



Stream 4.1: Extension of knowledge transfer: enhancing the knowledge base of industry personnel

1. Abstract:

The objective of this stream was to identify, generate, package information for dissemination on new grapegrowing, winemaking and health and regulatory matters of relevance and value to Australian grape and wine producers. The stream prioritised the provision of knowledge to address emerging issues with the potential to have a large-scale, negative impact on the quality, integrity, and image of Australian wine. The information was sourced from work undertaken at the AWRI; information in the public domain; and through insights gained from other activities, particularly through Stream 2.5. Topics were identified for communication to industry by monitoring trends within the 1,500 queries received per annum through the AWRI support services. Content for extension to industry was prepared and disseminated via the AWRI multi-faceted communication platforms, which included face to face delivery at roadshow workshops and seminars around Australia; workshops at Australian Wine Industry Technical Conferences (AWITC); Advanced Wine Assessment Courses (AWACs) and other tasting courses; other lectures and seminar presentations; and through other frameworks including AWRI *eBulletins* and *eNews* alerts; the AWRI website; the Innovators' Network; and, print publications such as the AWRI *Technical Review*, *Annual Report*, industry journals and peer-reviewed journals.

The outcome of this stream was the enhancement of the knowledge and skills base and development of the technical capabilities of industry personnel. The stream also supported rapid communication and adoption of best practice grapegrowing and winemaking principles based on new knowledge and inclusive of compliance with domestic and international mandatory and voluntary rules and regulations. The image of Australia as a technological advanced producer of wines of high quality and integrity was also enhanced through this stream.

2. Executive summary:

The AWRI acts as a major repository of information relevant to grape and wine production, wine and health, and regulatory issues on behalf of the Australian wine industry.

The staff members involved with Stream 4.1 are experts in their fields. They are responsible for the conversion of research outcomes into relevant applied knowledge, which ensures the dissemination of technically accurate and up to date knowledge extension. This function enhances and protects the quality and integrity of Australian wine, and the image of the Australian wine industry, and at the same time builds the knowledge and skills base of industry personnel. The outcomes of this stream also ensure that the AWRI provides only technically accurate and balanced knowledge relating to grapes and wine.

Through the combined Streams 4.2 and 4.3, the AWRI has developed a range of delivery frameworks which have a proven track record in facilitating rapid adoption and application of research outcomes. Stream 4.1 has developed content for delivery through these various frameworks including roadshow seminars and workshops, workshops staged as part of Australian Wine Industry Technical Conference (AWITC), the AWRI Advanced Wine Assessment Courses (AWAC), Research to Practice programs (RtP), the AWRI website, *Technical Review*, *Annual Report*, *eBulletins*, *eNews*, other publications and presentations at regional, industry and international events.

Roadshow seminar content was sourced from various AWRI activities, Wine Innovation Cluster (WIC) partners and other organisations, and were reviewed annually. Seminar topics were selected by each regional association prior to their seminar; this had a two-fold benefit as the seminar was specifically tailored for the needs of that particular region, and the AWRI staff gained a deeper appreciation of the topical issues in the region at that time.



Roadshow workshop themes were based on prevailing wine sector challenges and needs, identified by examining trends in queries received by the AWRI support services and compared to long-term trends since 1990. Dominant themes were surveyed and endorsed by the wine sector to confirm industry relevance, and workshop content was developed to deliver relevant and accessible resources. For example, this method was used to identify and develop the ‘Trouble free packaging for winemakers’ workshop which was delivered in 32 regions.

The AWRI staff support and underpin Australia’s position and reputation as a technologically advanced producer of wine by providing wine education to the next generation of Australia’s grapegrowers and winemakers. Lectures and presentations were delivered to universities across Australia, and at regional, industry and international events and also as part of the AWITC workshops, AWAC’s and other tasting events.

Further activities in this stream include the regular preparation of scientific and technical articles for the bi-monthly AWRI *Technical Review* and AWRI *eNews*, Innovators Network newsletters, *Ask the AWRI* columns and other forums. *eBulletins* and *eNews* were prepared as required and disseminated to approximately 2,500 subscribers in the wine sector. Content for these publications was identified based on emerging trends monitored through Stream 2.5, which provided the wine sector with rapid, early warnings of emerging issues. Stream 4.1 also develops and maintains content for electronic platforms including web-based extension tools and the AWRI website.

The AWRI staff members regularly liaise with regional associations and provide guidance to on-farm trials which facilitates the generation of meaningful data and analysis.

