GrapeLinks
Viticultural Knowledge Management

Australian Government
Grape and Wine Research and Development Corporation

Strategic Directions Group



FINAL REPORT to

GRAPE AND WINE RESEARCH & DEVELOPMENT CORPORATION

Project Number: GWR 00/2

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ABSTRACT
The SDG has brought together expertise from across the wine industry, and considered R&D needs right along the production chain (not focussed solely on grapegrowing or winemaking). Its methodical prioritisation has led to a comprehensive R&D Prospectus in 2006 with an Update in late 2007, to workshops for key priority area of R&D and several publications in Industry Journals. The SDG has helped to engage the wider industry in thinking about current and future challenges facing the industry and the knowledge needed to overcome them. The SDG outputs have influenced R&D planning by the GWRDC and by some R&D providers. The SDG found that the wine industry should expand its funding sources beyond the traditional. This will require commitment and dedicated resources to bring about change, but is a high priority if the industry hopes to maintain its competitive position.

EXECUTIVE SUMMARY
In a 2004 review by the Winemakers Federation of Australia (WFA) of how grape and wine research has been conducted in Australia, several opportunities were identified. These included:

- the need to improve the approach to setting research priorities for the wine industry;
- the need to ensure that R&D priorities are set by industry;
- the need to attract more 'external' investment to research; and,
- the need to have industry ownership of results

To address these opportunities, with the support of the Grape and Wine Research and Development Corporation (GWRDC), the Strategic Directions Group (SDG) was formed. This skills-based group with members drawn from various regions and across all aspects of industry, from grape growing, wine making through to wine marketing and wine tourism, were brought together in early 2005 to identify further research needs for the whole industry. Ex-officio members from the Winemakers Federation of Australia, Wine Grape Growers Australia (WGGA), the Grape and Wine Research and Development Corporation and Wine Industry Suppliers Australia (WISA) support the groups' activities together with an independent Facilitator and Executive Officer.

The group initially met to develop a process to identify research needs. A description of the processes in the entire wine value chain involving grapegrowing, winemaking, distributing, and marketing the final product was elaborated. Furthermore, the group identified overarching issues that must be addressed if the industry is to maintain its competitive position. In total 35 potential broad topics where R&D is required were identified.

The next task for the group was to determine which of these presented a key priority for **additional** research, whose outcomes would deliver the greatest benefit to the wider industry. Importantly, the group was asked to identify those topics that are not presently attracting sufficient research effort. Input from several regional priority setting exercises was incorporated into this phase of the group's work. Through individual scoring and ranking of the potential priorities, a group consensus was reached and was further refined with a face to face meeting and the 35 topics were honed down to 11 areas of high priority.

The areas identified for additional R&D were:

- Wine and society
- Wine drinkers' preferences
- Wine buyers behaviour
- Getting the product to market
- Optimal marketing of the product
- Monitoring and manipulating wine quality
- Excellence in winemaking technology
- Innovation in winemaking microbiology
- Monitoring and preserving grape quality
- Managing vineyards to produce quality grapes
- Sustainability of all industry processes

The Prospectus 'Investing in Innovation', summarising this work, was released in January 2006 and was targeted at research providers, funding bodies and private investors. A summary is available on the WFA website and the full Prospectus is available on application from the Winemakers Federation of Australia at www.wfa.org.au.

A considerable effort was made to extend and publicise the existence of the prospectus including write-ups in several major industry journals, a summary distributed to all members of the

Winemakers Federation of Australia and a mail out of the full Prospectus to all State Industry Associations and Research Institutions, including those research providers that do not traditionally conduct grape or wine research.

Workshops were held with industry to present and discuss the Prospectus, particularly seeking facilitation by State Associations for the process of attracting research providers to work on the priority topics. Briefings were held with several research institutions including the Wine Innovation Cluster that is forming on the Waite Campus of the University of Adelaide, with several divisions of CSIRO, and with various State research departments. Key Australian Government departments were also briefed including the then Departments of Foreign Affairs and Trade, Agriculture, Forestry and Fisheries, and Industry Science and Technology.

Since its release, 'Investing in Innovation' has been influential in engaging a wider group of research agencies not normally involved in grape and wine research. The Grape and Wine Research and Development Corporation has also utilised the findings of the Strategic Directions Group during the development of its recently released 'Five Year R & D Plan' as did The Australian Wine Research Institute in the formation of its business plan 'AWRI Business Plan Towards 2015'.

In August 2006 the Strategic Directions Group met in Griffith and along with the normal business, the Group engaged New South Wales industry members and locally based research service providers. The group met in Adelaide in November 2006, May and September 2007 and these meetings have included presentations from and discussions with consumer researchers, grape and wine quality measurement researchers, the Grape and Wine Research and Development Corporation board and staff of The Australian Wine Research Institute.

The Group, with support from the Grape and Wine Research and Development Corporation has conducted a number of workshops focussed on the Prospectus topics including: Getting the product to market; Wine drinkers' preferences; and, Grape and wine quality measurements. Summaries of these workshops have been published in various industry publications and the Strategic Directions Group progress was reported in the August 2007 issue of the Australian and New Zealand Grapegrower and Winemaker.

The SDG members also discussed the 'Wine Australia: Directions to 2025' and 'Taking Stock-Setting Directions' reports and the Grape and Wine Research and Development Corporation Five Year R&D Plan as well as the Commonwealth Government's priorities for rural R&D. In late 2007 the SDG reviewed changes taking place in part as a result of the 2006 Prospectus, and prepared a Prospectus Update, published in the Australian and New Zealand Wine Industry Journal in January 2008.

There has, as was intended, been some turnover of the membership of the group, but with sufficient continuity to ensure ongoing coherence in the work program. With the completion of its first three-year period there is an opportunity to assess the work and progress made by the SDG, and most importantly the impact it has had in influencing R&D strategy and priorities.

BACKGROUND

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 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".

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.

A national body called the Strategic Directions Group (SDG) was established in 2005, with members that encompassed representatives of wide range of skills and experience of value to the Australian Wine Industry (see **MEMBERS**), under the auspices of the Winemakers' Federation of Australia (WFA), Wine Grape Growers' Australia (WGGA) and the Grape and Wine Research and Development Corporation. Wine industry suppliers, through their peak body, the Wine Industry Suppliers Australia Inc. (WISA) also contribute to the work of the SDG.

