Innovation driving sustainable success

A Research Prospectus for the Australian Grape and Wine Sector

2010-2012

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FOREWORD

It is our pleasure as co-sponsors to present this second Prospectus on the research opportunities for the Australian grape and wine sector. This Prospectus has identified the knowledge required to drive the sector to sustainable success.

The past two years have not been easy for us. Volatile exchange rates, challenging climatic conditions, water management issues, hungry international competition and reducing profitability have left the sector concerned about its future. These factors were identified in *Wine Australia Directions to 2025*, which focused on improving success and return on investment at an individual and enterprise level. The Wine Restructuring Action Agenda has highlighted the need for immediate action to redress our significant supply-demand imbalance.

Now is the time for a renewed focus on innovation in our techniques and applications, with research and development leading to rapid adoption through targeted, meaningful extension programs.

The Australian Government has been keen for agricultural industries to collaborate on research projects so that limited research dollars can have maximum effect in rural industries. Many of the issues we face in the wine sector are shared in other industries: understanding and serving international consumers, managing our environment in a responsible manner for future generations, knowledge about the value chain and consumer preferences, and adding value wherever possible to ensure a positive farm gate return. Meaningful collaboration would be a sensible and effective approach in these areas.

This Prospectus provides guidance for researchers and investors to identify opportunities where they might partner on projects. Included in *Appendix V* is a linkage to websites that contain current details of research providers and of research projects being undertaken within the sector, so that a complete picture can be drawn of what is currently happening and what research opportunities exist.

We would like to take this opportunity to thank the many people who have been involved in this Prospectus for their work, either in its development or its review. We look forward to new knowledge driving innovation and prosperity for our sector.

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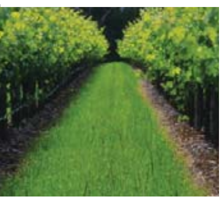

1 EXECUTIVE SUMMARY

The wine industry has been a success story for Australia but times and conditions are changing. Volatile currency markets, aggressive competition from new market entrants, limited loyalty to Brand Australia, water restrictions and quality issues, and a harsher climate have resulted in challenges that were not expected twenty years ago. These challenges include:

- Bridging the structural imbalance between the cost of production and the price opportunity
- Ensuring all elements of the value chain work together for continual improvements in quality and efficiency
- Developing a better understanding of consumers and their wine preferences
- Responding to information about new market opportunities based on consumer preferences
- Managing supply and demand fluctuations for grapes and wine
- Maintaining value when purchasers consider wine a commodity product
- Managing landscape and social impacts of potential closures of vineyards and wineries
- Managing environmental and sustainability responsibilities and the complexity associated with climate change
- Identifying and developing sector leaders.

The Wine Restructuring Action Agenda announced in November 2009 outlines a plan to address the difficult position the sector now finds itself in.

Robust and practical research is needed to assist the sector manage in this new era.

This Prospectus has been developed to inform investment decisions about the research, development and extension that is needed by the Australian wine sector. Guided by the *Rural, Research and Development Priorities* prepared by the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF), four themes have been identified that will enable the sector to be competitive, profitable and resilient.

They are:

1 Consumer focus ... what drives our customers

2 Integrated grape growing and wine making

3 Environmental sustainability, and

4 Sector development.

Within each theme there are a number of research opportunities that outline the knowledge required to move the sector forward.

Some of these opportunities are already being addressed but work must continue on them. Specific attention will be paid to dissemination and extension so that practitioners can use the outcomes of this knowledge quickly.

The grape and wine sector has a reputation for innovation and this will be critical for the future.

1 EXECUTIVE SUMMARY

The research opportunities are:

Consumer focus ... what drives our customers	• Identify elements of the value chain that add value to the consumer and that can generate high returns • Understand what influences consumers' choice of beverage • Identify market opportunities and develop products in price segments with sustainable margins to satisfy consumer preferences • Develop innovative approaches to inform consumers about wine • Develop innovative approaches to distribution and packaging • Develop alternative grape products
Integrated grape growing and wine making	• Understand the attributes of grapes and wine of relevance to consumers • Broaden the base of genetic material • Identify the distinctive characteristics that define regional wine styles • Improve understanding of handling processes on wine potential • Improve fermentation and winery processes to enhance wine quality and efficiency • Optimise the life of packaged wine
Environmental sustainability	• Support environmental best practice • Adapt viticultural practices to mitigate the impact of climate change • Continually improve water use • Improve wine making efficiency by reducing waste, energy and manual intervention
Sector development	• Develop a governance structure and sector strategies for capacity building, efficient resource use, knowledge sharing and consistent priorities • Develop dedicated teams to disseminate research and facilitate its uptake and commercial adoption • Attract, educate, develop and retain people to lead the industry • Better understand and prepare for biosecurity threats

2 INTRODUCTION

This Prospectus is the second prepared by the sector to guide researchers and funders on knowledge the sector believes can drive it forward. Prepared by the Strategic Directions Group (SDG), a group of practitioners drawn from many regional areas, it has sought to identify knowledge that needs to be generated, packaged up for use and then disseminated for commercial adoption. Information about the wine and grape sector can be found in *Appendix I*.

Three policy initiatives have guided this Prospectus. Two are government initiatives and the third is a sector driven initiative.

The Primary Industries Ministerial Council, comprising all State and Territory Ministers of Agriculture and chaired by the Australian Government Minister, has a policy to ensure that Research, Development and Extension (RD&E) capacities are aligned with future sector needs, that collaboration occurs so that Australia's position in international markets is strengthened and that delivery of RD&E is both efficient and effective. (See *Appendix II* for details of the National RD&E Framework).

The second government policy initiative which has guided this Prospectus has been DAFF's *Rural Research and Development Priorities*, as determined in 2007. These are outlined in *Appendix III*.

The Rural research and development priorities have been developed to foster innovation and guide research and development efforts during a period of environmental, economic and social change when profitability is increasingly difficult to maintain.

The sector policy referenced in this work has been the Innovation Policy of the Winemakers' Federation of Australia (WFA) and the Wine Grape Growers' Australia (WGGA). This policy explains the distinctive approach taken by the sector in ensuring its future through continued innovation. (See *Appendix IV* for details.)