Affiliation	Area of support/contribution
Wine Australia	A+ Wine, abridged AWACs and other wine education events
Australia China Council	Wine education events in China
Institute of Masters of Wine	Wine education events

3. Background:

A vast amount of information relating to grape and wine production, wine and health, and regulatory issues is generated through the AWRI’s activities and other activities that become available in the public domain. One of the established roles the AWRI plays for industry is to create and manage a centralised technical information repository. In addition, the AWRI was relied upon to convert technical information into accessible forms that can be rapidly adopted by the Australian wine industry. This transfer of knowledge historically not only built the capacity of industry personnel; it protected the integrity and image of Australian wine.

This stream sought to continue and enhance this centralised knowledge base and the delivery of this knowledge via roadshow seminars and workshops, workshops staged as part of the AWITC, AWACs, the AWRI website, *Technical Review*, *eBulletins*, *eNews*, publications, lectures and presentations at regional, industry and international events.



4. Stream objectives:

The stream objectives presented in this report relate to developing the technical abilities of personnel employed in the Australian wine industry and their understanding of technical opportunities through:

- identifying information and content relating to grapegrowing, winemaking and health and regulatory matters; and
- developing, packaging this new knowledge for dissemination in a manner that facilitates rapid adoption and application through a range of extension frameworks managed in Stream 4.2 and 4.3.

5. Methodology:

Identification of relevant information and content relating to grapegrowing, winemaking and health and regulatory matters was achieved through the following activities:

- Review of newly published research in high impact journals and through AWRI research outcomes.
- Consideration of matters raised by industry peak and statutory bodies, regional associations and regulatory authorities.
- Industry feedback from a range of sources including through the AWRI help desk (reported in Stream 2.5), during face to face contact with industry and through AWRI commissioned surveys. Stream 2.5 provided valuable insight into issues that potentially could have large-scale negative impacts on the quality, integrity, and image of Australian wine, identified through monitoring trends in the 1500 queries received per annum through AWRI support services.

The AWRI ensured information was prepared and packaged into valuable formats through the following:

- Use of teams of technical experts in appropriate academic disciplines with detailed knowledge of the relevant wine industry context including business needs, grapegrowing and winemaking processes and the product.
- Training of staff in effective communication and presentation techniques relevant to dissemination of technical subject matter.
- Standardisation of communication material through use of style guides and templates.

The information was disseminated via a range of AWRI communication platforms (summarised in detail in the combined Stream 4.2 and 4.3 report).

The AWRI's selected dissemination strategy, i.e. the platform used, was established on a case by case basis dependant on the nature of the information and how it would be used by the wine industry.

Technical information required for reference purposes was packaged into forms available through the following platforms:

- Publications in journals and trade literature.
- The AWRI website.
- The AWRI Annual Report.

Technical opportunities for which industry awareness could be improved was communicated through the following frameworks:

- *Technical Review*.
- *eBulletins* and *eNews*.
- Media releases.

Complex technical information requiring proactive face to face interactive communication was prepared for delivery through the following capabilities:

- Roadshow seminars and workshops.
- AWITC workshop program.



- Webinars.

In addition, university lectures were utilised to ensure new entrants to the wine industry are aware of new technical opportunities and practices recently adopted by the wine industry that are not part of existing curriculum.

6. Results and discussion:

Identification of information

A substantial range of information of significant value to the wine industry was identified relating to grapegrowing, winemaking and health and regulatory matters. Pertinent themes included:

- Diagnosis and maintenance of wine hazes and deposits.
- Diagnosis and management strategies for wine taints.
- Packaging technical support.
- Climate adaptation.

Details about these themes and how their dissemination was managed is summarised later in packaging and dissemination of information.

On-line surveys were also used to gauge the views and opinions of the grape and wine community on topical issues. This involved capitalising on AWRI's email database of 2,500 to connect with Australia's grape and wine community. The details of two surveys conducted are:

- After the exceptionally wet 2010/2011 season, an extensive survey was prepared to capture the experiences of growers and the lessons learnt during the season. Information captured included the key challenges faced by growers in controlling key diseases, for example, access to chemical control options, as well as data about practices and equipment used. The survey results were disseminated through national pest and disease debrief workshops rolled out across affected regions.
- In 2012, the AWRI, in collaboration with the National Measurement Institute (NMI) and Wine Grape Growers of Australia (WGGA), conducted a survey to gain a better understanding of the processes and techniques used to measure grape quality and to understand how quality measures are used in commercial transactions. Responses were drawn equally from grape sellers and buyers. Feedback from the survey indicated that most growers and winemakers would benefit from a standardised approach to both grape quality assessment and vineyard and weighbridge sampling. Such an approach would improve the transparency of the fruit grading and payment processes. Findings also indicated industry had little interest in the development of new analytical methods. A number of publications disseminated the findings of this work.