It was not proposed that the SDG 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. The SDG's aim was to produce a R&D Prospectus under the following terms of reference:

- Assess the best information available on the current and future directions of the industry, and to collate national priorities;
- Set specific R&D priorities to maximize investment, avoid duplication and achieve the greatest potential returns;
- Define R&D priorities in the form of a triennial Prospectus which recognizes the above information and which is aligned with industry needs;
- Provide an annual update of priorities in the form of an addendum to incorporate new opportunities and priorities;
- Suggest R&D projects to address these priorities;
- Identify appropriate sources of funding, including the GWRDC;
- Encourage collaboration between the industry and researchers;
- Engage the grape and wine industry in its work, and to provide an additional avenue for industry input into the GWRDC planning process including the Five-Year Research and Development Plan and Annual Operational Plan.

PROJECT AIMS

1. The release each three years of a Prospectus of industry priorities for additional R&D, to be updated annually;

2. To provide specific advice to WFA, WGGA and GWRDC, and to other industry bodies, as required, assisting the development of their own planning processes;

3. To broadly assess progress and new opportunities of R&D in topic areas identified as being of a high priority for the industry, and to consider the relative priority of potential new or emerging R&D issues;

4. To engage the grape and wine industries at regional, state and national levels to maximise the opportunity of industry input into the priority identification process.

METHOD

Meetings

The SDG members met 11 times between February 2005 and May 2008 for full day meetings which were often preceded by an afternoon used to communicate and discuss the SDG activities and findings with industry stakeholders. Several meetings included specialist workshops on topics identified in the 2006 Prospectus, with invited speakers and participants.
Meetings took place in SA, VIC and NSW. Full and agreed minutes of the meetings have been provided to GWRD/WFA.

Industry communications

- Distribution of the Prospectus (46p) and inclusion into WFA website.
- Letters with Prospectus copies sent to all State industry associations and Research institutions, including non-traditional providers
- Summary of contents distributed to all WFA members
- Sic publications in Industry Journals

Industry Briefings

- Briefings were held with Research Institutions- WIC, CSIRO, State governments, Key Australian Government Departments including DFAT, DAFF and DIST.
- Briefing in Griffith in August 06 involved the NSW industry and service providers
- Briefings in Adelaide (Nov. 06, May and Sept. 07) involved consumer researchers, grape and wine quality measurement researchers, the GWRDC board and AWRI.

Workshops

Workshops were held with industry representatives on 3 priority topics:

- Getting the product to market
- Consumer preferences
- Grape and wine quality measurements

For each workshop industry publications were produced (see **PUBLICATIONS**)

Priority setting process

A Discussion Paper was circulated to members proposing to either develop a broad list of potential research priorities, which the SDG members could then refine using their wide knowledge and experience together with information from existing industry documents (quick, but important topics could be missed), or some form of business system analysis where all key activities in the wine industry were listed and each considered in turn for potential priorities (more-objective, but requires a lot of work). After some discussion, members agreed to use a mix of the two types of approaches. The initial business system lists, circulated with the Discussion Paper, were used to help prompt suggestions of possible topics for research. Several hours of the first meeting were spent to brainstorm issues under the 5 broad headings of Consumers, Markets, Winery, Vineyard, and Land and Water. Approximately 500 issues were minuted and later grouped and combined with potential research priorities from existing wine industry reports and documents.
Members were also asked to consider what the Australian wine industry might look like in 2025, and identify its key characteristics. These could also point to longer-term topics for R&D.
Members discussed briefly the methods that could be used for the second step, in ranking a set of consolidated priorities prior to their inclusion in the draft Prospectus. There was general agreement to members individually scoring against the criteria of ***attractiveness*** (how important is this topic to the wine industry, is it a national or regional issue, does it affect everyone in the industry or only some, will new knowledge have a large or small influence?), ***feasibility*** (can R&D- in its broadest definition- help us to address this issue, is the topic amenable to research and how likely is it that the R&D will succeed), and ***likelihood of adoption*** (relative likelihood of the results of successful R&D being taken up and adopted by either the industry or others in society) with (anonymous) score sheets being circulated and the Group then meeting to discuss and finalise the rankings.
It was agreed that the SDG facilitator and secretary would collect and integrate all the issues identified by the SDG members and collate them into a smaller set (around 30), each priority to have a brief title and 2-3 sentences explaining the scope of issues or topics included within it. This list was prepared and circulated to the SDG members during March 2006 for comments, prior to the ranking exercise. Members individually scored and ranked these topics against the three selection criteria, and scores were summed and averaged. At its next meeting the SDG reviewed these results, members scoring high or low were asked to explain their decisions, members were then able to rescore if they wished, and a final set of ranked priorities was agreed and formed the basis for the 2006 Prospectus.

At the Prospectus Update Meeting in November 2007, SDG members reviewed a summary analysis of issues discussed in recent industry papers (Directions, Taking Stock, GWRDC Plan) and suggested R&D topics in response. They then ranked new and existing R&D topics (including those from the 2006 Prospectus not yet addressed) to identify those that were urgent and should be given special attention over the next year. Members absent on the day provided scores and comments by email.

RESULTS/DISCUSSION

1. Production of the Prospectus

The SDG identified 35 Potential R&D opportunities in 6 categories at its June 2006 meeting. The member's scores spread widely for all three criteria thus the total averages (n=14) also had a wide range, reflecting the different backgrounds and areas of expertise of members.

Fig. 1: Potential R&D opportunities as devised by SDG and State and Regional Associations.

