Wine Australia for Australian Wine

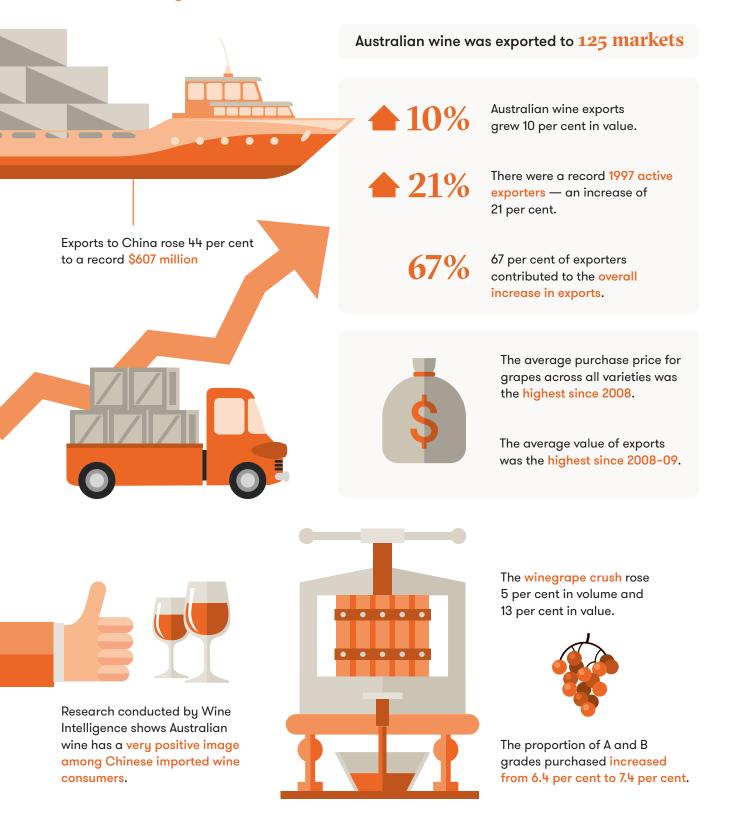
Performance Evaluation Report 2016–17



Highlights 2016–17

Wine Australia achieved our key objectives in 2016-17

Wine sector growth



Wine Australia events

Wine Australia hosted 130 marketing activities in key markets in 2016-17.



At our events



of surveyed exhibitors were satisfied.

97%

of attendees were <mark>satisfied</mark>.

Participants in master classes rated the quality of Australian wine at 8.3/10 before the event and 9.2/10 afterwards — an increase of 11%.

We work closely with Tourism Australia, state tourism commissions and regional associations to build international awareness of Australia's fine food and wine culture.

ProWein comments

'I was impressed with the Wine Australia stand, and the events and wineries really showed off the diversity and quality of Australian wine.'

German wine educator

'Incredible tastings and master classes at the Wine Australia stand. Even if I had stayed here for the entire ProWein, I wouldn't have been able to discover all that Australia has to offer as there is so much.'

Italian wine consultant and sommelier

Export assistance

When we surveyed our stakeholders:

99.7% found our Export Assistants very helpful or somewhat helpful. found our Export Assistance Team



82% were satisfied with them Label Integrity Program audit.



94% found the online export approximation of the system very easy or somewhat found the online export approval easy to use.

80.8%

were satisfied with our Market Insights services, which have a National Promoter Score of 25 (where above 20 is 'good').

Export Market Guides are now available for 33 key markets.



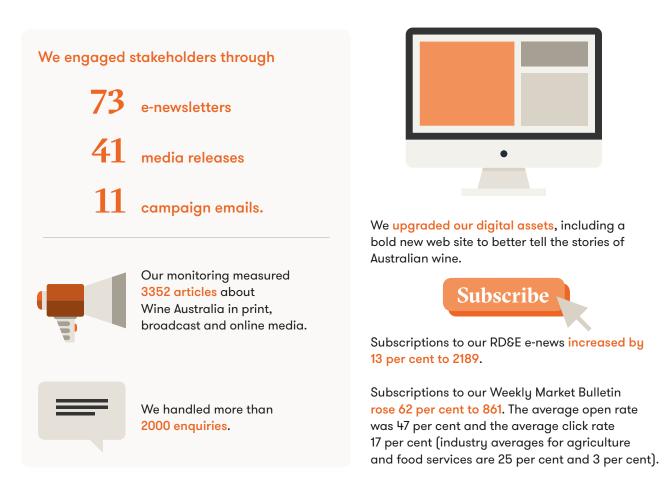
We implemented an automated system for generating export certificates more efficiently.



We created a joint Market

Access Team with the Winemakers' Federation of Australia (WFA) and the Australian Wine Research Institute (AWRI) to support the sector in export markets.

Information



Developing people



The seventh intake of the successful Future Leaders program began in June 2017, with 16 participants chosen from a very strong field.



We offered seven new **postgraduate scholarships** and supported travel for 20 outgoing scholars.

Regulatory

We conducted 246 audits to ensure the truth and reputation for truthfulness of Australian wine. A culture of compliance was reinforced outside the auditing program through direct engagement with stakeholders and education initiatives.

We analysed more than 300 Australian wines to monitor compliance with the Australia New Zealand Food Standards Code.

RD&E



We managed 246 research projects during 2016–17, with 57 completed during the period.



AGWA funding supported the AWRI in delivering **46 roadshow** workshops and seminars, attracting 1152 participants. In surveys, 87.1% of participants rated these sessions at 4/5 or higher.



New projects are investigating the use of digital technologies, including hyperspectral imaging, ultra wideband radar, LiDAR and NIR, to simultaneously measure grapevine canopy parameters, crop condition, disease status, bud fruitfulness and yield.



We introduced an innovative Incubator Initiative to support early career researchers and foster stronger links between wine regions and R&D.



