Independent Review

AWRI

gwrdc
GRAPE AND WINE RESEARCH AND DEVELOPMENT CORPORATION



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Executive summary and recommendations

The Grape and Wine Research and Development Corporation (GWRDC) invests in research, development and extension to support a competitive Australian wine sector. The GWRDC's funding for R&D investment comes from levies on the annual wine grape harvest, with the Australian Government matching these funds up to 0.5% of industry GVP.

The GWRDC invests in R&D from existing providers (such as CSIRO, state agencies, universities and the Australian Wine Research Institute (AWRI)) on behalf of the Australian wine industry. The investments are guided by the strategic research priorities of the Australian Government and the Australian grape and wine sector, through the GWRDC 5 year Strategic Plan.

Currently GWRDC invests in AWRI through a 7 year contract, the GWRDC-AWRI Investment Agreement, to deliver on a Seven Year Research, Development and Extension Plan (7-year RD&E plan). The Agreement commenced in July 2006 and will conclude in June 2013.

This review was commissioned to evaluate the impact for the grape and wine sector of the outcomes arising from the GWRDC-AWRI Agreement in order to make recommendations for maximising value in the future and to guide any future funding. The scope and objectives of the review were as follows:

- The impact, quality and relevance of outcomes of the 7-year RD&E plan on the Australian grape and wine sector.
- The scientific and technical excellence and collaborative aspects of activities conducted under the Plan and their impact on the outcomes for the Australian grape and wine sector.
- The effectiveness of governance practices and financial management utilised in the execution of the Plan and their impact on the outcomes for the Australian grape and wine sector.
- Maximising value in the future.

The review was undertaken by an independent committee. The main approaches used by the review committee were review of documents and face-to-face or teleconference interviews with AWRI, key industry stakeholders and other grape and wine researchers. The documents reviewed by the committee included those describing what was intended to be done, such as the GWRDC-AWRI Investment Agreement and the 7-year RD&E plan, reports provided by AWRI to GWRDC and minutes of meeting between the two during the implementation of the 7-year RD&E plan and a submission by AWRI addressing the terms of reference.

The impact, quality and relevance of outcomes of the 7-year RD&E plan on the Australian grape and wine sector

AWRI is highly respected both in Australia and overseas for the quality of its research. The impact and relevance of the outcomes were perceived by industry as good in some areas and less effective in others. It was clear to the review committee that industry understands the benefits that the investment of their levy funds have led or could lead to. However, it was not obvious to the review

committee that the current method of investment in AWRI was in fact obtaining the best possible return on investment for the industry in all areas.

The commercialisation strategy commonly adopted by the AWRI, of information dissemination rather than IP protection, was well supported by stakeholders. The adoption and extension strategies are appropriate, and, given the reasonably good knowledge and uptake of at least some AWRI outputs, it appears these strategies are effective. Despite the support for this approach to commercialisation and IP protection, the committee is of the view that the decision on whether or not to protect and/or commercialise IP should be made by GWRDC rather than AWRI.

The scientific and technical excellence and collaborative aspects of activities conducted under the plan and their impact on the outcomes for the Australian grape and wine sector

The scientific and technical excellence of most activities was considered good to excellent by stakeholders and AWRI's scientific peers. The collaborative aspects of these activities are not so well regarded. Cross institutional collaboration for the benefit of industry does not happen to the extent that it should. Better outcomes for the sector should be possible with enhanced coordination and collaboration amongst researchers within the Wine Innovation Cluster (WIC) and Australia more broadly, particularly those working on programs and projects with GWRDC investment and in the areas of viticulture, consumer research, engineering and process improvement. GWRDC could facilitate stronger collaboration by investing in priority projects involving all the key research providers.

The effectiveness of governance practices and financial management utilised in the execution of the plan and their impact on the outcomes for the Australian grape and wine sector.

AWRI's view was that the governance and financial framework of the GWRDC-AWRI Investment Agreement was effective and should be used as a basis for future arrangements. An examination by the review committee of how the framework worked in practice indicated that significant change would be beneficial. The KPIs and milestones for projects were not uniformly tight nor objectively measurable. Improvement in oversight regarding project selection, planning and direction would be beneficial to maximise the return on investment from the sector. In addition development and implementation of clear Commercialisation and IP Management policies and procedures from GWRDC would also ensure that the longer term industry benefits were being considered.

Recommendations for maximising value in the future

Over the past ten years, the size and nature of the Australian wine sector has changed dramatically. In this period, the area of vineyards bearing fruit has increased by 16 per cent and the number of wine companies has doubled. Plantings began to decline toward the later part of the decade, however, and the sector is currently in a contraction phase. In the short to medium term, therefore, the size of the crush and hence quantum of funds available for research and development is at best static and likely to decline.