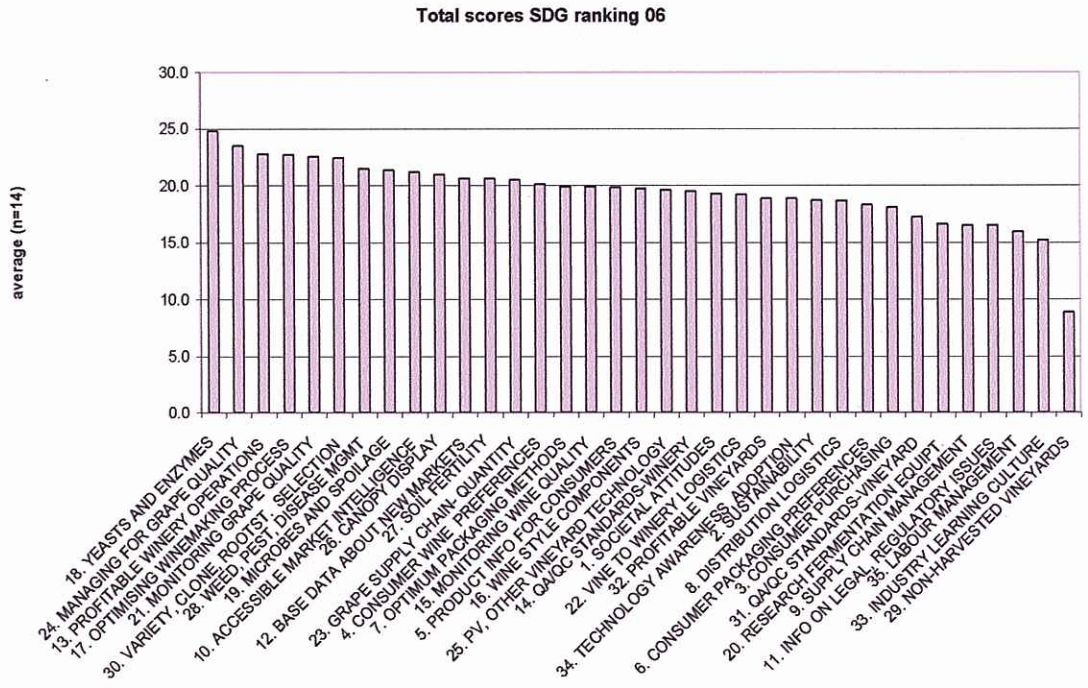
Porential R&D opportunities	Attract' ness Av.	Range	Feasibil ity Av.	Range	Adopta bility Av.	Range	TOTAL Average	Range
1. SOCIETAL ATTITUDES	7.8	5 10	6.1	0 10	5.4	2 10	19.3	10 to 30
2. SUSTAINABILITY	7.4	3 10	6.1	3 8	5.4	2 10	18.7	9 to 28
3. CONSUMER PURCHASING	6.9	1 10	5.6	1 10	5.5	0 9	18.1	3 to 28
4. CONSUMER WINE PREFERENCES	7.6	2 10	6.6	2 10	5.9	0 9	20.1	10 to 28
5. PRODUCT INFO FOR CONSUMERS	6.6	2 10	7.0	2 10	6.2	0 10	19.9	12 to 30
6. CONSUMER PACKAGING PREFERENCES	6.4	2 10	6.5	2 10	5.4	0 9	18.3	9 to 28
7. OPTIMUM PACKAGING METHODS	6.6	2 10	7.1	1 10	6.2	1 9	19.9	10 to 28
8. DISTRIBUTION LOGISTICS	6.4	2 10	6.2	1 10	6.0	2 9	18.6	7 to 25
9. SUPPLY CHAIN MANAGEMENT	5.7	2 9	6.1	1 9	4.7	1 9	16.5	0 to 28
10. ACCESSIBLE MARKET INTELLIGENCE	7.8	2 10	7.1	1 10	6.3	0 9	21.2	9 to 30
11. INFO ON LEGAL, REGULATORY ISSUES	5.8	0 10	6.5	0 10	4.2	0 9	16.5	0 to 25
12. BASE DATA ABOUT NEW MARKETS	7.1	2 10	6.9	0 10	6.5	2 10	20.6	10 to 30
13. PROFITABLE WINERY OPERATIONS	7.4	2 10	7.7	2 10	7.7	4 10	22.8	17 to 30
14. QA/QC STANDARDS-WINERY	6.1	2 10	6.9	5 8	6.5	2 9	19.5	12 to 25
15. MONITORING WINE QUALITY	7.3	2 10	6.4	2 10	6.3	2 9	19.9	6 to 28
16. WINE STYLE COMPONENTS	7.1	2 10	6.3	2 10	6.4	2 9	19.7	6 to 28
17. OPTIMISING WINEMAKING PROCESS	7.9	4 10	7.4	3 10	7.4	3 10	22.7	11 to 30
18. YEASTS AND ENZYMES	8.3	5 10	7.9	4 10	8.5	5 10	24.8	15 to 30
19. MICROBES AND SPOILAGE	7.2	4 10	7.1	4 10	7.1	3 10	21.4	14 to 30
20. RESEARCH FERMENTATION EQUIPT.	5.8	0 10	5.3	0 9	5.6	0 10	16.6	0 to 28
21. MONITORING GRAPE QUALITY	7.4	0 10	7.8	4 10	7.4	2 10	22.6	10 to 30
22. VINE TO WINERY LOGISTICS	5.9	2 10	6.6	2 10	6.7	2 10	19.2	6 to 30
23. GRAPE SUPPLY CHAIN- QUANTITY	7.0	3 10	6.6	2 10	6.9	2 10	20.5	9 to 30
24. MANAGING FOR GRAPE QUALITY	8.1	4 10	8.0	2 10	7.4	2 10	23.5	8 to 30
25. PV, OTHER VINEYARD TECHNOLOGY	6.4	0 10	7.4	5 10	5.8	3 10	19.6	10 to 30
26. CANOPY MANAGEMENT	6.8	2 10	7.4	2 10	6.8	2 10	21.0	6 to 30
27. SOIL FERTILITY	6.8	2 10	7.0	5 10	6.9	4 10	20.6	14 to 30
28. WEED, PEST, DISEASE MGMT	6.7	3 10	7.6	4 10	7.1	2 10	21.5	12 to 30
29. NON-HARVESTED VINEYARDS	2.4	0 7	3.8	0 10	2.7	0 8	8.9	0 to 25
30. VARIETY, CLONE, ROOTST.	7.2	2 10	7.8	5 10	7.4	4 10	22.4	10 to 30
31. QA/QC STANDARDS-VINEYARD	5.4	0 10	6.1	3 9	5.6	2 10	17.2	9 to 29
32. PROFITABLE VINEYARDS	6.6	0 10	6.5	3 10	6.4	3 10	18.9	9 to 30
33. INDUSTRY LEARNING CULTURE	5.1	2 10	5.4	2 10	4.7	0 10	15.2	4 to 29
34. TECHNOLOGY AWARENESS,	6.4	0 10	6.4	3 10	6.0	0 9	18.9	0 to 27
35. LABOUR MANAGEMENT	5.7	2 10	5.0	2 10	5.2	2 9	15.9	0 to 25