An independent analysis of AGWA-funded research across five themes showed an aggregated benefit-cost ratio of 2.4 to 1 on the selected projects.

Chair's report

It has been another very encouraging year for AGWA and for Australian wine, with both statistical and anecdotal evidence showing that we are back in vogue and that global consumers are increasingly aware of the quality of our wine and the diversity of our unique regions.

Australian wine exports grew an impressive 10 per cent by value to \$2.31 billion and 7 per cent by volume to 778 million litres in 2016–17. The average value of exports rose 3 per cent to \$2.97 per litre free on board (FOB), which is the highest level since 2008–09.

There was growth across virtually all price points, with the strongest rate in the \$30–49.99 per litre category. And there were more wineries keen to share their wines with the world. The number of active exporters rose from 1648 to a record 1997 during the year, with 1348 of them contributing to the overall increase in exports.

Importantly, the impact of this growth was felt throughout the sector. The 2017 winegrape crush was up 5 per cent by volume and an impressive 13 per cent by value, to \$1.22 billion. The average purchase price across all varieties increased 7 per cent to \$565 a tonne — the highest since 2008.

China leads the way

Australian wine's exceptional growth in mainland China continued, with the value of exports up 44 per cent to a record \$607 million. By value, Australia now holds a 24 per cent share of wine imported by mainland China, behind only France with a 41 per cent share. Our exports are growing at much faster rates than most major competitors.

During the year, we commissioned independent research from Wine Intelligence that showed pleasing signs about our positive image among Chinese consumers of imported wine. Of those surveyed:

- 90 per cent said they like the grape varieties we produce
- 86 per cent would be proud to serve wines from Australia
- 85 per cent believe Australia has distinctive wine-producing regions
- 84 per cent see Australian wine as being food friendly
- 78 per cent view Australian wine as an expensive/fine wine.

The picture is also good in the US, where exports rose 3 per cent to \$464 million, the highest value since 2011–12, and there was a significant 21 per cent increase, to \$43 million, in exports of \$10 per litre or more FOB.

Exports to the UK, our largest market by volume, fell 7 per cent by value to \$341 million, but there was strong growth at the higher price points.



Chair, Brian Walsh

Strategic priorities

Priority 1: Increasing demand and the	Strategy 1: Promoting Australian fine wine					
oremium paid for all Australian wine	• Asia Pacific	• China				
	North America	• UK and Europe				
	Strategy 2: Protecting the reputation of Australian wine					
	Annual analytical surveyLabel Integrity Program	Regulatory services				
	Strategy 3: Building Australian vi	ne and wine excellence				
	 Grapegrowing for excellence Wine provenance and measure Customer insights 	es of quality				
Priority 2: Increasing competitiveness	Strategy 4: Improving resource m	nanagement and sustainability				
	 Climate adaptability Biosecurity, pest and disease management 	Foundation dataSustainable resource management				
	Strategy 5: Improving vineyard p	performance				
	Enhancing grapevine and rootsEfficient and sustainable viney					
	Strategy 6: Improving winery per	formance				
	Enhanced yeast and bacterialEfficient winery production	performance				
	Strategy 7: Enhancing market ac	Cess				
	Market access					
	Strategy 8: Building capability					
	Developing people					
	Strategy 9: Business intelligence	and measurement				
	Business intelligenceMonitoring and evaluation					
Extension and adoption	Strategy 10: Extension and adopt	tion				
Supporting functions	Strategy 11: Corporate Affairs					
	Corporate AffairsSector engagement					
	Strategy 12: Corporate Services					
	Finance and administrationPeople and culture	Information and communications technology				

Targets and outcomes 2016-17

Strategic Plan targets

Two key targets are defined in AGWA's Strategic Plan:

- 1. The average price per litre for Australian bottled wine exports increases to a point where it is at or near the highest average price per bottle of our global competitors by key markets, and
- 2. Australian vineyards and wineries are efficient by global standards.

Target 1 is evaluated by tracking the average price per litre for Australian bottled wine exports in A\$ against that of the top five competitors in the key markets of China, the US, the UK and Canada, using trade data sourced from the Global Trade Atlas.

Target 2 is evaluated through two methods. First, benchmarking the adoption of five viticultural practices and five oenological practices in Australia to establish a competitiveness indicator. Secondly, a benefit-cost analysis of selected R&D projects.

Targets and outcomes 2016-17

Strategic Plan target	2016–17 target	2016-17 outcome
The average price per litre for Australian bottled wine exports increases to a point	The average price per litre for Australian bottled wine exports increases year-on-	The average price per litre for Australian bottled wine exports for 2016–17 was \$5.40.
where it is at or near the highest average price per bottle of our global competitors by key markets.	year from \$5.32 in April 2016.	Among the top five importers in key markets, Australia extended its lead at the top in China, narrowed the gap to France in the US, and lost ground to France in the UK and to the US in Canada.
Australian vineyards and wineries are efficient by global standards	There is greater transparency in the management practices and costs of Australian vineyards and wineries than for many other wine-producing countries.	Five viticultural practices and five oenological practices in Australia have been selected to establish a competitiveness indicator.
	We will benchmark two Australian wine regions against two like regions in the US, where information about management practices and costs is available in a timely manner. We will also benchmark the adoption of five viticultural practices and five oenological practices in Australia to establish a competitiveness indicator.	A benefit-cost analysis of selected R&D investments was conducted.

Performance 2016–17

Financial overview

We achieved an operating surplus of \$3.6 million for 2016–17.

Our revenue comes from two main sources: winegrape growers, processors and exporters who pay statutory levies, and the Australian Government, which matches the money raised by these levies when it is invested in eligible R&D activities.

There are three levies: the wine grape levy and the grape research levy, which are based on winegrape production, and the wine export charge, which is based on the FOB value of wine exports.

Approximately 46 per cent (\$20.2 million) of the 2016–17 revenue came from the 2 levies and export charge and 27 per cent of revenue (\$12.0 million) from the Australian Government matching contributions.