This Prospectus will be used by the Grape and Wine Research and Development Corporation (GWRDC) when making investment decisions about the use of funds. *Appendix V* contains a link to all research projects currently being undertaken on behalf of or by the sector.

Details of the tasks, terms of reference and membership of the SDG are in *Appendix VI*.

A considerable amount of work has been drawn on in the development of this Prospectus, most notably *Wine Australia: Future Directions to 2025*, the WFA document *Wine Sector Stewardship 2008 National Report*, and the work undertaken by Professor Andrew Fearne while a Thinker-in-Residence of the South Australian government focusing on sustainable food and wine value chains. A list of selective references can be found at *Appendix VII*.

3 RESEARCH CONTEXT

RD&E is funded by the grape and wine sector through levies and direct investment, by the Australian Government through levy co-investment, by State Governments (via research agencies and infrastructure grants), by the universities and by the Commonwealth Scientific and Industrial Research Organisation (CSIRO). The money raised by levy varies each year, based on the number of tonnes of grapes grown and crushed. For 2007-08 the estimated annual investment in recurrent wine RD&E from these sources was $59m with the estimated capital investment in RD&E of $25m for that year.

The GWRDC determines which RD&E projects will be funded based on the priorities of the sector and of the Australian Government (through its Rural, Research and Development program). It plans and funds collective research and development programs, and then facilitates the dissemination, adoption and commercialisation of the results throughout the sector. It does not undertake research and development itself but purchases it from existing providers on behalf of the Australian grape and wine sector.

Additional research is funded by:

- Private companies, particularly wine companies and supplier companies; some of the sector research funded by suppliers and wine companies is conducted overseas
- Government innovation programs including:
  - Cooperative Research Centre (CRC) program
  - Major National Research Facility (MNRF) program
  - Various DAFF programs such as Farm Ready and innovation programs
  - AusIndustry programs such as the research and development tax rebate and Commercial Ready programs
  - The Australian Research Council
  - The National Health and Medical Research Council
  - CSIRO
  - University granting programs
  - State Government and primary industries grants.
- The Australian Wine industry through:
  - Research and Development Corporation (RDC) levies
  - Regional association levies
  - Australian Wine and Brandy Corporation (AWBC) levies
  - Phylloxera and Grape Industry Board, South Australia.

Research providers

The principal providers of grape and wine research and development are:

- The Wine Innovation Cluster (WIC) in Adelaide, a partnership of:
  - CSIRO
  - The University of Adelaide
  - South Australian Research and Development Institute
  - The Australian Wine Research Institute (AWRI), and
  - Provisor Pty Ltd.[1]
- The National Wine and Grape Industry Centre (NWGIC) at Wagga Wagga, a partnership of:
  - Charles Sturt University
  - NSW Department of Industry and Investment, and
  - NSW Wine Industry Association.
- Tasmanian Institute of Agricultural Research, a joint venture between:
  - The University of Tasmania, and
  - The Tasmanian State Government Department of Primary Industries, Parks, Water and Environment.
- Departments of Primary Industries in both Victoria and Queensland and Department of Agriculture and Food, Western Australia
- Universities: Western Australia, Melbourne, Curtin, Southern Queensland and South Australia
- AWBC

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1 WIC partners announced on November 6, 2009 that they will integrate the activities of Provisor into their offerings. This integration process has been developed to build critical mass in areas of small and pilot scale winemaking, environmental programs, sensory evaluation and engineering services. This integration is part of a process that commenced with the development of the WIC and will continue with the WIC to ensure that it is providing world-leading support to the Australian wine sector in the most efficient manner possible.

3 RESEARCH CONTEXT

- Suppliers to the wine sector including viticultural equipment, wine making additives, packaging, logistics, warehousing, chemical companies, IT companies and consultants
- Wine making companies, and
- Grape growing enterprises.

Extension

State Governments, the sector itself and research organisations have a significant investment in the delivery of extension and capacity-building to the wine sector which includes:

- The Winegrowing Futures Program at NWGIC
- State Government agency extension programs
- The AWRI information service including 'road shows'
- Australian Society of Viticulture and Oenology seminar series
- The Australian Wine Industry Technical Conference Inc.
- GWRDC-funded and managed programs including its regional program
- AWBC
- Viticulturists and Grower Liaison Officers employed by major wineries
- Private industry consultants, and
- Suppliers to the grape and wine sector.

Innovation

Within the grape and wine sector, innovation is directed by the Innovation Policy Committee (IPC) which aims to apply existing research funds more efficiently so that both the quantum of funds and range and diversity of research and extension providers can be expanded. The sector has adopted the following innovation policies:

- Encourages a range of institutions, public and private, Australian and international, to compete for levy funds
- Encourages these institutions to seek co-investment from sources other than that of the levy funds, provided that the priorities and interests of the sector are met
- Encourages institutions to develop an area/s of expertise, particularly those relying on levy funds for core activities, to reduce duplication and to increase efficient use of scarce levy funds
- Encourages institutions to collaborate, e.g. utilising the WIC on the Waite Campus of The University of Adelaide, to integrate research across the entire supply/value chain from the environment to the consumer
- Recommends the investment of up to 30% of total GWRDC revenue in knowledge generation activities in areas of long term interest to the sector
- Supports, wherever possible, a strong nexus between research and education activities to maintain the intellectual capacity of the sector
- Supports targeted extension activities to ensure that research information is made available quickly and efficiently to levy payers
- Supports pre-competitive technical collaborative activities against sector priorities by organisations other than those publicly funded
- Recommends the allocation of up to 30% of total GWRDC revenue to entities, such as the AWRI and the NWGIC for core activities; and
- Supports the sector's own research organisation, the AWRI, with sufficient funds to undertake core activities and to harness the maximum extent the resources of all wine sector supportive organisations, including CSIRO, the universities and Departments of Agriculture/Primary Industries, by collaborative and non-duplicative endeavour.