It is clear that GWRDC needs to take a different approach in investing levy funds than in the previous decade in which impressive growth of the sector occurred. The industry may get better value from the investment if the relationship between AWRI and GWRDC was more like a strategic partnership. This could be achieved by better defining the relationship in a formal manner, such as through a

memorandum of understanding, by having more accountability and transparency as well as closer interaction at board, executive and management level.

The sector highly values the work of AWRI, and the overall aim of these recommendations is for a sustainable research investment environment with full accountability that gives the industry best value for money under the current and likely future economic conditions.

Our recommendations to GWRDC are as follows.

1) Continue to invest in AWRI as follows:
    a) maintain a core level to support technical troubleshooting, emergency response and other extension activities such as the DogBook;
    b) invest on a project by project basis in wine chemistry, microbiology and oenology that align with the GWRDC 2012-2017 Strategic Plan; and
    c) invest in other AWRI project proposals, where appropriate, through the competitive grant process
2) Focus AWRI on its areas of strength and practical utility:
    a) encourage more involvement of industry partners at all stages of projects, including selection;
    b) minimise consumer research except where it is part of a larger project and targeted to specific identified needs; and
    c) encourage AWRI collaboration with other researchers in viticulture, engineering and process improvement rather than develop capacity in these areas at AWRI.
3) Improve the relationship with AWRI and direction, management, oversight and accountability by:
    a) establishing better KPIs, milestones and progress reporting;
    b) conducting formal review processes for each project on a timetable consistent with both the duration and size of the project;
    c) requiring audited accounts on all expenditure of GWRDC funds;
    d) establishing quarterly project planning meetings between GWRDC and AWRI senior management and annual meetings between the boards of the organisations;
    e) ensuring that the above provisions are enforced and not allowed to drift; and
    f) developing and implementing clear policies and procedures in relation to decision on commercialisation and IP protection/management
4) Align new arrangements with the GWRDC's 5 year plan.

Background and introduction

The Grape and Wine Research and Development Corporation (GWRDC) has a key role in efficiently investing in research, development and extension for both the industry's and Australia's benefit. As part of its role as an investor in research it has an important partnership with the Australian Wine Research Institute (AWRI). This review was commissioned to examine the most recent funding agreement between GWRDC and AWRI.

AWRI was established in 1955 and is a national organisation based in Adelaide, South Australia. The purpose of AWRI is to contribute to the ongoing success of the Australian wine industry and its vision is 'to deliver high value to the Australian wine industry through world-class research and integrated solutions and to provide thought leadership to the research activities of the Australian wine industry.'

In 2006, the AWRI adopted a ten-year business plan. One of the plan's objectives was to secure long-term investment from GWRDC. The business plan called for this investment to be on a broader 'core and theme' basis rather than through individual multiple year project agreements. The aim was to create more security of funding and tenure for researchers and allow for longer range planning.

The GWRDC-AWRI Investment Agreement, signed in July 2006, documents these aspirations in its recital D:

The GWRDC and AWRI wish to enter into a funding arrangement on the terms of this agreement for the funding by the GWRDC of AWRI for the purpose of AWRI carrying out research, development and extension activities for the benefit of the Australian grape and wine industry, including:

(a) enhancing the ability of AWRI to deliver a strong Theme based portfolio of projects that represent a cross section of research for the benefit of the Australian grape and wine industry;

(b) enhancing the ability of AWRI to independently and flexibly manage resources for optimum research outcomes;

(c) fostering a strong partnership approach to maximising the return on investment for the Australian grape and wine industry and contributing to an ongoing culture of innovation that will underpin the production of high quality Australian wine for the world market;

(d) co-operating to deliver a portfolio of research, with the intention of progressing to Commercialisation of results and generating Intellectual Property for the benefit of the Australian grape and wine industry;

(e) recognising the potential to involve other Australian and international research institutions and companies as appropriate to participate in ways which will optimise benefits for Australia.

A Seven Year Research, Development and Extension Plan (7-year RD&E plan) was funded by GWRDC in July 2006 under this Agreement.

In 2011, the GWRDC Board resolved to undertake an independent review of the outcomes of its investment in the 7-year RD&E plan. Although AWRI had been reviewed previously, the reviews had not covered all areas in which GWRDC had invested nor have they been undertaken since the GWRDC-AWRI Investment Agreement commenced.

