response must be to use existing systems where possible. We currently have a high quality grape and wine research community in Australia. Key research is undertaken by, inter alia, the WIC, NWGIC, CSIRO Food Futures, University's and State Department of Agriculture's.

Arguably one of the issues we face is the ability to retain and attract top quality researchers due to the lack of long term funding and scarcity of funding. The GWRDC is aware of this issue and has some efforts in place to alleviate the issue, however, other possible solutions could include:

- top up programs to supplement existing resources to attract high quality applicants to key research and teaching positions; and
- attracting increased long term funding by increasing the pool of available research funds.

Imbalance between Technical Innovation and Research

Many forms of technical innovation exist as distinct from research and technical dissemination; however, for this discussion it would appear that two major forms are relevant for the Australian wine industry and its suppliers. Both forms of innovation require open access to research information produced by Australian and international researchers and a highly commercial culture in which to undertake the innovation work. One form could be considered as pre-competitive where the industry bands together and contracts out, for example, the testing of a new technology. This is more likely to be driven by the larger wineries. The second form is where an individual company contracts out the whole or a part of its technical program, an approach that demands strict confidentiality and a highly commercial approach to handling IP.

A major question that arises is how to best deliver on these two forms of technical innovation. Of the existing structures only AWRI and Provisor appear to have some capacity to deliver.

AWRI arguably can provide some level of technical innovation, although historically its major capacity has been in research, information dissemination and problem solving relating to oenology.

Provisor could also fill this gap, building on its role as an engineering-based service consultancy, project manager and R&D asset manager providing R&D facilities and services to the Australian Wine Industry. Being owned by the key research providers, CSIRO, the AWRI, The University of Adelaide and SARDI and established with support from the Australian Government, the South Australia Government and Victorian Government, Provisor is positioned to deliver these services to the industry.

A further possibility is additional industry investment through collaborative ventures.

In the case of technical innovation a case could be mounted for the GWRDC providing some seed funds on behalf of the industry (similar to what the GWRDC has done for closure trials or assessments on the performance of processing aids).

Conclusion

The Australian wine industry is a major national success story which has seen a decade of unprecedented growth. This success has been underpinned by a significant investment by targeted R&D, rapid business adoption of new technology and innovation at all levels within the industry supply chain.

The Australian wine industry has always sought to make wine that consumers and potential consumers want to enjoy. Securing optimal research will assist the wine industry continue to improve its performance at all stages of the value chain and retain its status as a world leader in innovative practices.