3 RESEARCH CONTEXT

Capability and gap analysis of RD&E

A capability and gap analysis of institutionally delivered RD&E was undertaken by Rural Solutions SA in early 2009 which focussed on key capabilities of researchers and research facilities, potential collaborations, gaps, risks and challenges.

The National Wine Research Network (a group formed in mid 2009 representing all research providers to the grape and wine sector in Australia) in reviewing this audit, noted that:

- The grape and wine sector in Australia is well supported by RD&E
- There is a broad range of capability across all areas of the production and value chains
- Strategic and applied research and development is well integrated, enhancing sector adoption of research outcomes
- Australia is a world leader in grape and wine RD&E, with strong international collaborations extending capability
- Wine companies make a significant contribution to RD&E
- There is significant collaboration between public sector agencies and wine companies, through trials carried out on commercial vineyards
- The diversity of capability across the different research and development providers is a key factor for innovation in the wine sector
- Capability is geographically distributed, broadly aligned with the distribution of grape and wine production and sector segmentation
- There is significant coordination of the national effort through centres such as the WIC and the NWGIC, which together provide significant capability
- There is a significant training element with more than 700 undergraduates and 220 postgraduates enrolled in university Viticulture and Oenology degrees
- There is the potential for further innovation in the wine sector through enhanced integration of research and development and effective delivery.

4 RESEARCH OPPORTUNITIES AND KNOWLEDGE REQUIRED

The process used for the identification of research opportunities and knowledge required was:

Stage 1:

- Review the first Prospectus, taking into account comments by users of the document, and the direction provided by the Australian Government on research and development for viable primary industries
- Review the success of the first Prospectus in broadening the funding base of research and development in the grape and wine sector
- Ask the question: What answers does the sector need to leapfrog it into the future? What changes to current practice could have a big financial impact?
- Scan the global environment both now, medium-term and longer-term to 2025 to understand potential threats and opportunities
- Consider the responses to the above within the context of current knowledge, research opportunities, research being undertaken in other primary industries and clear drivers of change to sector practice.

This resulted in four areas being considered much more closely for the urgency of the knowledge required, its impact, its significance to all of the sector or elements of it, and its extension capacity.

Stage 2:

A draft document was prepared in which the knowledge required was refined with some detail about the areas being considered. This document was used for industry consultation and was made available on websites and referred to organisations and individuals for comment and criticism.

The four key research areas identified are:

1 Consumer focus … what drives our customers
2 Integrated grape growing and wine making
3 Environmental sustainability
4 Sector development

There are 20 research opportunities within these four themes. While all are considered critical, six stand out as being of the highest priority for the future of the wine sector. They are marked with an asterisk.

GOAL: A competitive, profitable, sustainable, resilient and self-reliant Australian wine sector

Our themes				
Consumer focus … what drives our customers +	**Integrated grape growing and wine making** +	**Environmental sustainability** +	**Sector development** =	**Competitive, profitable, resilient industry**
Our research opportunities:				
Identify the value chain areas that generate high returns Determine what drives consumers' choice of beverage Identify market opportunities and develop products Inform consumers about wine in innovative ways Be innovative in distribution and packaging Develop alternative grape products	Understand grape and wine attributes Broaden genetic base of planting material Identify the distinctive characteristics of regional wine styles Improve understanding of handling processes on wine potential Improve fermentation processes to improve wine quality and efficiency Optimise the life of packaged wine	Support environmental best practice programs and research Adapt viticultural practices for the impact of climate change Continually improve water use Improve wine making efficiency by reducing waste, energy and manual intervention	Develop a governance structure and sector strategies for capacity building, efficient resource use, knowledge sharing and consistent priorities Dedicated extension teams to facilitate uptake, and commercial adoption of research Attract, educate, develop and retain people Better understand and prepare for biosecurity threats	Understand what consumers value,match this with vineyard management, wine making techniques and packaging approaches, ensure the highest levels of environmental stewardship, and develop appropriate structures and skilled people so that the sector can be competitive, profitable, resilient and provide leadership in agricultural businesses

4 RESEARCH OPPORTUNITIES AND KNOWLEDGE REQUIRED

4.1 Consumer focus … what drives our customers

The needs of the consumer are paramount. The sector must commit to the value chain methodology as a core business tool in order to understand where greatest value can be achieved. Each component of the wine value chain needs to understand and respond to domestic and international consumer requirements. Collaboration will ensure optimal efficiency, productivity, global competitiveness and a strong Australian brand.

Research opportunities

1*	Identify critical elements of the different value chains (financial, logistics, regulations, consumers, relationships and community), that add value to wine for the consumer and where investment can generate high returns
2	Determine what drives consumers' choice of beverage in order to understand consumer preferences and buying patterns
3	Identify market opportunities and develop products in price segments with sustainable margins to satisfy consumer preferences
4*	Develop innovative approaches to inform consumers about wine
5	Develop innovative approaches to distribution and packaging to meet changing market demands and consumer preference
6	Develop alternative grape products

Key issues

- Value chain analysis will provide information about consumer preferences, distribution and resource use so the sector can access more profitable market segments including those at higher price points.
- The Australian wine sector must be able to quantify consumer preferences and use this information to influence viticultural and wine making practices and capitalise on value building opportunities.
- Australian winemakers need improved market intelligence and behavioural research, through greater direct engagement with consumers, so they can produce wine that consumers will buy.
- Information dissemination to all suppliers and participants in the value chain will allow them to match their wine specifications, attributes and processes to meet consumer preferences and new market opportunities.
- Packaging and distribution have a major impact on consumer acceptance and cost-effectiveness of production. The wine sector must be innovative in these areas.
- Development of alternative products from grapes and wine, eg health, pharmaceuticals, cosmetics and food products, will provide opportunities to use existing infrastructure and waste streams more effectively.

* indicates a high priority research opportunity

4.2 Integrated grape growing and wine making

The rapid expansion of knowledge of grape characteristics, wine chemistry, biotechnology, microbiology and winemaking processes will enable the sector to meet consumer preferences. Using a vine to consumer approach, the management of vineyards and wineries can be improved with smarter techniques and machinery. Grape growers and winemakers will work together to meet consumer expectations and increase their profitability.