The purpose of the present review is therefore to evaluate the impact for the grape and wine sector of the outcomes arising from the GWRDC-AWRI Investment Agreement in order to make recommendations for maximising value in the future and to guide any future funding. Specifically, the review aimed to determine:

- what the return on investment has been to grape and wine levy payers and the Australian Government;
- how well the objectives documented in recital D have been achieved;
- what the impacts and benefits of these achievements have been for the Australian grape and wine sector; and
- what the optimal method is for maximising benefits in the future and determining future research themes.

The scope and objectives of the review were linked to the objectives documented in the GWRDC-AWRI Investment Agreement and are as follows:

1. The impact, quality and relevance of outcomes of the 7-year RD&E plan on the Australian grape and wine sector [Recital D (a) and (d)]
    a. What is the quantity and quality of the realised and likely future benefits arising from these outcomes for the Australian wine sector?
    b. How successful have the adoption, extension and commercialisation strategies been in promoting uptake of the outcomes?

2. The scientific and technical excellence and collaborative aspects of activities conducted under the plan and their impact on the outcomes for the Australian grape and wine sector [Recital D (c) and (e)]
    a. How much and what type of active collaboration with other researchers and companies has there been, and what is its impact on outcomes for the Australian grape and wine sector?
    b. How many publications and technical reports have arisen from activities and what is their quality and impact for the Australian grape and wine sector?

3. The effectiveness of governance practices and financial management utilised in the execution of the plan and their impact on the outcomes for the Australian grape and wine sector [Recital D (b)]
    a. Do the current AWRI-GWRDC governance arrangements and AWRI financial management systems provide an appropriate degree of oversight or should they be modified?
    b. How have the activities undertaken in the 7-year RD&E plan compared in terms of cost with other comparable activities that have had similar outcomes and impacts?

4. Maximising value in the future [Recital D (c)]
    a. Where should GWRDC invest to maximise the return on that investment?

Method

The review was undertaken by an independent committee. The review committee members were selected by the GWRDC Board based on their track record and standing, their experience in reviewing R&D outcomes with a focus on impact for industry and on their expertise within the grape and wine sector and within grape and wine research.

The composition of the review committee and a brief synopsis of their credentials is provided below:

Chair	**Dr Brian Fisher**	Director and Chair BAEconomics, formerly CEO Concept Economics, Vice-President, CRA International, Executive Director ABARE, Dean of Agriculture and Professor of Agricultural Economics, University of Sydney.
Members	**Ms Kathryn Adams**	Board member for Dairy Futures CRC, Pork CRC, Cotton Catchment Communities CRC, Agriculture Victoria Services, Safe Food Production Queensland, Future Farm Industries CRC, Forestry Corporation SA, and Adjunct Research Fellow, Australian Centre for Intellectual Property in Agriculture, Griffith University.
	Dr Véronique Cheynier	Director of Research at the INRA Joint Research Unit - Sciences for Enology, Montpellier, France.
	Mr Stephen Couche	Brand Sites and Visitation Director of Orlando Wines, previously Managing Director of Orlando Wines, Board Member of The Robinson Foundation (stem cell research).
	Mr Alan Kennett	Winery Manager Casella Wines, previously Winemaker Lindemans, Future Leaders Graduate.
	Dr David McKinna	Director and Principal of McKinna et al consultancy, 'founding father' of the David Syme Business School and Agribusiness Program, Monash University.

Several pre-review meetings of the review committee were held by teleconference to refine the methods used to conduct the review.

The main instruments used by the review committee were:

- review of documents, and
- face-to-face or teleconference interviews with key industry stakeholders.

The documents reviewed by the review committee included:

- GWRDC-AWRI Investment Agreement;
- 7-year RD&E plan;
- a written submission from the AWRI;

- selected minutes of the Joint Agreement Committee (JAC) for the GWRDC-AWRI Investment Agreement from 2006 to present; and
- summary prepared by GWRDC Management of commercialisation related agenda items brought to JAC.

Interviews were held with Board members, management and staff of the AWRI, GWRDC, Winemakers' Federation of Australia (WFA), and Wine Grape Growers' Australia (WGGA), with Australian wine sector members and with AWRI collaborators in the grape and wine sector in Australia.

The rationale behind the selection of producers and growers for interview was that the top ten wine producers, the two large grape grower organisations and at least one smaller wine producer from every wine producing state in Australia should be invited to participate. The selection of 'small' wine producers invited was also based on their known prior interaction with AWRI. Whilst not all those invited to participate were able to do so, seven of the ten largest wine producers in Australia were involved, between them representing more than 60 per cent of total tonnage crushed in Australia, as well as smaller producers, state based wine associations and the two large grower groups. The producers and growers interviewed were from all wine producing states in Australia except Queensland.