Revenue from regulatory fees made up 12 per cent (\$5.0 million) of income, and wine sector contributions to marketing activities made up 4 per cent (\$1.9 million) of total revenue for 2016–17.

Net assets were \$13.1 million at 30 June 2017 and financial assets were \$16.2 million, of which all was cash and term deposits other than receivables of \$3.3 million. Payables were \$4.1 million, of which R&D contracts represented \$1.9 million.

Full details of our finances are included in the Financial Statements section of this report.

Key performance indicators

We have nine key performance indicators against which we measure and report our performance against our strategic priorities and the Australian Government priorities. These are detailed in Table 1.

Table 1: Performance against Agriculture Portfolio Budget Statements 2016-17 measures

Key performance indicators	Target	Outcome
R&D projects are funded in line with the approved Annual Operational Plan	100%	100%
R&D contracts are actively managed through regular and ongoing monitoring of the research	100%	100%
The number of user-pays events hosted with wine sector partners to engage influencers in key markets	42	28 UPA + 22 other visits*
The number of AGWA-funded activities to engage influencers in key markets	70	70
Improvement in customer satisfaction rating for market insights services, as measured by customer satisfaction survey	74%	81%
An increased number of RD&E newsletter subscribers	1500	2189
The number of regional clusters participating in the Regional Program is maintained	11	11
Risk-based audits reinforce a culture of compliance and help protect the reputation of Australian wine		246 audits completed**
Export Market Guides provide accurate information about import requirements for our largest export markets	28	33

* The visits funding model changed in 2016. Visits are now solely funded by AGWA rather than through user-pays activities (UPAs). This has impacted the UPA target.

** A culture of compliance was reinforced outside the auditing program through direct engagement with stakeholders and education initiatives.

Investment allocation

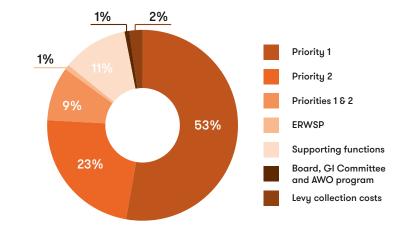


Table 2: AGWA expenditure by groupings for 2016-17

2016–17 Income and Expenditure	\$m
Priority 1: Increasing demand and the premium paid for all Australian wines	
Strategy 1: Promoting Australian wine	10.36
Strategy 2: Protecting reputation of Australian wine	1.31
Strategy 3: Building Australian grape and wine excellence	9.53
Total Priority 1	21.20
Priority 2: Increasing competitiveness	
Strategy 4: Improving resource management and sustainability	3.55
Strategy 5: Improving vineyard performance	0.88
Strategy 6: Improving winery performance	2.23
Strategy 7: Enhancing market access	0.53
Strategy 8: Building capability	0.75
Strategy 9: Business intelligence and measurement	1.29
Total Priority 2	9.23
Priorities 1 & 2: Extension and adoption	
Strategy 10: Extension and adoption	3.72
Total Priorities 1 & 2: Extension and adoption	3.72
Supporting functions	
Strategy 11: Corporate Affairs	0.49
Strategy 12: Corporate Services	3.88
Total supporting functions	4.37
Other	
Export and Regional Wine Support Package	0.53
Board, GI Committee & Australian wine overseas program	0.56
Levy collection costs	0.67
Total other	1.76
Total	40.28

Performance against the Strategic Plan

Priority 1: Increasing demand and the premium paid for all Australian wine

Strategic Plan target: The average price per litre for Australian bottled wine exports increases to a point where it is at or near the highest average price per bottle of our global competitors by key markets.

2016–17 Target: The average price per litre for Australian bottled wine exports increases year-on-year from \$5.32 in April 2016.

2016–17 Result: The average price per litre for Australian bottled wine exports for 2016–17 was \$5.40. Among the top five importers in key markets, Australia extended its lead at the top in China, narrowed the gap to France in the US, and lost ground to France in the UK and to the US in Canada.

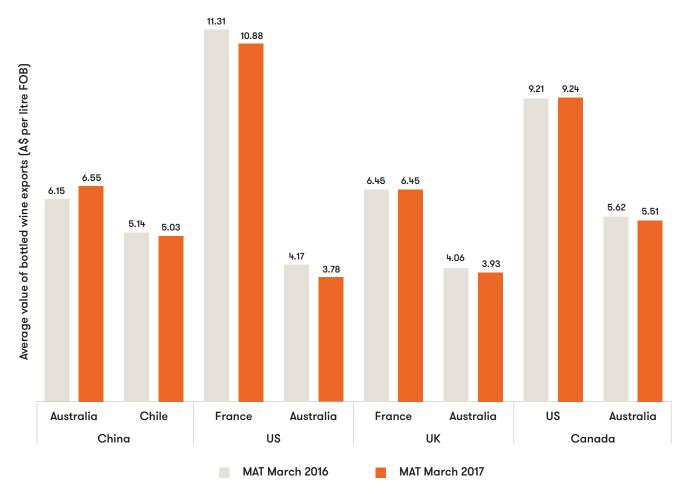


Figure 1: Average bottled value of wine exports for key wine markets and exporters • Source: Global Trade Atlas

Priority 2: Increasing competitiveness

Strategic Plan target: Australian vineyards and wineries are efficient by global standards.

2016–17 Target: There is greater transparency in the management practices and costs of Australian vineyards and wineries than for many other wineproducing countries. We will benchmark two Australian wine regions against two like regions in the US, where information about management practices and costs is available in a timely manner. We will also benchmark the adoption of five viticultural practices and five oenological practices in Australia to establish a competitiveness indicator.

2016–17 Result: Five viticultural practices and five oenological practices in Australia have been selected to establish a competitiveness indicator. A benefit-cost analysis of selected R&D investments was conducted.