The 6 highest priorities were targeting further research regarding (**Fig.2**):

- Yeasts and enzymes
- Management for grape quality
- Winery Profitability
- Optimisation of the winemaking process
- Measurement of grape quality
- Variety, clones and rootstocks

It seemed that these issues were foremost on the contributor's minds (in particular State and Regional Associations).

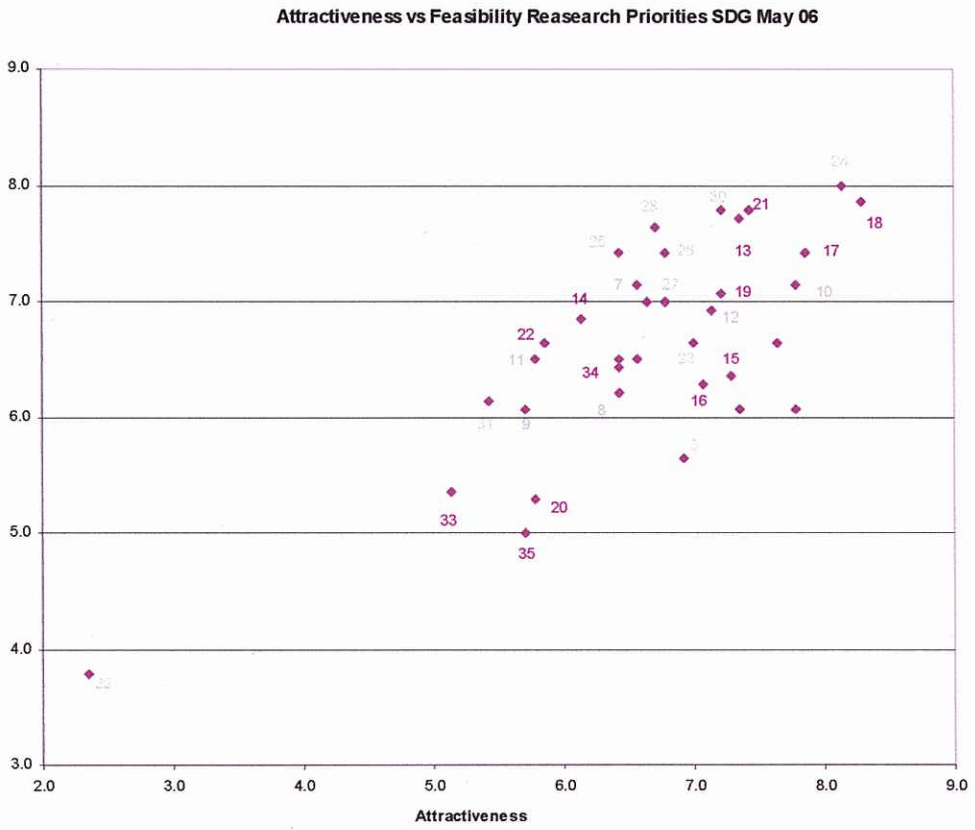
Fig. 2: Ranking by sum of scores for attractiveness, feasibility and adoptability for 35 potential research priorities, SDG 2006.



The research topics which were generally higher ranked (grape quality production and measurement and wine production and yeasts) had both high attractiveness and high feasibility scores (**Fig.3**). Topics reaching more than 7 points on both scales are except for Topic 10 (market intelligence) all winemaking or grapegrowing issues. Feasibility of consumer related topic was judged between 6 and 7 only. This showed the need for more information on research methods in this field and led to a workshop on consumer related existing and planned research.

On request of the SDG members a 36th priority was added before the Prospectus was released: Sustainability of all Industry Processes.

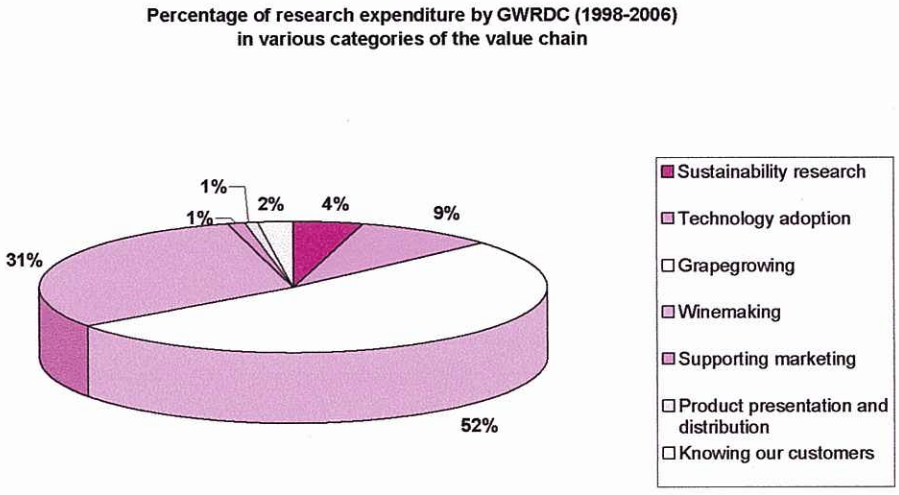
Fig. 3: Comparison of average ratings for 35 potential R&D opportunities on a ten point scale (10=highest) for attractiveness and feasibility by SDG in May 2006 .



One of the major aims of the SDG was to consider the whole wine production process rather than only the former strong focus on grapegrowing and winemaking (for which between 1989 and 2006 88% of all levy income was spent) and to include other aspects of the whole supply chain from the grape to the end user.