Review outcomes

1. The impact, quality and relevance of outcomes of the 7-year RD&E plan

a. The quantity and quality of the realised and likely future benefits arising from these outcomes for the Australian wine sector

b. How successful the adoption, extension and commercialisation strategies have been in promoting uptake of the outcomes.

This aspect was informed by views raised during interviews and by examining the information provided by AWRI electronically in response to the request from the review committee for a written submission. The AWRI-GWRDC Investment Agreement and the 7-year RD&E plan were also used as source documents.

Theme 1

The CRC Impact Tool assessment shows that generation of knowledge has been a major feature of grape and wine composition theme (Theme 1). In this theme, linking compositional data with viticultural and winemaking practices remains to be done for most of the flavour and phenolic work, apart from the work on taints. This assessment lines up well with the views of producers and growers, who nominated the work on taints as having had significant impact in their businesses, but generally did not nominate the knowledge generated on flavour and tannin as having had significant impact.

The development and availability of novel yeast strains within this theme is an excellent outcome and utilised by the sector. Conversely, the specific development of lower ethanol producing yeast has not been commercially successful despite significant investment and good science. The yeast genomic data are yet to deliver benefits but should provide significant capacity in this area for future strain development.

Theme 2

There is likely to be more uptake of knowledge generated in Theme 2, the grape and wine production theme, hence more realised benefit. In particular:

- The troubleshooting and problem solving service is well utilised and very highly valued and builds on knowledge developed in other streams (e.g. suboptimal fermentation, spoilage yeast, taints). This service was nominated by all industry members interviewed as a highly valued output from AWRI.
- The generation of knowledge to allow wineries to improve protein stability and bottling processes appears to be taken up by the sector and was nominated by at least one industry member as a valued outcome that had led to practice change in their business.
- Some benefit has already been realised and future benefit is likely from the generation of knowledge on the chemical basis for smoke taint, and methods to measure the impact of compounds and their precursors in grapes and wines. The work on smoke taint was an

aspect that was noted as highly valued by many sector members although few would have had opportunity or need to use it in practice.

- There has been some uptake by the sector of rapid spectral methods and instruments developed in this theme, but the work on developing a spectral style definition method for Pinot Gris/Pinot Grigio wines does not appear to be broadly valued or considered a good return on investment.
- Further knowledge on ensuring efficient malolactic fermentation has been generated and is likely of benefit to the sector.
- The generation of process engineering knowledge and on additional risk factors for suboptimal fermentation is still in the early stages but could lead to future benefits. Several of those interviewed expressed the view that the process engineering space was not a good fit for AWRI, and was not yet very productive. Part of the rational for considering engineering as not appropriate for AWRI was that many of the advances in this field are not wine specific and thus development of technology in this area does not warrant specific investment of grape and wine levies.

Theme 3

The wine in society theme, Theme 3, has delivered information about:

- Chinese consumer preferences for red wine styles.

  Although the data on Chinese consumer preferences, on face value, would appear to be valuable, and has been widely disseminated, this was the one outcome that was not nominated by any industry member as being valued. This is significant given that at least one outcome from every other stream in the 7 year plan was nominated as of value.
- Australian consumer preferences regarding taints and bottle age.
- Appropriate agrochemical use (the 'DogBook').

  In contrast to consumer research, the 'DogBook' was nominated multiple times as a highly valued outcome and as an output from AWRI that had changed business practices
- Wine and health, and regulation and compliance issues.

  The work on regulation, compliance and wine and health was not generally commented on by industry members but was considered relevant by the peak winemaking sector body, WFA, for discussions with international bodies to facilitate trade and as a basis for policy discussions with the Australian government. The appropriateness of using government funding for activities where government policy is already well established, such as in areas of alcohol and health, should be considered carefully.

Consumer research was not seen as a priority by the industry sector members interviewed, nor was it seen as a good fit for AWRI, unless it is directed at specific styles and understanding winemaking and viticultural practices that would allow the sector to achieve the attributes that consumers like. This is still seen as a significant knowledge gap. The view that AWRI should collaborate rather than develop consumer research capability in-house was expressed by several interviewees.

Theme 4

The information and knowledge transfer theme, has facilitated education of industry personnel through road shows, seminars, and conferences, electronic and print newsletters and bulletins, industry publications, the AWRI website and a dedicated grape and wine science library. The establishment of regional nodes was also seen by many as an extension service and was valued by industry sector members in regions with nodes. All of the extension mechanisms appear to be valued and used by most industry interviewees, with the road shows nominated multiple times as highly valued. There is some support for more viticultural content in the extension offerings, although many of those interviewed considered that this would be best achieved through AWRI collaborating with others.