Benchmarking adoption of viticultural practices and oenological practices

The five viticultural practices expected to most significantly improve competitiveness of the Australian vineyards are: pest and disease management (including trunk diseases and biosecurity); rootstocks use; spray application optimisation; adoption of vine balance/grape quality measures; and adaptation to climate change (including delayed pruning, clonal trials).

The five oenological practices are: clarification and filtration optimisation (including flotation/cross flow); improved cold stabilisation; increased wine efficiency (including Lean principles, activity-based costing and energy efficiency); improved fermentation monitoring; and removing faults and taints (including smoke taint and copper additions).

An approach to benchmarking the adoption of these 10 practices will be developed in 2017–18.

Benefit-cost analysis of R&D Projects

To evaluate the value of AGWA's R&D investments, we commissioned AgEconPlus to undertake an ex-post benefit-cost analysis of selected projects according to five themes:

- Lean
- Leadership Future Leaders
- Varieties and clones
- Powdery mildew assessment
- Wine Flavours Card

The approach followed the general evaluation guidelines that are now well established within the Australian rural research sector, including Research and Development Corporations, Cooperative Research Centres and some universities. The assessments were consistent with the Council for Rural RDCs (CRRDC) 2014 Impact Assessment Guidelines. Comparisons to analyses of previous investments should be made with caution as the latest CRRDC guidelines require practitioners to take a conservative approach to the estimation of costs and benefits. This will result in lower benefit-cost ratios than for analyses of R&D projects in previous years.

Each of the five analyses provides a description of the constituent projects, including objectives, outputs, activities, costs, outcomes and benefits. Benefits are described qualitatively according to their contribution to the triple bottom line of economic, environmental and social benefits. While potential benefits of each program are identified, the analysis focused on the most likely and most significant benefit stream. A number of potential benefits therefore remained unquantified and hence the estimated net benefits of some programs may be considered conservative. The analyses were undertaken for total benefits and AGWA benefits, including those expected in the future as a result of the investment.

The estimated benefits and costs show that the returns on the grower, Commonwealth Government and co-investor monies have been significant. Investments in each of the five themes yielded positive results, with benefitcost ratios ranging from 1.1 to 3.8 and the Internal Rates of Return well in excess of 5% (the discount rate used).

The aggregated benefit-cost ratio on the selected projects was 2.4 to 1.

Investment criteria			Investment progra	am	
investment ontend	Lean	Wine Flavours Card	Future Leaders	Varieties	Powdery Mildew
Present value of benefits (\$m)	\$3.4	\$1.9	\$2.2	\$1.7	\$1.7
Present value of costs (\$m)	\$1.0	\$0.5	\$0.8	\$1.6	\$0.6
Net present value (\$m)	\$2.4	\$1.4	\$1.4	\$0.1	\$1.1
Benefit-cost ratio	3.4	3.8	2.7	1.1	2.9
Internal rate of return (%)	106%	34%	275%	6%	57%
Modified internal rate of return (%)	12%	12%	14%	5%	10%
Unquantified benefits		Unification in marketing of Australian wines to China	Better sector decisions	Germplasm knowledge to inform the wine grape breeding program	Research outputs to assist in future development of objective assessment methods
		Increased sales to domestic tourists of Chinese descent	Contributions to community initiatives in regional Australia		Additional consideration and knowledge of environmental sustainability

Table 5: Summary of benefit-cost analysis of selected AGWA R&D projects

Strategy 1: Promoting Australian fine wine		
2016–17 targets	Result	2016-17 achievements
Asia Pacific		
Trade and consumer educational events deliver key messages to support the strategy.	•	All trade consumer educational events hosted by Wine Australia delivered our key messages.
Positive growth in consumer sentiment index in Hong Kong from 6.70, in Japan from 7.37 and in Singapore from 7.20.	•	Consumer sentiment in Hong Kong was 6.87, Japan 7.47, Singapore 7.29.
At least 90% of wineries and distributors who participate in user-pays and core events report they are satisfied.	•	90% of wineries that exhibited at a Wine Australia event were satisfied. The net promotor score was 34.97 (a score of 20+ is seen as good).
North America		
Trade and consumer educational events deliver key messages to support the strategy.	•	All trade consumer educational events hosted by Wine Australia delivered our key messages.
Positive growth in consumer sentiment index in the US from 8.09 and in Canada from 8.33 (English-speaking) and 7.99 (Québec).	•	Consumer sentiment in US was 8.13 in Canada (Eng) 8.05 and in Quebec 7.92. More funding is being allocated to Canada in 2017-18 to enhance marketing activities.
At least 90% of wineries and distributors who participate in user-pays and core events report they are satisfied.	•	90% of wineries that exhibited at a Wine Australia event were satisfied. The net promotor score was 34.97 (a score of 20+ is seen as good).
China		
Trade and consumer educational events deliver key messages to support the strategy.	•	All trade consumer educational events hosted by Wine Australia delivered our key messages.
Positive growth in consumer sentiment index in mainland China from 8.44.	•	Consumer sentiment in China was 8.26. As wine consumption increases in China, so do new consumer audiences who may not have a great awareness of Australian wine. The China wine market is still quite immature.
At least 90% of wineries and distributors who participate in user-pays and core events report they are satisfied.	•	90% of wineries that exhibited at a Wine Australia event were satisfied. The net promotor score was 34.97 (a score of 20+ is seen as good).
UK and Europe		
Trade and consumer educational events deliver key messages to support the strategy.	•	All trade consumer educational events hosted by Wine Australia delivered our key messages.
Positive growth in consumer sentiment index in the UK from 8.04.	•	Consumer sentiment in UK/Europe was 8.12.
At least 90% of wineries and distributors who participate in user-pays and core events report they are satisfied.	•	90% of wineries that exhibited at a Wine Australia event were satisfied. The net promotor score was 34.97 (a score of 20+ is seen as good).