Each of the 35 Potential R&D Priorities had been meticulously described guided by the by the SDG's verbatim notes of the brainstorming sessions and contain 2-3 sub-points. This list is in the Appendix of the 2006 Prospectus. The sub-points were later used to facilitate GWRDC's Knowledge Map. The SDG members were each given a list of 335 GWRDC funded Research Projects (1998-2006) sorted according to the Prospectus Sub topics, with $values (GWRDC contribution) attached. Spending of levy was as in **Fig. 4**.

Fig. 4: Proportion of levy funds spent by Prospectus categories.



Members who had scored topics high or low against the three selection criteria (attractiveness, feasibility, and likelihood of adoption) were asked to discuss the reasons for their ranking- this provided the basis for valuable discussion of the topics between SDG members. It was agreed to work from the list of topics ranked for attractiveness, as this was the key criterion for the industry, and because for some topics members felt they had not enough information to judge feasibility. The main issues discussed (for each numbered topic) were minuted.

The following priority topics for additional R&D were identified, highlighted by their categories, together with the primary reasons why they are of special interest to the Australian wine industry, ideas of organizations with the skills and capability to undertake the R&D, and potential sources of additional and joint funding for the work (**Fig.5**).

Fig. 5: Top Priorities identified by the SDG and depicted in the Prospectus.

What	How
WINE AND SOCIETY	Investigate the societal attitudes towards the consumption of wine and determine how these influence patterns of consumption
WINE DRINKER'S PREFERENCES	Develop tools creating a link between consumer's sensory preferences and measurable wine attributes related to important wine styles using consumer's language
WINE BUYER'S BEHAVIOUR	Determine whether and how pricepoints and sales are related to sensory or other attributes
PRESENTATION AND DISTRIBUTION OF WINE	Get an understanding of the environmental conditions in the distribution network that affect wine attributes. Develop innovative and cost effective ways of presenting attractive products to the customer which also maintain product integrity through the distribution network
LEGAL AND REGULATORY ISSUES	Analyse, understand and constantly communicate regulatory and other market access barriers - develop links to advocacy
MONITORING AND MANIPULATING WINE QUALITY	Develop tools which measure wine attributes of relevance for consumer preferences. Adapt winemaking processes to achieve these attributes
EXCELLENCE IN WINEMAKING TECHNOLOGY	Create and adopt new technologies - including those from other industries - that will continuously improve the productivity of the wine making process and the quality of wine
INNOVATION IN WINEMAKING MICROBIOLOGY	Explore new ways of using yeasts, bacteria and enzymes to better transform valuable grape precursors into the sensory wine attributes of high consumer preference
MONITORING AND PRESERVING GRAPE QUALITY	Develop tools which measure grape attributes of relevance for consumer wine preferences. Improve grape harvesting and delivery processes to preserve these attributes
MANAGING VINEYARDS TO PRODUCE QUALITY GRAPES	Enhance the ability to economically manipulate vineyards to deliver grapes suitable for the preferred wine attributes
SUSTAINABILITY ALL INDUSTRY PROCESSES	Determine opportunities to measure the industry's environmental footprint and identify opportunities to improve the environment for example with respect to biodiversity, water use efficiency and waste management

The Prospectus also explained the goals and key issues of the 11 priorities and pointed to potential co-investors. The 2006 Prospectus was widely distributed and discussed (see **COMMUNICATIONS**).
Feedback about the Prospectus was collected and provided to the SDG members.

2. Assisting the Industry Bodies in the development of their planning processes
On behalf of the GWRDC Board, Director Kathy Grigg thanked the SDG group in April 2007 for its important work in the past and said that the 2006 Prospectus had helped to structure GWRDC's new 5 year Plan (see also **Fig. 6** below).

At a SDG visit to the AWRI in September 2007 Dr. Markus Herderich, Group Manager of Research presented the planned the Institute's RD&E activities to be funded through the new 7 year plan which finances 94 staff working in 4 themes: Grape and wine composition, Grape and wine production, Wine and society and Information and Knowledge transfer. This plan had been prepared bearing in mind the priorities of the 2006 Prospectus.

3. Engaging with Industry
Engaging with Researchers and Practitioners:
The following workshops were held organised by the SDG (and ASVO) in response to Prospectus Priorities:

A.2 Develop and demonstrate links between consumer's sensory preferences and measurable wine attributes related to important wine styles, using consumers' language
SDG workshop on 20.11.06.

B.1 Gain an understanding of the environmental conditions in the distribution network that affect wine attributes. Develop innovative and cost effective ways of presenting attractive products to the customer which also maintain product integrity through the distribution network.
SDG Workshop on 24.8.06 with 8 Industry Representatives.

D.1 Develop tools which measure wine attributes of relevance for consumer preferences.

E.1 Develop tools which measure grape attributes of relevance for consumer wine preferences.
SDG Workshop on 26.9.07.

D.2 Create and adopt new technologies - including those from other industries - that will continuously improve the productivity of the wine making process and the quality of wine.
ASVO Workshop on 17.10.07

These workshops reviewed existing knowledge in these fields and highlighted research gaps which were – through the publications in the Industry Journals- made transparent for the whole industry.

Engaging with Industry Bodies:

The following documents were discussed and synoptically viewed by the SDG:

- The **WGGA Taking Stock and Setting Directions** document released on 23.4. 07
- The WFA **Directions 2025** document released on 2.5.07
- **The GWRDC's 5 year plan** released in August 07.

All three documents were extensively discussed by the SDG. SDG Priorities as in the Prospectus (bold in **Fig. 6**) were incorporated into the GWRDC 5 year plan. Naturally the WFA and WGGA Directions and Stocktake reports have a different emphasis but both see an importance in continuing research about markets and sustainably growing quality grapes with high profitability which is also seen as a high priority in the Prospectus. There was a lack of interest in packaging and supply issues outside the SDG. A more detailed synopsis of the aims in the different plans was produced and circulated to the SDG.

Fig. 6: Comparison of R&D priorities across various industry documents .