Research opportunities

1	Understand the attributes of grapes and wine of relevance to wine styles targeted for consumers
2*	Continue programs to broaden the genetic base of planting material suitable for Australia's changing environmental conditions
3*	Identify the distinctive characteristics that define regional wine styles
4	Improve understanding of harvest and post-harvest processes on wine potential
5	Improve fermentation and winery processes to enhance wine quality and efficiency
6	Identify the controllable variables to optimise the life of packaged wine

Key issues

- Measurement and process control tools in the vineyard and winery can be improved by being made simpler and more cost effective.
- As Australia's climate and environmental conditions change, a broader genetic base of planting material is required.
- Knowledge of gene technology to better manage vineyards, planting materials, and fermentation, which will further facilitate responses to threats, such as climate change, and will enable adaptation of wine styles to better meet customer preferences.
- Improve wine making flexibility through the production of different wine styles from a single grape variety based on vineyard practices and microbiology processes.
- Harvest and post-harvest techniques impact on grape quality which influences wine flavour and winemaking efficiency. Best practice approaches used in other industries may provide opportunities for improved processes and logistics.
- Knowledge of materials, additives and processes will reduce viticulture and wine making interventions and will increase efficiency and quality.
- Wine changes after it has been packaged. There is currently limited understanding of the interactions of transport and storage conditions on packaged wine.

* indicates a high priority research opportunity

4.3 Environmental sustainability

Water use efficiency, soil health, preparedness for climate variability and managing greenhouse gas emissions are important for our sector. Processes for natural resource management must be continually improved to ensure all elements of the value chain are environmentally sustainable.

Research opportunities

1	Support environmental best practice programs with research to facilitate excellence in environmental performance and to ensure vineyard and winery sustainability and market access
2	Adapt viticultural practices to mitigate the impact of climate change
3	Continually improve access, use and recycling of water
4*	Improve the efficiency of winemaking by reducing waste, energy requirements and manual intervention

Key issues

- Understanding, adapting to and managing the impact of climate change on vineyard performance will be critical for the sustainability of the sector.
- The sector needs an improved understanding of the impact of viticultural practices on soil quality with respect to structure, biology and carbon composition. Improved practices can optimise vineyard health, sustainability and wine quality.
- The ability to measure in real time water quality and flows is integral to managing water responsibly.
- Biodiversity and ecosystems, life cycle studies of energy, packaging materials and waste streams, will be critical knowledge for the sector's environmental reputation.
- Understanding the impact of spray drift, leaky vineyards and leaching will become more important with peri-urban encroachment and greater environmental scrutiny.

* indicates a high priority research opportunity

4 RESEARCH OPPORTUNITIES AND KNOWLEDGE REQUIRED

4.4 Sector development

The sector through its Wine Industry Restructuring Agenda has acknowledged the urgent need to take action to ensure that supply and demand is in balance. This will require hard decisions about grapes under production. Decisions must ensure that vineyards and wineries can produce wines at price points which will find customers and can be profitable over the long term.

Strong leadership now, attention to future leaders and an improved structure will ensure the sector is competitive, sustainable, resilient and profitable. The sector must develop people who can lead our sector in dynamic times. Its structures must be adaptable to provide leadership as new global entities emerge and existing operators move to different sectors in response to the changing environment. This will ensure that sector-wide issues such as biosecurity, trade and market access, and structural issues can be managed effectively at a national level.

Research opportunities

1	Develop a governance structure and unified set of sector strategies that encourage capacity building, efficient use of resources, sharing of knowledge, reduction of duplication and consistent priorities
2*	Develop dedicated teams to disseminate research and facilitate its adoption, including potential commercial practice; this includes access to pre-competitive information for all sections of the value chain
3	Implement procedures that attract, educate, develop and retain people in research and diagnostic areas to ensure high levels of professional practice and research in the sector
4	Prepare and improve our understanding of the implications of biosecurity issues

Key issues

- The sector is complex and has several national bodies with different objectives and membership. This creates confusion and potential duplication. The opportunity exists to determine the role, responsibility and key stakeholders of each group to ensure that the sector is efficient, focussed, consistent and effective in its work on behalf of its members.
- Research and development in agribusiness must be disseminated in an effective way so that its benefits can be realised. Dedicated teams focusing on the importance and relevance of current research for their region will enable timely and effective dissemination to practitioners and commercial adoption.
- The grape and wine sector has a long and distinguished history in Australia because it has been prepared to innovate and experiment, to invest in education, research and development, and to participate in and lead global trends. The future of the sector depends on its ability to continue to attract and retain people with the capacity to be national and global leaders in research, teaching and innovation in all areas of sector practice.
- The sector comprises inter-generational family businesses, publicly listed companies, private companies and micro-businesses. Ownership in some is stable and in others, fluid. Best practice management, strengths and weaknesses of structures, and the capacity and willingness to innovate are all areas in which research would benefit the sector.
- Protections against biosecurity threats will require both national and regional approaches to ensure the stewardship of natural resources.

* indicates a high priority research opportunity

5 REVIEW AND EVALUATION

This Prospectus will be reviewed on an annual basis for its continuing relevance. The recently established National Research Coordination Forum (NRCF) (see *Appendix II* for details) will take responsibility for ensuring that there is a robust review of the research opportunities identified in this document.

The NRCF will use this Prospectus as a major input into its deliberations. It has as its key roles:

- To identify RD&E priorities
- To identify opportunities for collaboration within RD&E
- To monitor RD&E capabilities
- To investigate optimal resource allocation among providers
- To suggest strategic RD&E requirements.

The NRCF will report to the IPC which is a high level sector body with representation from both the WFA and WGGA. It has the task of ensuring that research and development delivers cost effective outcomes that meet both current and the expected needs of the sector.

The NRCF will comprise members from WFA, WGGA, State government agencies associated with wine and grape growing, representatives of both the National Wine Extension and Innovation Network and the National Wine Research Network and the GWRDC. This group will ensure that RD&E is responsive to sector requirements and is conducted and delivered in the most efficient and effective manner.