Achieved
 In progress / partially achieved
 Not achieved

Strategy 2: Protecting the reputation of Australian wine				
2016-17 targets	Result	2016–17 achievements		
Annual Analytical Survey				
Compliance with the Code is demonstrated through analysis of 300 Australian wines.	•	We analysed more than 300 Australian wines to monitor compliance with the Code. This included establishing the methanol, captan and glyphosate levels of the samples.		
Label Integrity Program				
Any minor breaches of the record-keeping requirements of the Act that are identified through risk-based inspections are remedied, while action is initiated in response to serious breaches.	•	A high level of compliance with the record keeping requirements of the Act was demonstrated. Minor breaches were remedied through corrective measures being adopted by record keepers. No serious breaches were identified.		
Regulatory Services				
We will develop and introduce an automated export certification process to (largely) replace the existing manual system.	•	We developed an automated system for generating export certificates that greatly increased the efficiency of the export certification process and cut red tape for exporters.		

Strategy 3: Building Australian vine and wine excellence

2016-17 targets	Result	2016-17 achievements
Grapegrowing for excellence		
Knowledge of the impact of canopy, crop load and carbon availability manipulation on wine composition and sensory properties. Potential molecular markers for grape vine attributes associated with 'vine balance' identified.	•	Wines made following different canopy treatments were scored for key aroma and flavour characteristics. Wines from the 'early defoliation' treatment showed more intense tannins and dark/ stewed fruit characters, and were preferred by sensory panelists. Gene expression data representing the major regulatory points of the flavonol pathway were collected from field samples. Further sampling and more intensive examination of a few key genes are under way.
Results from a three-year trial on the performance of selected Shiraz and Chardonnay clones in multiple regions is used to inform the sector on the influence of region and climate on wine style.	•	Results from the first three years were showcased at the 16th AWITC, to allow sector participants to gain a deeper understanding of differences in clonal wine styles.
New models to profile fruit ripening evolution and predict harvest dates for preferred wine styles are demonstrated and communicated to the sector.	•	Robust ripening models were delivered, providing a means to align specific wine styles with a harvest decision based upon berry sugar accumulation. Clear markers of berry maturation and wine styles in red wines have been identified, providing targeted and objective measures to assist in determining optimum harvest times. For white cultivars (Chardonnay and Sauvignon Blanc), grape berry skin colour evolution was used to optimise harvest decisions for specific wine styles. Numerous presentations and publications have communicated these outcomes to growers.
Beta testing of a portable, smartphone-based imaging tool to assess ripening development in white grape varieties and berry volume/irrigation requirements in the field.	•	Field testing was used to inform the user interface design and functional features of the app, to produce the beta version. Results of beta-testing are being used to further refine the app.

Strategy 3: Building Australian vine and wine excellence

2016-17 targets	Result	2016-17 achievements
Third season results using remote and proximal canopy sensing tools to determine whether yield and quality follow the same patterns of spatial variability at the 'within-vineyard' scale.	•	Severe frost, hail and other canopy damage during the season led to the field sites being abandoned permanently. Equipment issues also led to a redesign of the experimental plan, involving an evaluation of a near infrared (NIR) sensor to map fruit quality parameters at an alternative field site in the coming season.
Four new digital viticulture projects initiated that use sensor technologies to improve the estimation of grape yield, condition and quality, disease detection, bud fruitfulness and spraying efficiency.	٠	New projects are investigating the use of digital technologies, including hyperspectral imaging, ultra wideband radar, LiDAR and NIR, to simultaneously measure grapevine canopy parameters, crop condition, disease status, bud fruitfulness and yield. A further project is developing a PACE system (Pesticide Adjusted for Canopy Environment) to optimise and automate the application of agrichemical sprays according to the density of the canopy.
Wine provenance and measures of quality		
Results of a four-year study on in-field powdery mildew severity assessment and objective measurements for contamination available to the sector.	•	A diagrammatic key and smartphone app, with supporting online training resource, were developed to improve visual assessment of powdery mildew in vineyards. These were received enthusiastically by the sector. A DNA-based assay was developed for quantification of powdery mildew fungus in grapes, but spectroscopy methods were unable to discriminate powdery mildew severity in the range critical to the sector.
Data confirming the identity of 'green flavour' compounds in red wine, consumer responses to them and amelioration strategies.	•	Key compounds have been confirmed as important to 'green' flavour in Shiraz wine. The inclusion of grape stalks in Shiraz fermentations increased the concentration of these compounds in wine. There was lower consumer acceptance for wines with 'green' sensory attributes. A simple treatment option has been shown to successfully lower the concentration of 'green' compounds with limited influence on other aroma compounds.
Information disseminated to the sector on in-mouth flavour release from precursor compounds and their sensory significance in wine.	٠	Two scientific papers have been published, together with an AWITC conference proceedings paper, and presentations have been made at the 16th AWITC and AWRI roadshows. The addition of glycosides isolated from grape marc to white juice or wine gave increased 'floral' and 'fruit' attributes in finished wine compared to a control, together with higher terpene concentration and no increase in bitterness. Moderate additions of the glycosides were well accepted by consumers.
Information disseminated on the effect of low concentrations of carbon dioxide (CO ₂) on the tastes and textures of still red and white wine, and on the potential of wine macromolecules to influence taste and texture.	•	The effect of dissolved CO_2 at wine-realistic concentrations on the flavour and mouth-feel of still table white wine has been quantified for the first time. Specifically, examples of the same white wine with different dissolved CO_2 levels, acidities and alcohol content were created, and these were presented for tasting in volumes and at a temperature typical of domestic wine consumption (150 mL at 10°C). Preliminary results suggest dissolved CO_2 levels interact with wine acidity and alcohol levels to affect the bitterness, sweetness and hotness of still white wine.
Information disseminated on the fate of hydrogen sulfide (H ₂ S) in wine, the formation of volatile sulfur compounds from precursors and the role of metal ions on the release of sulfur compounds.	•	Information was disseminated through articles and publications, and presentations at roadshows and the 16th AWITC. The role of active oxygenation during fermentation in minimising H ₂ S in wine was emphasised. Precursors to H ₂ S and methanethiol have been identified from both grapes and yeast. The increase of undesirable sulfur compounds due to metal ions, particularly copper, acting on precursors has also been highlighted.