Packaging information for dissemination – generation of reference material

Publications

The AWRI's standard publication policy requires that where possible each peer-reviewed publication is accompanied by an Australian industry trade publication on the same subject matter. The AWRI's overall publication performance from July 2006 to July 2013 includes 285 peer-reviewed papers that attracted 2,863 citations with an overall h-index¹ of 27 (citations and h-index based on those publications captured in the Web of Science database).

Total publications from the AWRI indexed in Web of Science have increased substantially in recent years, with increased output in almost all fields and subfields. More of the AWRI's publications appear in the top 1%, 5% and 10% clusters, compared to other South Australian and Australian institutions, in all fields. The AWRI has published three of the 13 most highly cited Australian

¹ h-index is a measure commonly used to assess both the productivity and impact of peer-reviewed scientific publications. The h-index number reflects the number of papers published that have attracted at least that many citations in other peer-reviewed scientific publications.



publications which are amongst the top 1% in the world in relevant journals.

A new initiative launched in 2011 was the regular contribution of a monthly Q&A column published in each issue of the *Australian and New Zealand Grapegrower and Winemaker* journal. The column addresses the most commonly-asked questions directed to AWRI Support staff each month. The following 'Ask the AWRI' articles were produced:

- **Botrytis – implications in wine development** answered pertinent questions regarding how 2011 Botrytis and laccase-affected fruit should be treated post-fermentation and during wine ageing.
- **Start preparing now for vintage 2012** suggested winemakers do a pre-vintage stocktake of their chemicals and additives, highlighting expiry dates and appropriate storage conditions for different materials.
- **The burning question on smoke taint** highlighted the basics of what contributes toward smoke taint flavour in grapes and wines.
- **Mixed cost and quality effects from thinning** identified the pros and cons of efforts to remove fruit prior to harvest.
- **Salt in grapes and wine a common issue** explained the legally permitted levels of sodium and chloride in grapes and wine and how salt can be avoided.
- **Root pruning and cover crops combine to control vigour** suggested cultural practices to manage vine growth in vigorous sites.
- **Strobilurin resistance to Powdery Mildew in a vineyard** explained the risks of resistance in viticulture and outlined the strategies that minimise the risk.
- **Rules and regulations on the move** highlighted a number of regulatory changes occurring at the start of 2012, such as allergen labelling requirements for exporting wine to Canada and the EU from July 2012, along with comments on the newly allowed use of CMC in Australia, and a change to the minimum alcohol content for wine, reducing from 8% to 4.5%.
- **How to and why identify Matter Other than Grape (MOG)** addressed quality issues that might be experienced in wines due to different kinds of MOG, including taints from millipedes and other insects observed during the wet 2011 and 2012 vintages .
- **Constant observation key to avoiding dilemma of stuck ferments** provided prevention and management strategies for effective fermentation.
- **What's that smell? Is that Brett? (two parts)** highlighted recent trends in people detecting Brett at levels below reported thresholds.

The AWRI website

The AWRI website is a valuable and effective resource for referencing technical knowledge. The website content is continually enhanced and updated to provide quick access to up-to-date and relevant content. A large-scale overhaul of content and associated update was undertaken in 2007 and in 2009. Over 100 webpage additions have occurred ranging from winemaking tools, on-line calculators, packaged information on wine bottling, sensory assessment, fining trials, as well as a wide range of fact sheets and FAQs.

The AWRI Annual Report

Information is packaged up in the AWRI's Annual Report providing stakeholders with a concise summary of AWRI's research outputs for each year of the investment agreement. A highlight summary generated at the beginning of the report to assist the busy reader. In addition, the AWRI's Managing Director (or his nominee) prepares and delivers face to face presentations of the annual report highlights to the main state-based and national industry bodies each year. Details about the management of the AWRI Annual Report are provided in Stream 4.2 and 4.3.