People wishing to make comments on the research topics should contact one of the members of the NRCF, or their sector liaison person within WFA or WGGA.

APPENDIX I

The Australian Wine Sector

Australia has a wine sector with an impressive history of achievement over two centuries. Significant growth in the last decade in the volume of wine exported and its monetary value have made it an Australian success story. Wine is Australia's third largest agriculture export and is more valuable to our economy than wool, milk and cream, and barley.

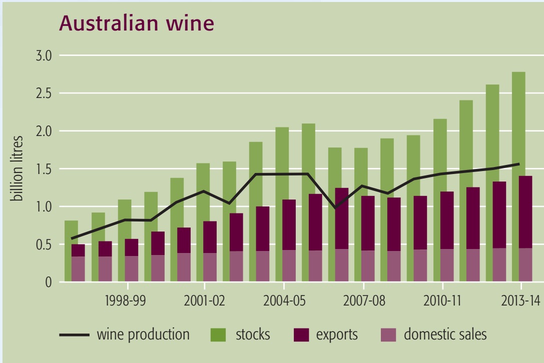
A range of micro-climates allowing wine production across all price points, and emerging cohesion in sub-sector structures, focussed research and development, rapid adoption of new technology, targeted marketing campaigns, and a focus on innovation and continuous improvement, have enabled the sector to grow.

The sector currently has:

- 8,000 vineyards
- 173,000 hectares planted across 89 wine regions (cool, temperate and warm)
- A total crush of 1.8 million tonnes
- 2,320 wineries with 1,278 (55%) of wineries crushing less than 50 tonnes and 1,042 (45%) crushing 50 tonnes or more
- The top 14 wineries crushing 71% of grape intake
- Direct employment of 31,000 people and indirect employment of 27,000 people[2].

The 2007-08 value of the Australian wine sector was $4.8 billion with exports of $2.7 billion (60%) and domestic sales of $2.1 billion (40%). Current economic and environmental factors have seen the wine grape crush decline in 2008-09 by 7%, or about 125,000 tonnes, with the five-year average crush being 1.79 million tonnes.

Australian wine production[3]



International profile

Between 2000 and 2006, Australia's wine production almost doubled while its share of the world wine export market increased by 50%. By comparison, France, the biggest wine producing nation in the world, reduced its world export share by 5%. Australia is the only country to have significantly improved its position as a wine producer since 2000.

The Australian wine sector:

- Accounts for 5.1% of the volume of all world wine produced
- Is the 6th largest wine producing nation (after France, Italy, Spain, USA and Argentina)
- Is the 4th largest wine-exporting nation (after France, Italy and Spain)
- Exported $2.7 billion of wine in 2007-08
- Exports to approximately 100 countries, mainly UK 33%, USA 27%, EU (excluding UK) 14% and Canada 10%[4].

2 AWBC winefacts October 2007 and ABS 1329.0 *Australian Wine and Grape Industry 2008* and *The Australian and New Zealand Wine Industry Directory 2009*
3 ABARE *Australian Commodities Outlook* March 2009
4 ABS 1329.0 *Australian Wine and Grape Industry 2008*

APPENDIX I

The Australian Wine Sector

Regional impact

Billions of dollars have been invested by individuals, companies and others into the expansion of the sector with direct and indirect benefits for regional economies. Benefits include a dramatic increase in regional employment, increased investment in infrastructure and growth in local tourism.

In 2009, Victoria had 698 wineries and South Australia had 620. New South Wales and the ACT had a combined total of 443 wineries, Western Australia 361, Queensland 106 and Tasmania, 92. The Northern Territory is the only state/territory where the wine sector is not a major employer in regional areas.

Wine grape growing contributes to the economy in 89 defined wine areas throughout Australia. South Australia is the predominant wine grape production state, accounting for 44% of total production in 2007-08[5].

Tourism impact

Many of Australia's small wineries rely heavily on cellar door visits for viability. For them the route to market is primarily through sales direct to the public and increasingly, profitability is underpinned by sales of merchandise and the provision of meals as well as wine sales.

The wine tourism sector has seen a marked increase in the number of international visitors above and beyond that of other tourism industries.

Between 2000 and 2008, international tourists visiting wineries in Australia rose at an annual rate of 6%, despite Australia recording a growth rate of international visitors of only 2%.

Domestic tourism to wineries, both overnight and day visitors, experienced a similar annual increase between 2000 and 2007 of 3% and 2% respectively. This is despite an annual decline in total visitors around Australia.

International tourism has a much stronger market share in the wine sector than the domestic sector, with 13.2% of international tourists visiting a winery in Australia. In 2008, international winery visitors spent a total of $5 billion on their trip.

Success factors for the wine sector

The critical features of Australia's past success with wine have been:

- Innovation in production techniques and technologies and rapid adoption of best practice wherever it has been found
- Understanding and catering to the demand of export markets
- Bringing new consumers into the market
- Effective branding strategies
- Clear industry leadership
- Wine diversity and quality[6] has changed consumers' views about wine.

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5 ABARE (2009) *Australian Wine Grape Production Projections to 2010-11*