• Achieved • In progress / partially achieved • Not achieved

Strategy 3: Building Australian vine and wine excellence

2016-17 targets	Result	2016–17 achievements
Develop a set of guidelines for winemakers to measure metal ion speciation in wines and information to interpret the results in relation to wine oxidation, removal of H ₂ S, and casse formation.	•	Copper has been found to predominantly exist in wine as copper sulfide, which can still catalyse oxygen consumption in wine but at a much lower level. Removal of copper sulfide from white wine via membrane filtration was found to be limited due to the size of the copper sulfide particles and due to wine macromolecules, such as proteins and polysaccharides, preventing the adsorption of the copper sulfide onto the membrane media. Conditions conducive to the conversion of copper to non-sulfide complexed forms in wine were identified.
Initiate two projects examining the provenance and quality of premium Tasmanian Pinot Noir and sparkling wines.	٠	Two new projects on quality and provenance were initiated this year, one on Pinot Noir and one on sparkling wine.
Initiate a collaborative project to identify the main drivers of regionality/typicality for Australian Shiraz wine.	•	A new collaborative program was developed with multiple R&D providers, focusing on Shiraz terroir and commenced in January 2017.
Initiate a project to further develop the use of multi- elemental isotope ratios and other trace elements to verify the origin of wines.	٠	The initial stages of this project have seen the successful development and validation in wine of analytical methods to determine a range of new isotopic ratios. These methods are currently being applied to previously studied wines to assess their efficacy in improving the accuracy of providence determination.
Customer insights		
Finalise a guide to WeChat for Australian wineries.	•	A final report has been made available on a project about WeChat use. The guide has been delayed due to resource restraints.
Understand the route to Chinese market for a representative cohort of Australian wine brands.	•	We have an excellent understanding of the structure of the Shanghai retail market based upon 40 retail audits. Once the quantitative analysis of the audits is validated we will move to replication in other cities.
Run four sector-orientated webinars in collaboration with Wine Communicators of Australia.	•	 Webinars on the following topics were presented in collaboration with Wine Communicators of Australia China Wine Barometer Preparing for export Market update Developing premium products.
Extend the research findings from the 'Advance Australia Fair?' project.	•	This project's findings were delivered by Robert Joseph to wine exporters at the Exporters forum in November 2016.
Extend the research findings from the China Wine Barometer project.	٠	This project's findings were delivered to the sector by Armando Corsi at a webinar in May 2017, through a YouTube clip and through our newsletter.

Strategy 4: Improving resource management and sustainability

2016–17 targets	Result	2016–17 achievements
Climate adaptability		
Extend information on delayed pruning as a strategy to mitigate early grape ripening and decompress vintage.	•	The use of delayed pruning as a strategy to shift grape maturity was communicated to sector through journal articles, regional roadshow workshops and presentations at technical seminars. Three years of research showed that delaying pruning can delay maturity by up to two weeks without any major deleterious effects on yield or grape and wine quality.

Achieved
 In progress / partially achieved
 Not achieved

Strategy 4: Improving resource management and sustainability

2016-17 targets	Result	2016–17 achievements	
Understand how winter drought may impact vine production and wine quality.	•	A second year of research has been completed to further understand the impacts of reduced winter rainfall on grapevine production. There was a significant change in yield response between the 2015-16 and 2016-17 growing seasons for vines that received the least amount of water during winter. Preliminary wine data have shown positive compositional and sensory attributes from the most 'winter-drought' vines.	
Information is available on the impact of elevated temperature and elevated CO ₂ on the growth and production of Shiraz.	•	The resulting impact of four years of imposed elevated temperature and CO ₂ levels on Shiraz vines was conveyed to an industry reference group meeting held in Irymple, Victoria, in June 2017. Elevated CO ₂ has been shown to greatly affect photosynthesis, vine reserves and nutrition.	
Further data are collected on the use of in-canopy misters and sprinklers to alleviate the effects of heatwaves on grapevine growth, yield and wine quality.	•	Critical information gained from the 2016–17 growing season will be used to inform the research methods in 2017–18. A longer misting time is needed to effectively reduce the impact of heatwaves on vine physiology.	
Information is available on the cost, water and emission savings that can be achieved through the use of new grapevine varieties and different vineyard layouts and management approaches.	٠	Details of the unique trial site established in the Barossa to collect critical data on vine performance, input and management costs for new disease resistant scion-rootstock combinations, commonly referred to as 'no spray' and 'no-prune' vines, were communicated to the sector through RD&E News. Encouraging preliminary results indicate that the mildew-resistant vines were not impacted by fungal infection, despite strong disease pressure, and received no fungicide sprays.	
New knowledge is available on the genetics of stress response and its heritability during propagation of grapevines.	•	Significant work was carried out to investigate the heritabil stress response in grapevines. Cabernet Sauvignon vines w propagated under a range of stress treatments. DNA and R were extracted from leaf samples to assist in the analysis o expression.	
An initial evaluation of smoke taint remediation technologies and techniques is available, based on season 1 laboratory and field trials.	•	A project on smoke taint was initiated through the Rural R&D for Profit program. Partner organisations include the AWRI an DEDJTR. A network of seven remotely accessible smoke detect was established throughout Victoria and data from smoke eve was collected. Several chemical agents with the potential to mitigate the effects of smoke taint in the vineyard or in the win were identified and protocols for evaluating them were devise	
Foundation data			
Complete a proof of concept in the Riverland and Western Australia.	•	Work continues on the development of the system, with research into technical capability for determining vineyards from satellite	
Develop and release stage 1 of the platform nationally.	•	images and ongoing work with regions and states to refine the data collection method.	
Sustainable resource management			
DNA profiles are obtained for all publicly-owned grapevine germplasm and unique accessions from other Australian collections to allow comparison with international reference material.	•	Over 1500 leaf tissue samples were collected for analysis from grapevine varieties and clones in the 'public' germplasm collections held by CSIRO and SARDI and other participating private agencies holding unique accessions. DNA extraction of the samples is in progress and primer design for DNA profiling is under way following the identification of suitable SNP markers.	
Information disseminated on wine and health.	•	Papers were published on links between alcohol consumption and health risk factors, on influences of wine consumption choices and on the evidence base for low risk drinking guidelines.	