R&D PRIORITIES	SDG Prospectus	GWRDC 5Y Plan	WFA Directions	WGGA Directions
1. SOCIETAL ATTITUDES	x	x	x	
2. SUSTAINABILITY EXPECTATIONS				
3. CONSUMER PURCHASING	x	x	x	
4. CONSUMER WINE PREFERENCES	x	x	x	
5. PRODUCT INFO FOR CONSUMERS			x	
6. CONSUMER PACKAGING PREFERENCES				
7. OPTIMUM PACKAGING TECHNOLOGY				
8. DISTRIBUTION LOGISTICS	x	x		
9. SUPPLY CHAIN MANAGEMENT	x			
10. ACCESSIBLE MARKET INTELLIGENCE	x	x	x	x
11. INFO ON LEGAL, REGULATORY ISSUES	x	x	x	x
12. BASE DATA ABOUT NEW MARKETS	x	x	x	x
13. PROFITABLE WINERY OPERATIONS				
14. QA/QC STANDARDS-WINERY				
15. MONITORING WINE QUALITY	x	x	x	
16. WINE STYLE COMPONENTS	x	x		
17. OPTIMISING WINEMAKING PROCESS	x	x	x	
18. YEASTS AND ENZYMES	x	x		
19. MICROBES AND SPOILAGE		x		
20. RESEARCH FERMENTATION EQUIPT.		x		
21. MONITORING GRAPE QUALITY	x	x		x
22. VINE TO WINERY LOGISTICS	x	x		x
23. GRAPE SUPPLY CHAIN- QUANTITY				x
24. MANAGING FOR GRAPE QUALITY	x	x	x	x
25. PV, OTHER VINEYARD TECHNOLOGY				
26. CANOPY DISPLAY				
27. SOIL FERTILITY		x		
28. WEED, PEST, DISEASE MGMT		x		
29. NON-HARVESTED VINEYARDS				
30. VARIETY, CLONE, ROOTST. SELECTION		x	x	
31. QA/QC STANDARDS-VINEYARD				
32. PROFITABLE VINEYARDS	x	x		x
33. INDUSTRY LEARNING CULTURE		x	x	x
34. TECHNOLOGY AWARENESS, ADOPTION		x		x
35. LABOUR MANAGEMENT				x
36. SUSTAINABILITY	x	x	x	x
Climate change		x	x	x
Biosecurity		x	x	

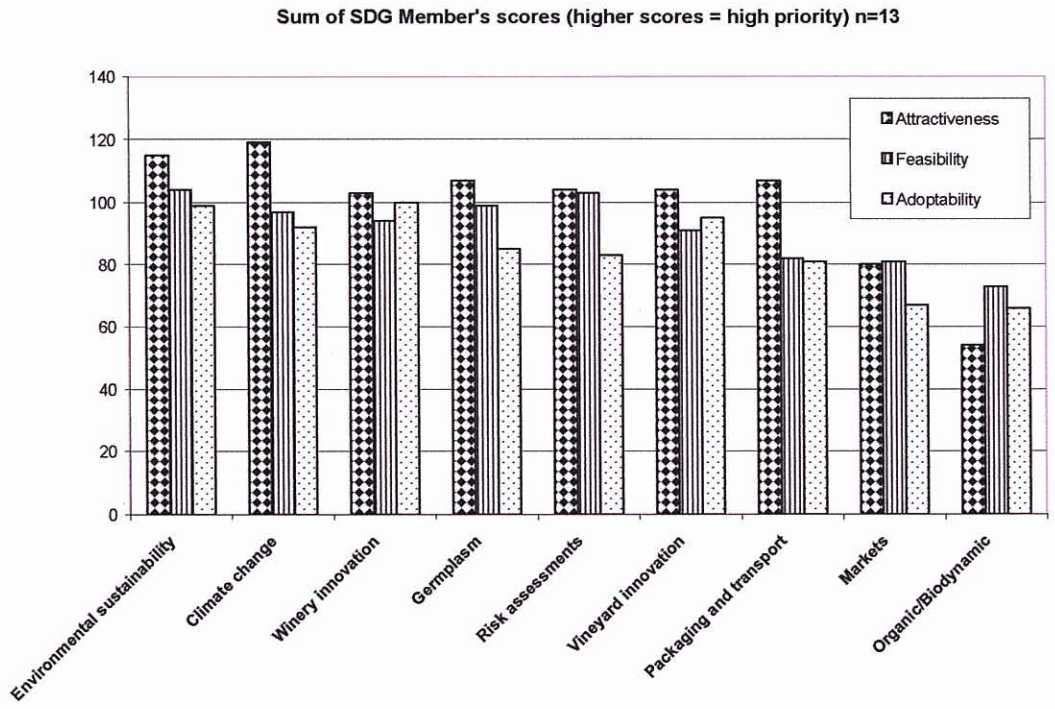
4. Determining relative priorities for currently identified priorities or any potential, new or emerging R&D issues and producing a Prospectus Update.

The SDG discussed new and emerging R&D issues at each of its meetings, and these were incorporated into its identification of priorities and then further detailed discussion of them. A Prospectus Update was prepared in November 2007 following a review of progress made in addressing the 2006 Prospectus priorities and of recent industry reports and plans. Members identified a final list of topics for scoring, and comments on these topics were also collected and collated in **Fig. 7**.These topics were ranked using the same criteria and method as in 2006 (described in **METHODS**) and results are shown in **Fig. 8**.

Fig. 7: Nine high priority topics for additional research in their final rank order (highest priority first) and comments made by 7 SDG members.