In summary, AWRI is close to universally respected for the quality of its research. The balance between 'blue sky' and applied research was generally considered appropriate by those interviewed, although some 'tweaking' of the blue sky aspects was thought to be necessary to maintain focus. The relevance of the work undertaken in the 7-year plan was considered good apart from work on consumer preferences and process engineering, as noted above. However, in each Theme, areas were highlighted where the outputs were not always highly valued by industry, raising the question as to whether there was sufficient industry focus and rigour by AWRI in identifying the highest priority projects.

There were multiple nominations of the problem solving and emergency response services, the 'DogBook', road shows and extension activities and the nodes as valued, as would be expected given these activities are the most public face of the organisation. However, this does indicate that the research that goes on behind these more public activities is high quality. Several industry members interviewed commented on the need to maintain high quality blue sky research to have the knowledge and capacity for emergency response and trouble shooting.

Commercialisation and IP Protection

The commercialisation strategy commonly adopted by the AWRI, of information dissemination rather than intellectual property (IP) protection, was generally well supported by all interviewees. The rationale is that it is too costly to protect and to prosecute IP, and perhaps even impossible to do so given the business structure of some large Australian wine companies. It is therefore better to disseminate and promote rapid adoption in Australia in both AWRI's and interviewees' views. The fact that at least some of the IP generated through the Investment Agreement is tailored for Australian conditions was seen as making the IP less likely to be adopted by others, and hence dissemination rather than protection was seen as low risk. There was some disquiet voiced about IP being locked up in commercial research contracts at AWRI outside of the GWRDC-AWRI Agreement.

The GWRDC-AWRI Investment Agreement contains a clear statement of intent about commercialisation and devotes Schedule 1 to this topic. In brief, IP generated as a result of the investment must enhance the profitability, international competitiveness and sustainability of the Australian grape and wine industry. Any disposal, encumbrance or commercialisation of IP must result in a measurable benefit in respect to this objective. Commercialisation of IP has not been generally seen as a high priority for AWRI or the industry, as noted above. In contrast, IP has been publicly released on the assumption that the information will be rapidly adopted by the Australian

industry before the rest of the world. The exception to this has been when the IP has needed a commercial partner for further development and commercialisation, such as IP related to BevScan and novel yeast strains. In these cases, attempts are made to allow for early release to or discounted cost for the Australian market.

Decisions on commercialisation and IP protection should not be left to AWRI but should be made jointly by GWRDC and AWRI, with GWRDC having the key role. Under the GWRDC-AWRI Agreement, JAC had a role in this, but interviews and minutes of the meetings show that the process was not adhered to.

GWRDC should have a policy on commercialisation and IP management y which should be reflected in all its agreements and any deviation should be through a clearly articulated and enforced decision-making process. While the free dissemination policy may seem effective on the surface, it should be assessed on a case by case basis, where protectable IP has been identified, to ensure that opportunities are not being lost in the long term by taking the short term 'easy' option.

Return on Investment

The impact, or return on the GWRDC-AWRI Investment Agreement, was not formally assessed. A benefit costs analysis was undertaken by AWRI even though this was specifically not requested by the review committee, due to the time and resources required to do so rigorously. The benefit costs analysis provided by AWRI was not considered by the review committee in any detail and the comments made here are based on the views of the industry expressed at interview. Indeed, it may not be valid to strictly measure only return on investment on a commercial basis because of the public good element to the investment. The review committee did request AWRI to complete the modified CRC Impact Tool and the qualitative analysis provided by the Tool was considered by the committee and is referred to above.

Overwhelmingly, industry members believe that they are getting a very good return on investment in certain areas but that investment by AWRI in other areas does not deliver as effectively. It was acknowledged that the emergency response, problem solving and work on taint would significantly increase the perceived return on investment. Interestingly, several interviewees said they would still pay the levy if it was voluntary, because the return on investment from AWRI was so good. Others have or would invest over and above the levy in specific projects at AWRI. This tended to be a sentiment expressed more readily by smaller producers than larger companies. Several of the larger producers felt that the impact of the investment could be enhanced if there was more industry consultation.

Conclusion

In conclusion, the impact, quality and relevance of the outcomes of the 7-year R,D&E plan are perceived as good in a number of areas and industry understands the benefits that the investment of their levy funds have led to or could lead to. There was general agreement that the adoption, extension and commercialisation strategies were appropriate, and, given the reasonably good knowledge of and uptake of at least some AWRI outputs, it appears these strategies are effective. Several improvements were suggested by the interviewees to enhance impact, quality and relevance and these are discussed further below under point 4.