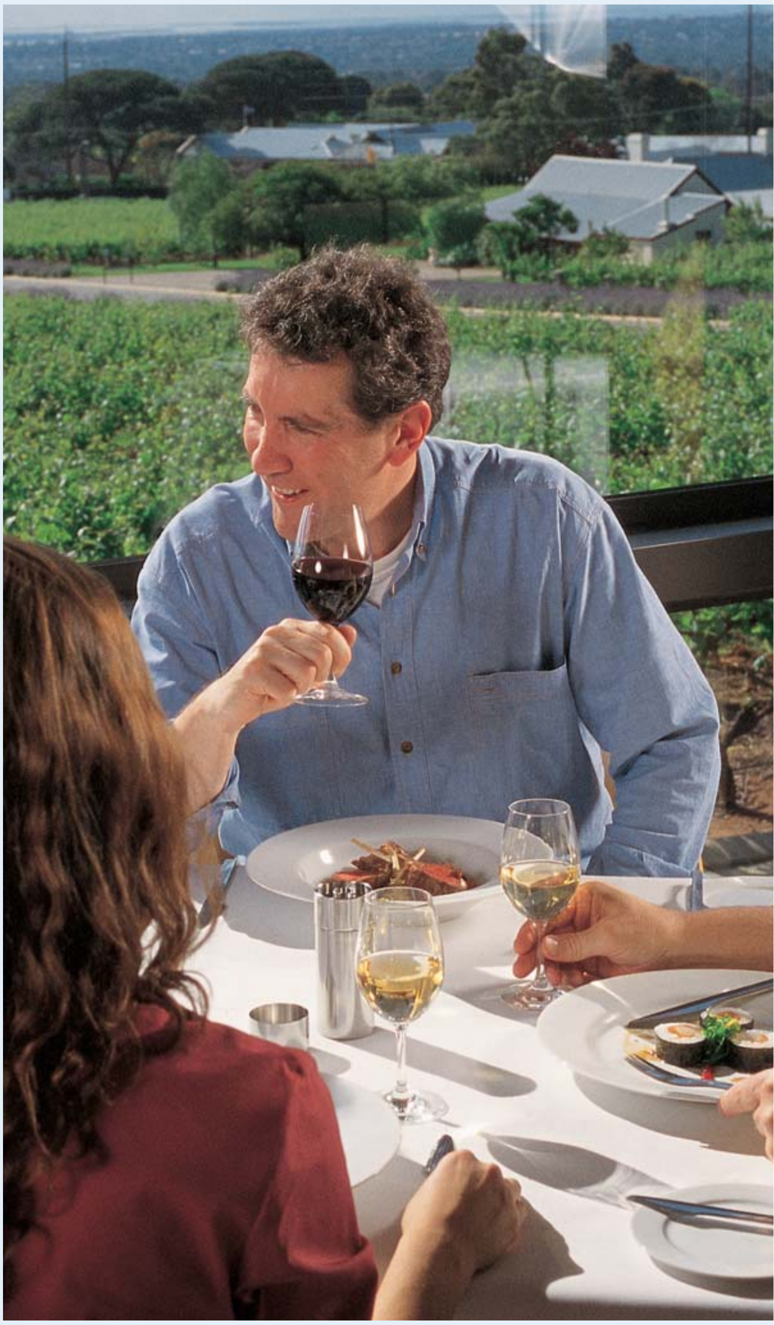
6 In this Prospectus the term 'quality' is used to denote fitness for purpose

APPENDIX 1
The Australian Wine Sector

Challenges

The wine sector now faces a highly competitive international environment, with greater concentration of competitors in the main markets for Australian wines. The significant challenges for the sector are:

- Bridging the structural imbalance between the cost of production and the price opportunity
- Developing a better understanding of consumers and their wine preferences
- Ensuring all elements of the value chain work together for continual improvements in quality and efficiency
- Managing supply and demand fluctuations for grapes and wine
- Managing the downward pressure on pricing and profit margin as a result of retail consolidation and global over-supply
- Growing Australia's international presence when there is slow domestic growth and strong competition for export growth
- Responding to information about new market opportunities based on consumer preferences
- Maintaining value when purchasers consider wine a commodity product
- Managing landscape and the social impact of potential closures of vineyards and wineries
- Greater environmental and sustainability challenges and responsibilities, with additional compliance issues and complexity associated with climate change
- Managing volatile exchange rate movements which affect the price and competitiveness of Australian wine in overseas markets
- Developing sector leaders who can work with governments, stakeholders and each other to consolidate and grow the sector's export income, regional development, employment, scientific research and innovation.



APPENDIX II

National RD&E Framework

The Primary Industries Ministerial Council comprising the Australian Government and State Government ministers with responsibilities for primary industries has called for the development of a national strategic framework for primary industries RD&E. The aim of this initiative is to ensure Australia's research, development and extension capacities are aligned nationally with future sector needs, to initiate collaboration that strengthens Australia's position in international markets and to ensure that RD&E delivery is both more efficient and effective.

The development of the Wine Sector Strategy has been led by the GWRDC, WFA and Primary Industries and Resources South Australia (PIRSA) with support from CSIRO and the State Governments of New South Wales and Victoria.

The strategy has been developed by key stakeholders from the sector, research, universities and government agencies. The centrepiece of the strategy is a proposed structure and system that includes:

- A National Wine Research Network
- A National Wine Extension and Innovation Network
- A National Research Coordination Forum.

The National Wine Research Network will be a forum for wine research and development providers to share research and information, to encourage consultation, coordination and communication amongst research and development providers and to be a point of contact for sector bodies.

The National Wine Extension and Innovation Network will coordinate wine sector extension and innovation services to ensure those services are delivered in the most timely, client-focused and cost effective manner.

The National Research Coordination Forum will lead, coordinate and link the parts of the system. It will provide a regular high-level forum of wine sector leaders, researchers, funders, government agencies, regions and extension service providers to ensure that wine RD&E is responsive to sector requirements and is conducted and delivered in the most efficient and effective manner.

The key outcomes, once the strategy is fully implemented, are an Australian wine sector development and extension system that:

- Has clear, market-driven priorities which cover the whole of the value chain and are updated regularly
- Comprehensively meets the needs of the sector
- Is integrated, independent and specialised, with large critical mass and less fragmentation across the nation
- Funds research on the basis of programs requiring collaboration rather than on the basis of projects
- Has a high level of collaboration and exploitation of synergies through strategic partnerships and sharing of expertise and research infrastructure
- Is efficient and effective including in its use of infrastructure
- Retains and builds capability in areas strategically important to participants
- Has national centres of research excellence supported by well-linked development and extension systems so that wine sector research developed in one location will be available nationally for the whole sector
- Has a high level of sector access to international and Australian RD&E capabilities with faster and more effective ‘concept to application’.

APPENDIX II

National RD&E Framework

The proposed structure and system is shown diagrammatically in the chart below.