Packaging information for dissemination – raising awareness of opportunities

The AWRI Technical Review



A snapshot of recent relevant research outcomes for the wine industry is generated for the *Technical Review*. This included abstracts of current and relevant grape, wine, marketing and wine and health articles for 42 issues of the *Technical Review* over the investment agreement. Details about the management of the AWRI *Technical Review* are provided in Stream 4.2 and 4.3.

eBulletins and eNews

eBulletins and *eNews* distributed to AWRI's email lists (approximately 2,500 email addresses), have allowed rapid communication about wine sector issues direct to industry members. The AWRI *eNews* is a bi-monthly communication to inform grape and wine producers of the latest research findings and news from the AWRI. *eBulletins* were issued on single topics, designed to be an effective and fast way to disseminate information on important issues (details about this communication platform are provided in the Stream 4.2 and 4.3 report).

Content was prepared for a total of 116 *eBulletins* released during the investment period. Twenty-one *eBulletins* were prepared by members working within this stream, which specifically addressed winemaking, viticulture and regulatory emergency issues (excluding agrochemical updates) and included information and practical recommendations. These are detailed in the Stream 2.5 report (Table 1 and Figure 1). Some examples include:

- Detailed prevention and control strategies were disseminated via the AWRI *eBulletin* as a result of the implications of an extended drought from 2005 to 2009 and a number of fire events across Australian grapegrowing regions during this period. Limited available information highlighted a need for research in this space. An appropriate method was required to adequately identify whether smoke-affected grapes would produce smoky wine. The very warm vintage and heatwave in March 2008 was problematic in the vineyard and stuck fermentations were experienced in wineries across Australia. *eBulletins* were disseminated to assist growers and winemakers with these issues. In addition, in collaboration with GWRDC and the Department of Environment and Primary Industries-Victoria, several information packages were also developed to provide more information on bushfires and smoke taint.
- In 2010, advice was provided via *eBulletin* to industry regarding phosphorus acid and natamycin residues in wine in response to impending trade barriers and associated regulatory issues. Information was also disseminated regarding issues with residual elemental sulfur and associated impact on wine fermentation, changes to export requirements to China and changes to allergen labelling in the EU.
- In the difficult 2010 and 2011 growing seasons, *eBulletins* were issued detailing appropriate management strategies for locust plagues and powdery mildew. Later in the year, multiple bulletins detailed warnings about implications of fungal diseases on winemaking and appropriate winemaking strategies to manage this risk. This was followed by other bulletins produced in conjunction with the GWRDC which contained detailed information and Fact Sheets for Powdery Mildew, Botrytis and Non Botrytis moulds.

Content was prepared for a total of 22 editions of *eNews* issued during the investment period. *eNews* articles were prepared in response to emerging trends noted from queries to the AWRI support services (but that did not specifically necessitate production of an emergency *eBulletin*). Highlights of the articles prepared for *eNews* included 'Don't get contaminated this vintage!'. This article was released just prior to 2011 vintage to highlight that vintage is the riskiest period where wines can be tainted or contaminated. The article detailed how to keep wines taint free during vintage by taking simple preventative measures and precautions.

Other significant *eNews* articles prepared in this stream included:

- **Didn't see that coming – how did that get there?** This article alerted the industry to an emerging trend of high calcium levels in wine observed by the AWRI's winemaking team in the 2011 vintage.
- **A question on tartaric acid use** was issued to highlight changes to the interpretation of the specifications for additives in the Australian and New Zealand Food Standards Code. It now 'implies' that winemakers can use L-tartaric acid, D-tartaric acid or a racemate or enantiomer mixture for winemaking in Australia. The AWRI advised winemakers to continue to use L-tartaric acid for acid adjustments in winemaking in order to avoid the formation of unpredictable calcium DL-tartrate



crystalline deposits that are more likely to occur when using D- or the racemic (DL-) tartaric acid.

- **On the wood** highlighted issues regarding use of oak alternatives in Australia. In particular, Acacia cannot be used for wine barrels and FSANZ should be consulted before using any timber other than oak.

- **Avoid costly miscalculations** was prompted in response to an unfortunate measurement error when adding winemaking additives; wineries were encouraged to reference the Winemaking Calculators resource available on the AWRI website.

- **What's in your water** highlighted a variety of taints and contaminations that have been observed in water used in wineries in 2010.

- **Removing salt from wine without the hypertension** highlighted a new AWRI publication which discussed non-commercial independent assessment of Electrodialysis (ED) as a means of removing excess salt from wine.

- **It's filtration time – prevent those uninvited guests** was released at a time when most wineries were bottling wine, and highlighted an article discussing variable *Brettanomyces* species and yeast growth that can occur post-bottling with ineffective filtration.

Media Releases

Preparation of content for media releases provided a further avenue for raising awareness about technical opportunities to the wine industry and wine consumers. During the investment agreements period, 47 media releases were prepared and 264 enquiries from journalists were addressed.