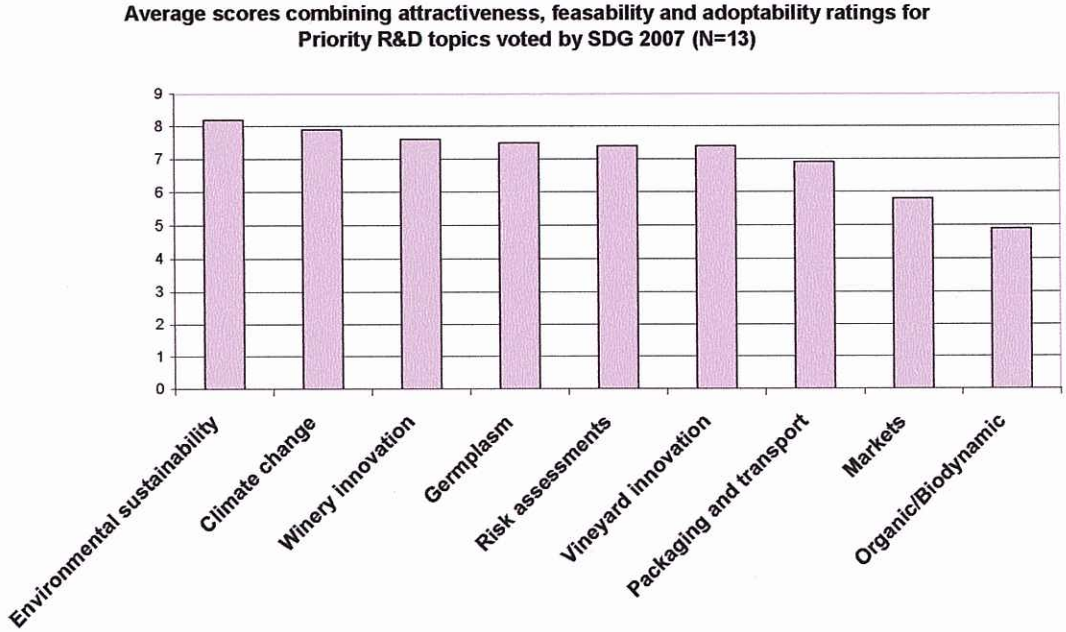
Topics for additional research	Comments by 7 SDG members
Ecological Sustainability - Energy/carbon footprint, recycling, life cycle analysis, food miles	Energy footprint, Life cycle analyses, Air quality and other discharges, Nutrient/agrochemical lossess off site, Winery waste streams, C sequesteration vs loses in vineyard /processing /packaging/transport/storage/ consumption. Market and regulatory impacts beyond our control,
Risk assessments - Climate (regions/varieties), biosecurity, biodiversity, market/regulatory changes, availability of skills	Shorter term than climate change. Water availability, drought frequency and intensity, salinity, impacts on irrigation water quality and land salinisation. Water regulation/marketing, Biosecurity risks eg sharpshooter, Market and regulatory issues linked to scenarios eg MRL, Enterprise sale, debt, Biodiversity in vineyards and sourroundings and possibility to offset, GMO's.
Climate change - Industry supply scenarios, water availability and price, varieties and regions, processing and infrastructure change, biosecurity	Take basic info (eg water, temp., rainfall variability/distribution, salinity) and translate into info that can be used by the wine industry eg to assess water availability. What are the opportunities - arable land shortfall for vines = future wine regions. Condiser varieties for different future requirements. variability/ forecasting - impacts on location/size of processing infrastructure and technology. Biosecurity risk analysis for climate scenarios and actions needed eg quarantine. How can industry respond to the problems of salt, smoke etc with calimate change. Energy (eg refrigeration) demand.
Winery innovation - Efficiency, processing equipment, enzymes (dissolve rather than squeeze) role of nitrogen, reducing volume losses, value adding (flavour impacts, unproductive time)	Efficacy and value-adding (no value losses) in procession operations. Benchmarking underway in Provisor project. New/improved systems approach to equipment and processes. New enzymes and other means of flavour enhancement. Incorporate new knowledge eg other than temperature to control fermentation.Role of N from grapes to wine and consumer preferences. Product losses, time wasted, energy wasted, life cycle analysis of winey processes.
Vineyard innovation - Systems approach, reduce and recapture inputs (eg tunnel sprayers), harvesting efficiency, post harvest vine mmt in drought, consistent methods of grape quality assessment	Systems to trace the effect of innovations to quality of wine. Understand where value is added or lost. Keep work on Prospectus section 21. Mechanisation tools for spraying, harvesting (avoiding current 8-15% loss of liquid) and pruning. Opportunities to reduce agchem input and non -target effects. Post harvest wine management in drought. Objective measurement of grape quality to match batches (like and like).Need to know links btween consumer preferences and grape characteristics.
Germplasm - Varieties for a changing climate (temperature and water efficiency) biosecurity, vine health	Important but organisational issue rather than R&D? There is curent work on resistance to pests and diseases, heat and drought tolerance, rootstocks, salinity and adaptability to future climates. Funding for germplasm collection or use overseas'sources, evaluation and distribution. Continue the work of section 30 in the Prospectus including new clones and rootstocks considering new pressues of climate, P&D.
Packaging and transport - Alternative packaging, consumer acceptance, life cycle analysis, recycling, preserving product quality, traceability	Packaging is moving too fast for R&D - mkt is driving innovation, may give rise to R&D questios in future. Transport is researchable - see Project Brief B Focus on degree and duration of heat, and contamination with field and lab studies.
Markets - Ongoing market intelligence and extension, future market and consumer scenarios, consumer preferences vs purchases, brand vs variety/region	Pre-competitive market intelligence and extension throughout the industry. What are consumer preferences and how are they formed. Most larger companies (where the main benefit lies) do it themselves. Mid sized companies who might benefit -what will assist them? Proposal will need to clerly identify users and output and what the benefit will be vs expenditure. Who has read the Directions advice? Separate section 10,11,12 in Prospectus.

Fig. 8: Final ranking of attractiveness, feasibility and adoptability of additional research priorities.



Environment and Climate change stood out with respect to attractiveness. The attractiveness of next 4 topics was almost rated equally. When attractiveness, feasibility and adoptability were combined (**Fig. 9**) the average score for packaging and transport research was very low due to low ratings for feasibility and adoptability. Market research was assessed top be a lower priority (considerable work already in progress) and the attractiveness of research about organic production systems was low but the R&D was considered feasible.

Fig. 9: Ranking of potential additional research priorities by their average scores when attractiveness, feasibility and adoptability were added.