2. The scientific and technical excellence and collaborative aspects of activities conducted under the plan and their impact on the outcomes for the Australian grape and wine sector

a. The amount and type of active collaboration with other researchers and companies and the impact of this on outcomes for the Australian grape and wine sector.

b. The number of publications and technical reports that have arisen from activities and their quality and impact for the Australian grape and wine sector

This aspect was informed by views raised during interviews and by examining the information provided by AWRI in the written submission.

AWRI is generally considered poor at collaborating with other research agencies, particularly those in the Wine Innovation Cluster (WIC) co-located with AWRI on the Waite Campus of the University of Adelaide. There were some views that this might have been a bigger issue in the past than it is likely to be in the future. Several of the scientists at WIC noted that AWRI provided them with access to instruments purchased through the GWRDC-AWRI Investment Agreement. GWRDC was viewed as being able to play a role in encouraging collaboration in the future.

The top 12 collaborations nominated by AWRI in their written submission included WIC, although in seventh place. Furthermore, the major impacts nominated by AWRI of the WIC collaboration were not directly related to industry benefit, being construction of the WIC Central building, facilitation of a scientific conference in 2011 and a joint venture with one WIC partner to offer small-scale winemaking services. Collaborations with other researchers within WIC or Australia did not make AWRI's top 12 collaborations, apart from work on smoke taint. Self-reporting and the views of other researchers and industry are well aligned in concluding that WIC has not been a vehicle for strong collaboration.

Apart from WIC, AWRI viewed the main impact of its collaborations as follows (main collaborators in parentheses):

- enhanced extension (regional industry groups);
- availability of new yeast strains (suppliers);
- enhanced and fit for purpose tools such as Pinot G, Tannin Portal, BevScan (industry, instrument manufacturers and software developers);
- capabilities for genomic and metabolomic studies (state and federal government, international researchers);
- future access to European Union funding (international researchers);
- preventing technical trade barriers (peak industry bodies, Government departments);
- objective data on wine and health (other researchers);
- enhanced education and professional development (professional societies, Universities, Wine Australia);

- appropriate and rapid emergency response (GWRDC, peak industry bodies, Wine Australia, industry);
- ability to measure rotundone, the 'pepper' compound, in grapes and wines (international flavour company); and
- better understanding of genetic diversity of wine yeast (international researchers).

Industry interviewees noted that there was some industry collaboration in research projects but not as much as desired. This is borne out by examining the top collaborations nominated by AWRI where R&D outcomes with industry collaboration only make up two of the five R&D outcomes noted above and R&D outcomes only make up five out of the eleven collaborations in total. More industry involvement at the beginning and throughout research projects has potential to enhance the relevance of outcomes. AWRI collaborations could be facilitated and require the agreement of GWRDC to better focus the priorities and directions.

Over the past six years of the GWRDC-AWRI Investment Agreement, AWRI has produced more than 500 publications. Of these, 286 are peer-reviewed, with the remainder made up of technical journal articles, conference proceedings, industry publications and book chapters.

In addressing the quality of the peer reviewed papers, AWRI provided an assessment of the overall h-index as 22. This index is normally applied to an individual and means that 22 of the individual's total papers were cited at least 22 times. An individual with an h-index of 22 in grape and wine science within 6 years would be exceptional, but the meaning of this index for an organisation is not clear, particularly when h-indices of similar organisations over the same time period have not been calculated or provided. In terms of quantity, 286 peer reviewed papers from 47 professional scientists over 6 years is an average of one paper per scientist per year. This is not particularly strong, given that many of the papers are multi author publications. Even when all publications are included in these calculations, the average is less than two publications per scientist per year.

The top 25 publications nominated by AWRI were from 2008 to 2012. When the most recent (2012) papers were excluded, the median number of citations for these papers was five. These metrics indicate that the quality of these papers is reasonable.

Perhaps more pertinent to an assessment of quality is that of AWRI's peers; those interviewed commented that AWRI's publications are valued. As noted above, the AWRI is close to universally accepted as producing high quality research.

As well as the non peer reviewed publications noted above, AWRI also publishes a yearly update of Agrochemicals registered for use in Australian viticulture (the 'DogBook'), a bimonthly newsletter (Technical Review), an Annual report and maintains a website. From interviews it was clear that the 'DogBook' and Technical Review are highly valued by the sector.

In summary, the scientific and technical excellence of activities conduced under the GWRDC-AWRI Investment Agreement is considered good to excellent by stakeholders and scientific peers of AWRI. The collaborative aspects of these activities are not so well regarded. WIC is considered to be dysfunctional and not much more than a co-location of the researchers. Cross institutional collaboration for the benefit of industry does not happen to the extent that it should. Better outcomes for the sector should be possible with enhanced coordination and collaboration amongst

researchers within WIC and Australia, particularly those working on programs with GWRDC investment. Improvements in this area would be coming off a very low base and could be better facilitated by GWRDC if its investment was more project based rather than theme based.