Wine Sector RD&E: Proposed Structure and System

Innovation Policy Committe

Role:
Ensure that R&D delivers cost effctive outcomes that meet current and future needs of the Australian Grape and Wine Industry

Membership:
- WFA
- WGGA

Reports to

National Wine Research Network

Role:
- Communication between researchers
- Connect capabilities
- A science network extending to Market and Consumer Behaviour Capabilities and Applied Science
- Resource sharing
- International connections

Membership:
- CSIRO
- Universities
- State Agencies
- AWRI
- Provisor
- GWRDC
- Extension Network Rep

National Research Coordination Forum

Role:
- Identify RD&E priorities
- Identify opportunities for collaboration
- Monitor RD&E capabilities
- Suggest strategic RD&E

Membership:
- WFA
- WGGA
- State Agencies
- National Extension Rep
- Research Network Rep
- GWRDC

National Wine Extension and Innovation Network

Role:
- Coordination of Grape and Wine Extension
- Input into strategic RD&E directions

Membership:
- National Extension Network
- State Agencies
- GWRDC Innovators Network
- ASVO
- AWRI
- WFA
- WGGA
- 1 x Winemaker
- 1 x Grape Grower
- Research Network Rep
- Consultants and Advisers
- VET/TAFE Providers
- AWBC
- Winery Engineers and Suppliers

Representation

Representation

Representation

August 2009

APPENDIX III

National Research and Development Priorities

The current Australian Government priorities have been determined in accord with the *Primary Industries and Energy Research and Development Act, 1989* which has as its objects:

- Increase economic, environmental and social benefits
- Achieve sustainable use and management of natural resources
- Make more effective use of human resources and skills
- Improve accountability for expenditure.

There are two sets of Australian Government research and development priorities of relevance to this Prospectus: *Australian Government's National Research Priorities*, as determined in 2003, and the DAFF's *Rural Research and Development Priorities*, as determined in 2007.

National Research Priorities

An environmentally sustainable Australia

Transforming the way we utilise our land, water, mineral and energy resources through a better understanding of human and environmental systems and the use of new technologies –

1. Water – a critical resource
2. Transforming existing industries
3. Overcoming soil loss, salinity and acidity
4. Reducing and capturing emissions in transport and energy generation
5. Sustainable use of Australia's biodiversity
6. Developing deep earth resources
7. Responding to climate change and variability

Promoting and maintaining good health

Promoting good health and well being for all Australians –

1. A healthy start to life
2. Ageing well, ageing productively
3. Preventive healthcare
4. Strengthening Australia's social and economic fabric

Frontier technologies for building and transforming Australian industries

Stimulating the growth of world-class Australian industries using innovative technologies developed from cutting-edge research –

1. Breakthrough science
2. Frontier technologies
3. Advanced materials
4. Smart information use
5. Promoting an innovation culture and economy

Safeguarding Australia

Safeguarding Australia from terrorism, crime, invasive diseases and pests, strengthening our understanding of Australia's place in the region and the world, and securing our infrastructure, particularly with respect to our digital systems –

1. Critical infrastructure
2. Understanding our region and the world
3. Protecting Australia from invasive diseases and pests
4. Protecting Australia from terrorism and crime
5. Transformational defence technologies

APPENDIX III

National Research and Development Priorities

Rural Research and Development Priorities

Productivity and adding value

Improve the productivity and profitability of existing industries and support the development of viable new industries.

Supply chain and markets

Better understand and respond to domestic and international market and consumer requirements and improve the flow of such information through the whole supply chain, including to consumers.

Natural resource management

Support effective management of Australia's natural resources to ensure primary industries are both economically and environmentally sustainable.

Climate variability and climate change

Build resilience to climate variability and adapt to and mitigate the effects of climate change.

Biosecurity

Protect Australia's community, primary industries and environment from biosecurity threats.

Supporting the Rural Research and Development Priorities

Innovation skills

Improve the skills to undertake research and apply its findings.

Technology

Promote the development of new and existing technologies.

APPENDIX IV

Innovation Policy for the Australian Grape and Wine Sector

An important function of the WFA and WGGA, as the pre-eminent bodies of the grape and wine sector, is to direct the path of innovation as part of the wine sector's overall future directions.

As the key advisory body to the wine sector on innovation, the IPC aims to apply more efficiently existing research funds to sector innovation needs and to both expand the quantum of funds and the range and diversity of research and extension providers.

In a major way, industries have grown and prospered through innovation and strong leadership. Our sector has used two processes to drive this innovation – through the provision of new knowledge from research and through sector led and directed activity.

Exploring the 'new territory' of human knowledge has been the classic role of research; exploiting this new knowledge has been the classic role of business entrepreneurs. Specialised cultures have grown up around each of these areas, each with their specialised skills.

In the research, development, extension and implementation model the research and extension is driven largely through one culture and the development and implementation largely through another.

The Australian grape and wine sector has a long history of successful innovation by which it produces a range of wines of interest to the global consumer, has become internationally competitive and supports a significant number of regional communities.

Innovation is driven by the companies that make up the Australian wine sector, either individually or collaboratively, and uses information from a wide variety of sources, such as in-house research and technical activity, publicly funded research, extension and education, suppliers to the sector, private companies and consulting organisations, and its own research organisation, the AWRI. The Australian wine sector supports the established role of the AWRI as a world-class research institution.

There is a strong need for improved collaborative relationships between research providers, to deliver research, education and extension across the whole wine production and marketing chain, including its social and economic impacts.

Since 1986 the Australian grape and wine sector has formed a partnership with the Australian Government by which levy funds collected from the sector on a per tonne basis are matched by Government up to 0.5% gross value of production to invest in research and extension activities.

These levy funds have been invested in research and extension projects undertaken by the AWRI, by publicly funded organisations, such as the CSIRO, State Departments of Agriculture/Primary Industries, universities, and by organisations that are publicly funded. The investment of levy funds is managed by the GWRDC, an Australian Government statutory organisation.

In recent times the operating environment for the Australian grape and wine sector has changed with a prolonged drought, concerns over the global financial crisis, the future impacts of climate change, increased competition in global markets, customer aggregation, and a highly variable currency.

Such changes drive the need for intensified innovation by the sector. As a result, all research providers should review their forward plans and ensure adequate flexibility to accommodate the changing environment.