Packaging and disseminating – face to face formats

AWRI roadshow seminars

Held in regional locations, roadshow seminars provide an accessible and interactive forum for provision of information direct to wine industry participants. Seminars were usually one-day events consisting of up to 12 presentations. A portfolio of approximately 80 presentations (reviewed annually) were developed based on relevance for the wine industry. This portfolio included content covering novel research outcomes from the AWRI, WIC partners and other organisations. The final roadshow seminar program was tailored for each region, based on selections of topics from the portfolio made by the regional associations.

The 12 topics most requested by the wine regions were:

- Strategies for the control of *Dekkera/Brettanomyces* during winemaking.
- Which new AWRI technologies can add value to your business?
- Manipulation of phenolic profiles in red grapes and wine by viticultural management.
- Vine balance – how does it affect yield and wine quality?
- Features of the AWRI website.
- Strategies for successful induction of malolactic fermentation.
- Wild ferments – what are the alternatives?



- Does grapevine nutrition have an impact on wine quality?
- Grape and wine tannins, red wine colour and mouth-feel – an overview on current research, emerging applications and future challenges.
- Grape maturity and tannins: the impact of viticultural treatments on grape and wine tannins.
- The link between bentonite requirements and vineyard and winemaking practices.
- Impact of nitrogen on grape and wine quality.

In addition, 74 wine, 32 viticulture and 60 health and regulatory presentations were prepared on request from organisations such as regional associations, universities, Interwinery Analysis Group (IWAG), ASVO, wine shows, government organisations, regulatory bodies, GiESCO, International Symposium on Grapevine Physiology and Biotechnology, International Symposium for Cool Climate Viticulture and Oenology, other conferences, and other stakeholders.

Themes addressed included:

- Trouble free winemaking – managing wine instabilities, understanding and managing nitrogen and identifying wine faults (Launceston, 2006);
- *Brettanomyces* – latest research and control strategies (Hunter Valley, 2008);
- Winemaking to produce desired wine styles (Bendigo, 2008);
- Microscopy and applications (Swan Valley, 2008);
- Tannin workshop (Limestone Coast, 2013); and
- Tannin and Brett workshop (Mudgee and Canberra, 2013).

AWRI roadshow workshops

Workshops were developed based on demand, tailored and delivered to translate research outcomes into practical winemaking advice. Workshops were practically oriented and included tastings, simple and practical diagnostic tests and exercises.

Common industry problems and challenges were addressed through delivery of targeted themed workshops. A total of four workshops were prepared and delivered as follows:

1. Trouble free winemaking – avoidance and management of common wine instabilities (2006)
2. The avoidance of taints and chemical instabilities during winemaking (2006-2009)
3. A guide to troublefree packaging for winemakers (2009-2012)
4. Adapting to difficult vintages (commenced May 2013)

One specific workshop example included the theme ‘Trouble-free packaging for winemakers’ which was launched in 2009 in response to data collected via Stream 2.5. These data highlighted that technical challenges were being experienced in packaging wine into the bottle and delivering it to the consumer in an optimal condition. This workshop included advice on the necessary logistics to prepare wine for bottling. The workshop also covered the necessary quality control requirements during packaging. Recommendations for storage and transport of wine were also provided along with several tastings to highlight wines affected by packaging problems.

The AWRI packaging workshop was delivered in 32 wine regions over a three-year period.

In 2008, the AWRI acquired the extension resources from the Cooperative Research for Viticulture (CRCV) to ensure the continuation of value from the 14-year investment in knowledge by the CRCV. The resources included the CRCV website and the Research to Practice (RtP) education and training modules. The AWRI identified and updated relevant information and added it to the existing AWRI extension platforms to ensure that the information could still be utilised by the grape and wine community. More than 60 factsheets were made available; six RtP workshops and accompanying training manuals were developed (see below) and 19 workshops were delivered. The portfolio of RtP workshops available includes:

- Managing grapevine nutrition in a changing environment.
- Sustainable viticulture: a comparison of organic, biodynamic and conventional practices.



- Integrated pest management for changing viticultural environments.
- Alternative varieties – emerging options for a changing environment.
- Winery wastewater management.
- Laboratory Quality Control practices.

Webinars

Webinars provide live presentations of technical information similar to that available through AWRI Roadshows and Workshops but accessible to participants from their desk with a computer connected to the internet. Participants have the capacity to interact directly with presenters and share knowledge with other webinar participants. In total nine technical sessions were prepared for webinars in 2011 and 12 sessions for 2012. Details about the management of this platform are provided in the Stream 4.2, 4.3 report.