3. The effectiveness of governance practices and financial management utilised in the execution of the plan and their impact on the outcomes for the Australian grape and wine sector.

a. The degree of oversight and its appropriateness provided by AWRI-GWRDC governance arrangements and AWRI financial management systems

b. The cost effectiveness of the activities undertaken in the 7-year RD&E plan compared with other comparable activities that have had similar outcomes and impacts

This aspect was informed by views raised during interviews and by examining the information provided by AWRI in the written submission. The GWRDC-AWRI Investment Agreement, JAC minutes and the summary of commercialisation issues bought to JAC were also source documents.

AWRI's view is that the governance and financial framework of the GWRDC-AWRI Investment Agreement has been so effective that it should be used as a basis for future arrangements. AWRI believes that resource utilisation has been enhanced, reporting and oversight is more effective, that there has been better long term planning, and enhanced ability to leverage third party investment, to attract and develop intellectual capital, and to strike effective collaborations.

Specific examples of changes in direction of projects, describing the process used, how industry feedback and priorities were sought and considered and benefit to industry as a result were provided by AWRI in the written submission. Some of these examples demonstrate that the AWRI is able to diagnose some immediate industry needs through monitoring trends in calls to the troubleshooting service. However there have been other examples given by interviewees where outputs and outcomes from AWRI have not been valued to the same extent (see discussion above under Theme headings in point 1).

It is of note that only some of the examples provided by AWRI involved the GWRDC in decisions but many did not. It is pertinent to note that the KPIs and milestones within the 7 year plan were not uniformly tight nor objectively measurable. Even where they are, the process set out in the GWRDC-AWRI Investment Agreement was not followed, resulting in poor project management and accountability. This indicates that improvement in oversight regarding project selection, planning and direction is required to help maximise the return on investment for the sector. It is possible that more independence than is desirable has been enjoyed by the AWRI through the GWRDC-AWRI Investment Agreement.

One of the governance instruments set by the GWRDC-AWRI Investment Agreement was the Joint Agreement Committee (JAC) composed of the Program Management Team of GWRDC and the Executive Management Group at AWRI. An examination of the minutes of JAC indicates that few strategic decisions were made by this Committee. AWRI views JAC as providing a rigorous quarterly reporting framework not a decision making framework. Commercialisation issues brought to JAC were generally for information, not for decision, and despite a clear description of the role of JAC in decision making (GWRDC-AWRI Investment Agreement) JAC appears to have been ineffectual in this regard.

The governance model of AWRI with an industry-elected board, composed of several board members who have or currently run businesses in the sector was seen as important by several of those interviewed, although some interviewees still felt that not enough industry input was sought. Interviewees also noted that the longer term funding arrangements had decreased accountability, and GWRDC was encouraged to provide more direction and oversight in the future.

AWRI was considered expensive, notwithstanding the comments on valuable outcomes for the sector, and criticised for not leveraging enough funding. The size and relatively recent build up of cash reserves at AWRI was seen as a contentious issue. Although AWRI's financial accounts appear to meet accepted standards, its accounting to GWRDC for its investment is not subject to independent scrutiny. There does not appear to be adequate identification of where GWRDC funds are spent in the annual report and it seems inappropriate that the AWRI is not transparent about where money is spent given the GWRDC provides the great majority of funding. There is the ability, and a natural temptation to cross-subsidise commercial activities with GWRDC funds by loading the overheads into GWRDC funding and some interviewees questioned whether this had occurred. AWRI reports that the overheads are attributed through staff numbers in the various departments. The fact that AWRI keeps separate sets of accounts for different clients means it is not possible for GWRDC to confirm this and refute the views of stakeholders. One set of records should be adequate and should be made available to GWRDC for auditing quarterly.

In conclusion, governance and financial management practises require significant improvement. Opportunities for GWRDC to have greater involvement and influence on the outcomes have not been utilised as fully as anticipated in the GWRDC-AWRI Investment agreement.

4. Maximising value in the future

a. identifying where GWRDC should invest to maximise the return on that investment

There were many views expressed during interviews about this aspect.

In terms of scope and priority setting, better alignment to GWRDC's 5 year plan was widely viewed as desirable. Industry input is via the GWRDC 5 year Research Plan and it seems logical that the AWRI plan be aligned with this. Since the current arrangement will end in the first year of GWRDC's 5 year cycle, this proposal would be relatively simple to implement.