Strategy 4: Improving resource management and sustainability

2016-17 targets	Result	2016–17 achievements	
Biosecurity, pest and disease management			
Nationally-endorsed diagnostic protocols are developed for six new high-priority threats and two existing protocols are updated.	•	Eight draft diagnostic protocols for high-priority grapevine pests (six new and two updates) were submitted to the Subcommittee on Plant Health Diagnostics (SPHD) and are currently awaiting review and endorsement.	
A detailed contingency plan is released and a diagnostic protocol for angular leaf scorch is submitted.	•	A simulated eradication of angular leaf scorch (by drastic pruning) was unable to be tested for a second season because of drought conditions at the trial site in New York State during 2016. The project was therefore extended for a further 12 months. A draft diagnostic protocol for angular leaf scorch, submitted to the SPHD in December 2014, will be updated prior to endorsemer with information gathered from the New York field trials.	
A website to support pMapp, the smartphone tool for powdery mildew assessment in vineyards, is launched for use during 2016–17 vintage.	•	pMapp was released globally in November 2016, following its exclusive use in Australia for the 2015–16 season. A website was launched at the same time, following extensive industry consultation. It supports pMapp by providing training in recognition and assessment of powdery mildew in the field.	
New knowledge on fungicide resistance and updated resistance management strategies for downy mildew, powdery mildew and botrytis is disseminated to the sector.	•	Samples of downy mildew, powdery mildew and botrytis collected from vineyards in the main Australian viticultural regions were tested against a range of commonly used fung to determine the incidence and severity of fungicide resistar The results showed the presence of resistant populations of three causative pathogens to many commonly used fungicid A field management approach involving fungicides with diff modes of action can contribute to the mitigation of resistant Knowledge was disseminated through over 24 presentations growers and sector personnel, 11 industry journal articles an conference presentations.	
New guidelines for best practice agrichemical spraying to reduce spray drift, including a decision-support tool and a drop-size calculator smartphone app, are released.	•	Work completed on best management practices (BMPs), decision support tools and droplet size calculators aligns with national initiatives (through the APVMA and the NWPPA) and is helping ensure drift regulations protect the environment and are flexible for growers. BMP guidelines have been presented to growers at workshops, with further extension events in progress and factsheets being developed.	
The sector is informed on the latest grapevine trunk disease research and best management practice, with new knowledge available on pruning wound susceptibility, appropriate timing of fungicide application, and duration of efficacy for control of eutypa and botryosphaeria dieback.	•	A single application of fungicide to pruning wounds within six days of pruning was shown to protect grapevines from pathogen infection for up to three weeks. Remedial surgery was effective in the control of dieback, particularly for own-rooted vines, which regenerated readily. Findings were extended to the sector via industry publications, a workshop and presentations at the 2016 AWITC, several regional workshops and publication of a Eutypa Best Management Practice Guide.	
New research is underway to investigate the effect of differing wine region climates on the incidence, severity and management of eutypa and botryosphaeria fungal trunk disease.	•	A new project, initiated in 2017, aims to optimise management techniques for eutypa and botryosphaeria dieback in grapevines across diverse climates. In addition, grapevine clones and rootstocks will be tested for their disease susceptibility, and the infection threshold in grapevine propagation material will be determined.	
Recommendations are made on improved disinfestation protocols for the movement of diagnostic samples between declared phylloxera zones.	•	Current disinfestation protocols were extensively tested on at least seven endemic phylloxera strains. As a result, modification of existing disinfestation treatments for clothing, footwear, planting material, diagnostic samples and vineyard machinery has been proposed.	
An in-field proof of concept trial is initiated on the use of detection dogs for preliminary screening of phylloxera infestation.	•	A pilot study under controlled conditions using sniffer dogs for early detection of phylloxera showed promising results. However, odour-based detection methods are yet to be trialled in the field.	