The IPC, with representation from WFA and WGGA, recommends a set of sector innovation priorities through the work of the SDG that takes into account the needs and aspirations of the mix of companies within the sector.

Individual members of the Australian wine sector, suppliers to it, private companies and consulting organisations are responsible for their innovation activities; however, the Australian grape and wine sector seeks to maximise the return from the efficient investment of levy funds and funds from other

APPENDIX IV

Innovation Policy for the Australian Grape and Wine Sector

sources in research, extension and pre-competitive technical activities. To this end the IPC recommended the implementation of the following policies which were adopted by WFA and WGGA in 2009. In effect the sector:

- Encourages a range of institutions, public and private, Australian and international, to compete for levy funds
- Encourages these institutions to seek co-investment from sources other than that of the levy funds, provided that the priorities and interests of the sector are met
- Encourages institutions to develop an area/s of expertise, particularly those relying on levy funds for core activities, to reduce duplication and to increase efficient use of scarce levy funds
- Encourages institutions to collaborate, e.g. utilising the WIC on the Waite Campus of The University of Adelaide, to integrate research across the entire supply/value chain from the environment to the consumer
- Recommends the investment of up to 30% of total GWRDC revenue in knowledge generation activities in areas of long term interest to the sector
- Supports, wherever possible, a strong nexus between research and education activities to maintain the intellectual capacity of the sector
- Supports targeted extension activities to ensure that research information is made available quickly and efficiently to levy payers
- Supports pre-competitive technical collaborative activities against sector priorities by organisations other than those publicly funded
- Recommends the allocation of up to 30% of total GWRDC revenue to entities, such as the AWRI and the NWGIC, for core activities; and
- Supports the sector's own research organisation, the AWRI, with sufficient funds to undertake core activities and to harness to maximum extent the resources of all wine sector supportive organisations, including CSIRO, the universities and Departments of Agriculture/Primary Industries, by collaborative and non-duplicative endeavour.

APPENDIX V

Research projects undertaken for the Grape and Wine Sector

The GWRDC website contains details of all research being undertaken for the grape and wine sector and related research. There are also links from the GWRDC website to the sites of the research providers. The GWRDC site is updated regularly and contains current information.

Please refer to ***www.gwrdc.com.au*** for details of grape and wine sector research projects.

APPENDIX VI

Strategic Directions Group

The SDG was established in 2004, following nominations of potential members by sector bodies and other interested groups with the skills and experience needed to provide advice on the future research needs of the sector. Attention was also given to the geographic spread of members to ensure that the major wine-producing regions were represented. While SDG members do not represent their nominating agencies they are required to consult with their organisations on the contents of this Prospectus.

The SDG charged with preparing the second Prospectus met for the first time in October 2008 and concluded its work on the Prospectus in November 2009.

The four main tasks of the group have been to:

1. Release each three years a Prospectus of sector priorities for additional research and development, to be updated annually
2. To provide specific advice to WFA, WGGA and GWRDC and to other sector bodies, as required, for the development of their own planning processes
3. To broadly assess progress and new opportunities for research and development in topic areas identified as being of high priority for the sector, and to consider the relative priority of potential new or emerging research and development issues
4. To engage the grape and wine industries at regional, state and national levels to maximise the opportunities for sector input into the priority identification process.

The terms of reference of the SDG were:

- To take into account the sector direction specified in *Wine Australia: Directions to 2025 – An industry strategy for sustainable success* and *Taking Stock & Setting Directions for the Australian Wine Grape Industry*
- To identify future demands from the external environment – beyond viticulture and wine making, looking both upstream (e.g. marketing) and downstream (e.g. nursery industry), as well as to government
- To collate and prioritise national research needs
- To set specific research and development priorities to maximise investment, avoid duplication and achieve the greatest potential returns
- To define research and development priorities in the form of a triennial Prospectus which recognises the above information and which is aligned with sector needs
- To provide an annual update of priorities in the form of an addendum to incorporate new opportunities and priorities
- To provide sector input into the GWRDC planning process including the *Five-Year Research and Development Plan* and *Annual Operational Plan*.

The SDG reports to the Boards of the WGGA and WFA via the Innovation Policy Committee.

SDG Members from 2008

Name	Representing
Tony Battaglene *(ex officio)*	Winemakers Federation of Australia
Simon Berry	berry2wine Pty Ltd. *(joined August 2009)* representing the Wine Grape Growers' Australia
Rob Glastonbury	De Bortoli Wines
John Griffiths	Faber Vineyard
Richard Hamilton	Foster's Group Limited
John Harvey *(ex officio)*	Grape and Wine Research and Development Corporation
Russell Johnstone	Pernod Ricard Pacific
Geoff Linton	The Yalumba Wine Company
Mark McKenzie *(ex officio)*	Wine Grape Growers Association Australia *(resigned August 2009)*
Darren Oemcke	Wine Industry Suppliers Association
Lawrie Stanford	Australian Wine and Brandy Corporation
Richard Smart	Smart Viticulture *(resigned August 2009)*
Bronwyn Halliday *(facilitator)*	Bronwyn Halliday & Associates

APPENDIX VII

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APPENDIX VIII

Glossary

AANRO	Australian Agricultural Natural Resources Online
ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
ASVO	Australian Society of Viticulture and Oenology
AWBC	Australian Wine and Brandy Corporation
AWRI	The Australian Wine Research Institute
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSU	Charles Sturt University
DAFF	Department of Agriculture, Fisheries and Forestry (Commonwealth)
GWRDC	Grape and Wine Research and Development Corporation
IPC	Innovation Policy Committee
MNRF	Major National Research Facility
NRCF	National Research Coordination Forum
NWGIC	National Wine and Grape Industry Centre
PIRSA	Primary Industries and Resources, South Australia
RD&E	Research, Development and Extension
RDC	Research and Development Corporation
SARDI	South Australian Research and Development Corporation
SDG	Strategic Directions Group
WFA	Winemakers' Federation of Australia
WGGA	Wine Grape Growers' Australia
WIC	Wine Industry Cluster

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