Maintaining and enhancing a focus on practical utility of research outcomes should be part of any new arrangement. Some ways to do this would be to:

- finalise projects once the majority of gains have been made (rather than continuing to the 'nth degree') and having a greater awareness of the speed required to implement results into commercial practices;
- the ability to refocus though a formal review process by GWRDC should be implemented for all projects, staggered across the term of the agreement;
- extension activities could be enhanced and focus should be maintained in the core research areas of chemistry, microbiology and oenology; and
- more involvement of industry partners up front and throughout a project was seen to be important.

There needs to be greater oversight from and visibility to GWRDC in selection, progress and financial reporting of projects. AWRI should supply a copy of audited accounts to GWRDC each year. Project selection should be formally justified through a system that gives greater weight to utility versus fundamental understanding and objective analysis of the major input costs of grape growing and winemaking. Projects with the greatest likelihood of quick, widespread benefits should be preferred over longer term niche research projects. GWRDC should have approval or veto power over AWRI projects that are funded by GWRDC, ie not just at a higher 'stream' or 'theme' level. Formal objective assessment of possible value to the industry would mean more development of broadly useful, immediately beneficial tools. For example completion of the 'Improving Winery Refrigeration Efficiency' reference guide would have higher priority than research into Tasmanian sparkling wine.

Some areas of investigation that should be minimised at AWRI and undertaken in collaboration with other researchers are viticulture, consumer research, and engineering and process improvement. These areas were selected based on both the mediocre track record of AWRI in the area and the availability of this expertise in other research organisations. Most of the advances in engineering are not industry specific and AWRI and the sector could build on what others have done outside of levy funding system. There was a strong and widely held opinion that AWRI should link and collaborate with other researchers in viticulture, not develop capability and undertake research 'in house' in this area. The grape to wine interface is an area considered to provide the greatest gains in future and this needs to be a focus of collaborative work. As well as the grape to wine interface, research efforts should be more strongly linked across the value chain. GWRDC could play a key role in helping to ensure that this collaboration occurs.

The AWRI believes that a new agreement should be set at a minimum of $10 million per annum, indexed for inflation under a long term 10 year agreement with a review at 5 years to ensure alignment with subsequent GWRDC 5 year plans (5+5 model). The AWRI Board and Managing Director did not appear to have, or given much thought to, a 'plan B' and could not nominate any currently unproductive areas of activity that could be wound back in the event of a funding reduction. Views expressed by those interviewed about the quantum and term of funding were that the current quantum was not inappropriate but priorities and governance should be improved. There was strong support to align with the GWRDC's 5 year plan cycle, but the 5+5 model was not considered sustainable. There was reasonable support from industry interviewees for a competitive grant process for 'non core' activities; core activities being problem solving and extension. This

would not necessarily mean less funding went to AWRI, but projects might be better and have more industry involvement and co investment if support was contestable. One interviewee noted that the amount of funding is not the question: 'just get the priorities right and fund excellence'. Indexing for inflation was not considered appropriate and there was some support for indexing to the size of the grape crush. If this course of action is taken, care would be required to ensure that the level of investment does not diminish to the extent that critical mass is lost.

One of the major desires expressed at interviews was to retain the emergency response capability of the AWRI. The review committee accepts that this can only be provided if the AWRI has on staff a reasonable breadth of high level research expertise which can be drawn on quickly to give the rapid response that is expected by industry. A possible method to achieve this is to retain the current investment arrangement for the research areas that the AWRI has delivered most value (i.e. from grape quality assessment through to bottling), and oblige the AWRI to compete for project funding outside their core competency areas. This would allow the GWRDC control over the assignment and direction of viticultural research and any precompetitive marketing research that might be undertaken. It also implies that the direct funding for the institute would be reduced to a level that is sufficient to maintain only the wine science capability rather than the larger breadth. Funding through a competitive process should mean that expertise and an excellent return on investment could be achieved more effectively. To give just one example, the 'Improving Winery Refrigeration Efficiency' reference guide referred to above, and noted by those interviewed as a useful outcome, was funded by GWRDC through a competitive grant process, not under the GWRDC-AWRI Investment agreement.

There appear to be some tension between GWRDC and AWRI as would be expected with a purchaser provider model. It was suggested that the industry would get better value from the investment if the relationship was more like a strategic partnership. This could be achieved by better defining the relationship, having more accountability and transparency as well as closer interaction at board, executive and management level.

In conclusion, the overall aim of the recommendations coming out of this review is for a sustainable research investment environment with full accountability that gives the industry best value for money under the current and likely future economic conditions.