Australian Wine Industry Technical Conference (AWITC) workshop programs

The entire workshop programs for the 13th and 14th Australian Wine Industry Technical Conferences (2007 and 2010) were developed, organised and delivered during the investment agreement period. The workshop program for the 15th AWITC was also developed and organised and scheduled for delivery in July 2013. As this event draws the largest gathering of industry members in Australia to one location, this platform provides a unique, efficient and effective means of communicating technical content in a face to face forum. Individual workshops were developed and delivered within this stream at the AWITCs. Examples include:

Health and Regulatory

- The A-Z of labelling for the domestic and export marketplace.
- The A-Z of national and international labelling for wine.
- The pros and cons to health of wine.
- Addressing the elephant in the room – wine and health policy.
- Winemaking, composition and labelling – what you need to know.

Wine

- *Brettanomyces* – latest research and control strategies.
- Test your limits! Determine your own threshold for important wine flavour compounds.
- Understanding and managing smoke taint.
- Perfecting Pinot Noir.
- A taste of wine education. Guided tastings from the world's wine assessment courses.

Viticulture

- Nitrogen – friend or foe – nitrogen nutrition and wine quality.
- Salty vines and wines.
- Emerging varieties from the Mediterranean.
- Environmental sustainability – where are we now and what are the drivers?
- Emerging varieties: what is the latest?
- Measures of quality from the vineyard to the winery.

In addition, presentations delivered within other workshops presented at the AWITC included: Wine colloids and protein stability; Stinky sulfurs and other stories – origin and control of reductive off-flavours in wine; and Organic viticulture.



Lectures in wine science, wine marketing, viticulture and oenology at the Universities of Adelaide and South Australia, and other relevant educational institutions as requested Wine in Society

Two one-hour lectures were prepared annually for the University of Adelaide and similar content was presented to wine marketing students at the University of South Australia on request. In addition, a one-hour lecture was presented at the University of Melbourne.

Winemaking and Viticulture Advances

41 wine and 25 viticulture two-hour lectures were prepared and presented by winemaking and viticulture staff to viticulture and oenology students at University of Adelaide.

7. Outcome and Conclusions:

Grape and wine producers and other industry members have benefited from the creation and packaging of highly relevant and quality information, for delivery in a user-friendly, convenient format. This has been achieved through the identification and development of relevant information generated both at the AWRI and externally. The range of communication mechanisms (managed in Streams 4.2 and 4.3), including roadshow seminars and workshops, lectures and the AWRI's publications, has successfully connected stakeholders with information generated in this stream to enhance the quality, integrity and reputation of Australian wine.

There were numerous instances where rapid packaging and extension of information was critical to help Australian wineries produce high quality, fault and taint free wines in compliance with regulatory impediments. For example, after the exceptionally wet 2010/2011 season, the national pest and disease debrief workshops supported affected regions in managing these difficult vintage conditions to meet export regulations. *Brettanomyces* management strategies continue to be one of the most requested Roadshow seminar topics and the Australian wine sector has achieved a decreasing incidence of Brett spoilage marker compounds at a comparatively low base as surveyed at international wine shows. The development and delivery of up-to-date and balanced scientific evidence and information on a range of wine and health matters have also ensured balanced and informed content is available for policy makers and wine consumers.

The effectiveness of knowledge extension activities can be demonstrated through, for example, the decreased incidence of wine instability investigations required to be undertaken in the period following the conclusion of the 'instability' workshop series (Figure 1) in 2006. This low incidence of general, but easily avoidable, wine instability issues has been maintained as the wine sector has become more informed. Similarly, the incidence of wine taint investigations has decreased since the completion of the taint workshop series in 2009 (Figure 2) which communicated the quality assurance steps and preventative strategies against taints. Grapegrowers and wine producers have thus experienced fewer technical problems because they are better informed about key sources of quality loss during production and processing, and able to implement more effective quality assurance systems.

An independent economic assessment in 2012 of the industry impact of the resolution and avoidance of selected, common taints and faults through the AWRI's activities reveals that the AWRI activities resulted a net present value of ~\$264 million on an incremental RD&E investment of ~\$8.6 million, (http://www.awri.com.au/about_the_awri/7-year-rde-plan/) comprising:

- *Brettanomyces* management and avoidance from 1998 to 2009 (~\$49 million on an incremental RD&E investment of \$3.2 million);
- halophenol taint mitigation and avoidance from 2004 to 2011 (~\$124 million on an incremental RD&E investment of \$1.5 million);
- smoke taint mitigation and avoidance from 2003 to 2011 (~\$41 million on an incremental RD&E investment of \$1.5 million); and
- general help-desk services (~\$50 million on an incremental RD&E investment of \$2.4 million).