It was concluded that there are:
Short term priorities which can be addressed quickly through **Risk Assessments** (to include industry leaders as active participants) for water availability and price, salinity (land and water), biosecurity (pest and disease incursions), skills availability in wine regions, market development and evaluation, regulatory issues, biodiversity (industry effects) and use of GMO's (eg grape varieties or yeasts)

Longer term priorities (which require additional R&D and will therefore take time) on the topics of:

- Ecological Sustainability of the industry- measuring and enhancing the environmental sustainability of the whole production chain
- Climate change- identifying potential regional impacts and industry responses
- Winery innovation including fermentation aids like enzymes
- Germplasm- making sure there is healthy planting material of the appropriate varieties, clones and rootstocks
- Vineyard innovation including grape quality assessment
- Transport and packaging issues, particularly heat and contamination risk in prolonged distribution chains
- Markets and regulations issues where early identification of trends or risks would enable the industry to respond quickly
- Organic and biodynamic production- comparison of organic and biodynamic production systems with conventional. There were different views as to the priority of this topic, some members considered that it should not be included as a high-priority.

Priorities in the 2006 Prospectus that are now being addressed were considered to be

- ✓ Wine and society
- ✓ Supporting optimal marketing (Directions 2025 report)
- ✓ Wine drinker's preferences and purchase decisions (current R&D)
- ✓ Yeasts as part of wine microbiology
- ✓ Tools to measure wine quality
- ✓ Tools to measure grape quality (needs work for consumer preferences as a basis)

OUTCOME/CONCLUSION

The SDG has been an effective mechanism to bring together expertise from across the wine industry, and to consider R&D needs right along the production chain and not focussed solely on grapegrowing or winemaking. Its work has led to a comprehensive R&D Prospectus and an Update for that, and to workshops for key priority areas and publication in Industry Journals. The SDG has helped to engage the wider industry in thinking about current and future challenges and the knowledge needed to overcome them.

The SDG outputs have influenced R&D planning by the GWRDC and by some R&D providers. However, this has not been as effective as might have been, partly due to the drought and reduction in funds available to undertake R&D in new topics, but also because of the lack of resources available to take the SDG findings and seek additional funding for them outside of the usual funding sources including beyond the immediate industry itself.

RECOMMENDATIONS

The wine industry may wish to lift its total R&D effort undertake activities to expand its funding sources beyond the traditional. This will require commitment and dedicated resources to bring about change, but is a high priority if the industry hopes to maintain its competitive position.

PUBLICATIONS

Investing in Innovation: A Research Prospectus for the Australian Wine Industry 2006–2008. Winemaker's Federation, 2006.

R&D in the Australian Wine Industry: The role of the Strategic Directions Group. Tony Battaglene, Jim Fortune and Mark McKenzie. Australian and New Zealand Wine Industry Journal Vol. 22. No.1, 115-117 (2007).

Industry Leaders continue to set Strategic Directions. Tony Battaglene, John Harvey and Mark McKenzie. The Australian and NZ Grapegrower and Winemaker August Issue, 11-14 (2007).

Consumer preference a focus for Australian R&D. Phil Price and Erika Winter. Australian and New Zealand Wine Industry Journal Vol. 22. No.4, 89-90 (2007).

Accessible tools to measure grape and wine quality – how far are they away? Erika Winter, Stephen Trowell, Daniel Cozzolino and Bob Drambergs. Australian and New Zealand Wine Industry Journal Vol. 22. No.6, 93-95 (2007).

Strategic Directions Group – The role of process in innovation. Russell Johnstone, Tony Battaglene, Phil Price and Erika Winter. In: Towards Best Practice through Innovation in Winery Processing. ASVO Proceedings (2008).

2008 R&D Prospectus Update. Phil Price and Erika Winter. Australian and New Zealand Wine Industry Journal Vol. 23. No.1, 100-101 (2008).

COMMUNICATIONS

A slideshow was produced in 2007 to be used by SDG members to inform relevant stakeholders about the aims and purposes of the SDG. A presentation was produced "Strategic Directions Group – The role of process in innovation" and presented by Russell Johnstone at the ASVO Conference and Riverland Technical Group Meeting.

MEMBERS

Initial members of the SDG:

Tony Battaglene	Director, Intern. & Regulatory Affairs	WFA
Damien DeCastella	Manager Southern Vic Vineyards	Foster's Wines
Richard Dolan	Managing Director	Nelwood Wines Pty Ltd
Trevor Drayton	Winemaker	Drayton's Family Wines
Philip Englefield	President	Robinvale & District Winegrape Growers Association
Christopher Findlay	Professor, School of Economics	University of Adelaide
Jim Fortune	Executive Director	GWRDC
Brian Freeman	Manager	Freeman Vineyards
Vicki Greaves	Global Marketing Manager	Hardy Wine Company
John Griffiths	Chief Winemaker	Faber Vineyards
Richard Hamilton	Senior Viticulturist	Foster's Wines
Russell Johnstone	Group Technical Manager	Orlando Wyndham Group
Kate Lamont	Proprietor	Lamont's Vineyards
Geoff Linton	Technical Manager	Yalumba Wine Company
Phil Price	Managing Director	Mackellar Consulting
Tony Royal	Managing Director	Portavin SA Pty Ltd
Erika Winter	Managing Director	GrapeLinks

Members as of May 2008:

Tony Battaglene	Director, Intern. & Regulatory Affairs	WFA
Richard Dolan	Managing Director	Nelwood Wines Pty Ltd
Travis Fuller	Innovations Manager	McWilliam's Wines
Rob Glastonbury	Operations Manager, Bilbul	De Bortoli Wines
John Griffiths	Chief Winemaker	Faber Vineyards
John Harvey	Executive Director	GWRDC
Richard Hamilton	National Viticulturist	Foster's Group Ltd.
Russell Johnstone	Group Manager Viticulture	Orlando Wyndham Wines
Geoff Linton	Technical Manager	Yalumba Wine Company
Mark McKenzie	Executive Director	Wine Grape Growers Australia
Darren Oemcke	Chairman	Wine Industry Suppliers Australia
Phil Price	Managing Director	Mackellar Consulting
Richard Smart	Managing Director	Smart Viticulture
Lawrie Stanford	Manager, Information and Analysis	AWBC
Erika Winter	Managing Director	GrapeLinks