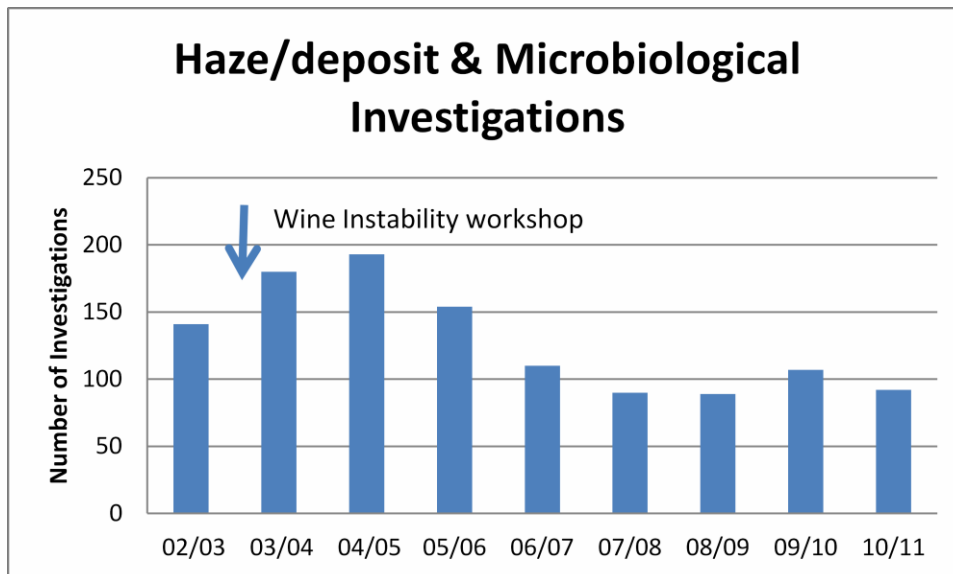


Figure 1. Declining number of haze, deposit and microbiological investigations conducted by AWRI Winemaking and Extension Services after implementation of ‘The avoidance of taints and chemical instabilities during winemaking’ workshop series

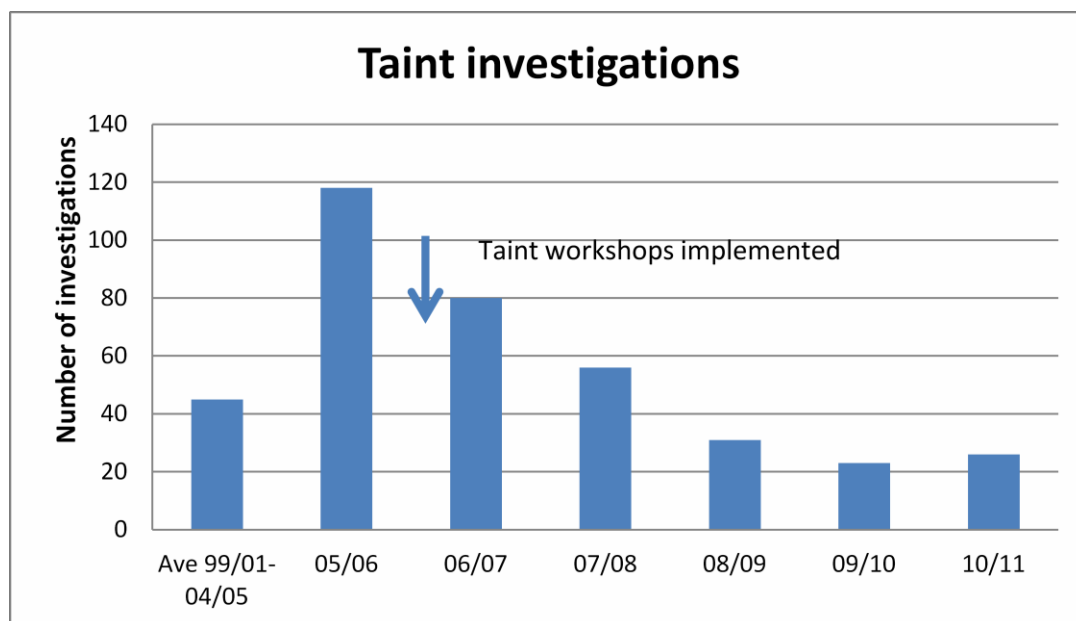


Figure 2. Declining number of taint investigations conducted by AWRI Winemaking and Extension Services after implementation of ‘The avoidance of taints and chemical instabilities during winemaking’ workshop series.

8. Recommendations:

The packaging and delivery of information through extension platforms has a long history of effectiveness. The multi-faceted strategy using a mix of face-to-face interactions with print and electronic media address industry’s information sourcing requirements. The roadshow concept of regional seminars and workshops boosts two-way communication and extension of information; each



party gaining greater insight through the ability of personal interaction affording deeper discussion of topics of interest. The current offering of print and electronic resources continues to provide valuable information to industry members at the convenience of stakeholders, (to be addressed in project portfolio 4.1 in the AWRI's new R,D&E plan 2013-2018). Stakeholder feedback indicated that the wine industry wants the following:

- more regular information in a user friendly plain English format;
- increased face to face coverage across Australia's wine regions, changing from a three to two year rotation cycle for roadshow seminars, alternating with a three year rotation cycle for roadshow workshops, will ensure every region has a face to face event each year, (to be addressed in Project 4.1.1 of the AWRI's R,D&E plan 2013-2018).

The wine industry has also requested that the next roadshow workshop, commencing in 2013, will combine viticulture and winemaking topics to deliver complete packaged information on 'Adapting to difficult vintages'. This workshop will address issues from the vineyard to the winery and provide solutions to the difficult vintage conditions experienced over the last seven years, (to be addressed in Project 4.1.1 of the AWRI's R,D&E plan 2013-2018).

Further development of a database to enable emerging trends or issues to be highlighted nationally, regionally and locally is recommended. This will allow the deployment of targeted responses to areas where action is required, (to be addressed in Project 5.1.1 and Project portfolio 4.1 in the AWRI's R,D&E plan 2013-2018).

Increased communication through channels such as *eNews* and other industry electronic communications and newsletters, and also through Q&A formats such as *Ask the AWRI* columns will be pursued to cater for regular information dissemination in user-friendly formats, (to be addressed in Project 4.1.4 of the AWRI's R,D&E plan 2013-2018).

The introduction of an 'industry snapshot' of current wine composition, oenological practices and processing technology will enable wineries to compare compositional trends in their products with their peers and understand any associated technical implications or risks. Benchmarking operational practices is a very effective method of raising awareness of opportunities and highlighting the benefits of their deployment. An industry snapshot of winemaking practices and process technology will highlight which novel research outcomes and innovations have been effectively adopted and any technical implications this has had for the wineries involved, (to be addressed in Project 4.1.5 of the AWRI's R,D&E plan 2013-2018).



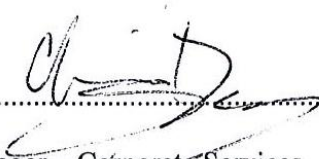
9. Budget reconciliation:

Financial Year	Receipts / Income ❶	Outgoings / Expenditure ❷
Year 1: 2006/2007	\$415,575	\$415,575
Year 2: 2007/2008	\$460,641	\$460,641
Year 3: 2008/2009	\$589,900	\$589,900
Year 4: 2009/2010	\$578,071	\$578,071
Year 5: 2010/2011	\$598,866	\$598,866
Year 6: 2011/2012	\$636,714	\$636,714
Year 7: 2012/2013	\$556,959	\$556,959
TOTAL	\$3,836,726	\$3,836,726

❶ Note that the GWRDC – AWRI Investment Agreement budget was established and approved at an aggregate level, with variances to budget (i.e. annual overspends and underspends) reported and considered at that same aggregate (i.e. whole of agreement) level. The receipts / income relating to a Stream for any year therefore equate to the outgoings / expenditure within that Stream for that year, as any variances between total Investment Agreement funding received and total funds expended were considered at the whole of Agreement rather than individual Stream level.

❷ Includes a pro-rated share of Theme 5 *Executive management and administration*.

I hereby certify that this statement is true and accurate.

Signature of duly authorised representative.....

Chris Day

Group Manager – Corporate Services

29/11/2013.....

Name:

Title:

Date:



10. References:

The AWRI's R,D&E plan 2013-2018; http://www.awri.com.au/about_the_awri/rde-plan/

Contact:

Communication Manager

Tel: (08) 8313 6600