Strategy 5: Improving vineyard performance			
2016-17 targets	Result	2016-17 achievements	
Enhancing grapevine and rootstock performance			
New mildew-resistant grapevine varieties are evaluated in terms of their agronomic performance, yield and potential to produce desirable wine styles.	•	Seasonal conditions did not affect the disease resistance of the vines, with none showing any evidence of downy or powdery mildew infection. Data on the agronomic performance and wine attributes of elite selections in the source block over several seasons have been collated for inclusion in the final report.	
Confirmed list is developed of DNA markers for predicting fruit and wine flavour, from elite mildew- resistant selections.	•	Four SNP markers for Muscat flavour have been assessed, with three now incorporated into a new SNP panel that can be used to identify loci for Muscat flavour, flower sex, vine stature and mildew disease resistance in a low-cost, high-throughput, single multiplex PCR test.	
The third year of field trials evaluating and demonstrating 40 new disease-resistant varieties for warm, irrigated regions is completed.	•	Third year trials have been completed and vine performance data are being evaluated. Of note, and despite considerable disease pressure, no incidence of fungal disease was observed either red or white disease-resistant varieties.	
bunch architecture traits are available. numerous gene to the overall pl bunch architect investigate diffe gibberellin- med		Results indicated that bunch architecture is regulated by numerous genes, each contributing a limited amount of variation to the overall phenotype. Therefore, a major QTL controlling bunch architecture could not be identified. Further work will investigate differentially expressed genes that correlate with gibberellin- mediated internode elongation, to determine whether these are linked to bunch architecture.	
A second generation of experimental germplasm containing multiple genes to improve mildew resistance in future grapevine breeding programs is produced.	•	Progeny from selected germplasm crosses are being screened with DNA markers to identify plants that have inherited both REN4 and RPV12 mildew resistance genes. Positive lines are beir verified using powdery and downy mildew resistance assays.	
DNA markers are developed and tested for abiotic stress resistance.		DNA markers for sodium and chloride exclusion have been generated. Experiments are under way to ascertain how wide in the available germplasm these markers can be utilised. Ba on growth data from Plant Accelerator experiments, samples have been targeted for a transcriptomic analysis for heat an water use efficiency resistance markers.	
A validated glasshouse screening method is developed to assist in rootstock selection.		Work has focused on physiological measurements on mature V. cinerea × V. vinifera selections. Full analysis of physiologica and related molecular data from experiments in the smart house and in the field have demonstrated the extent to which traits determined in new rootstock selections are likely to be transferred to mature, field-grown vines.	
Molecular markers for resistance to phylloxera and root- knot nematodes are identified, to provide new screening methods for rapid selection of rootstocks with these traits.	•	17 SNP markers have been identified for marker-assisted selection to predict resistance to the root-knot nematode <i>M.</i> <i>javanica</i> in grapevine. Screening work to identify molecular markers that predict phylloxera resistance has indicated that a single dominant locus conferred resistance to both G1 and G4 phylloxera genotypes. This provides confidence that it will be possible to identify markers to predict phylloxera resistance.	
Shiraz plantlets are transformed to incorporate a new chloride exclusion gene. Plantlets are tested for chloride and sodium exclusion traits, and root-knot nematode resistance.	•	Constructs to reduce the activity of two putative chloride excluding genes have been made and used successfully to transform Shiraz plantlets to test their function. Work is also evaluating the effect of HKT genes on sodium exclusion. Over 10 transformed Shiraz plantlets have been propagated for in vitro testing of their ability to resist nematode attack.	

Strategy 5: Improving vineyard performance		
2016-17 targets	Result	2016-17 achievements
Efficient and sustainable vineyard management		
Outcomes are communicated on field performance trials of native under-vine plant species on vine growth and nutrition, weed suppression, soil moisture and soil biology. Economic data for the trials is evaluated.	•	Project outcomes have been delivered through regional grower workshops. Factsheets are being prepared and the online decision support tool (CoverCropFinder.com.au) is being updated with the latest information on under-vine plant species. Economic data will be evaluated before the end of the project.
Preliminary yield prediction models are developed, based on traditional statistical methods and machine learning, and are applied to historical vineyard and weather data.	•	Model development is proceeding well, with additional yield data from growers being added to the database. These additional data points are used to train and continually improve the models. Options for the user interface are being considered.
Software is developed to support the acquisition and analysis of images to assess grape yields in four experimental vineyards using smart devices.	•	A prototype system was successfully developed for field testing at the experimental vineyard sites.
Evaluation of yield forecasting software and a prototype smart device for use with a tablet/phone.	•	Maps of shoot density have been automated, based on images acquired using smart devices. These are combined with images of inflorescences and bunches collected in the field, to generate the yield forecasts. The forecasts are being evaluated against best practice manual estimation methods, to assess their accuracy.

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Strategy 6: Improving winery performance
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2016-17 targets	Result	2016-17 achievements
Enhancing yeast and bacterial performance		
The most promising yeast and/or lactic acid bacteria strains from directed evolution trials are evaluated in pilot- and commercial-scale fermentations.	•	Winery-scale fermentations using four lactic acid bacteria trial strains (O. oeni) were evaluated for performance in replicated 50-litre fermentations of Shiraz wine.
A novel wine yeast strain is developed with improved characteristics for red winemaking, through marker- assisted breeding.	•	Novel strains developed in this program have been undergoing trials this year to evaluate varietal and wine style suitability. Interspecific hybrid yeasts have been trialled in high sugar and low temperature fermentations and strains that elevate rose aroma profiles have been evaluated in Chardonnay, Riesling and Pinot Noir.
Knowledge on the effect of commercial fermentation nutrient addition on yeast strain performance is disseminated.	•	Determinations of yeast strain-specific performance have shown that while pre-fermentation juice variables such as free sulfur dioxide and copper concentrations are strong discriminating factors of yeast performance, commercial fermentation nutrients (composed primarily of nitrogen) appear to have equivalent effects on all yeast, improving overall performance. Articles are currently being prepared for industry and academic journals.
Data based on winery scale trials, processes and procedures to enhance malolactic performance and malolactic fermentation efficiency is collected.	•	Trials of regional bacterial isolates continued, with a focus on evaluating the suitability of strains for use in simultaneous inoculation regimes and high sulfur dioxide conditions. Isolates have been trialled in sparkling base and red wine scenarios at multiple sites.
Information is disseminated to sector stakeholders on control strategies and detection methods for brettanomyces yeast in wine.	•	Information on brettanomyces was distributed through presentations at the 16th AWITC and in an article published in the Australian Journal of Grape and Wine Research that reviews a range of control measures that can be used to limit the impact of brettanomyces in the winery.

Strategy 6: Improving winery performance			
2016-17 targets	Result	2016-17 achievements	
Practical guidelines are developed for winery wastewater treatment plant operators, to maximise plant efficiency and reduce the likelihood of microbiology-related plant failures.	•	Guidelines relating to solids management / cleaner production, maintenance and preparation, system monitoring, provision of a healthy microbial environment and contingency planning were communicated to wastewater plant operators.	
A microbial germplasm collection of yeast and bacterial strains is characterised and maintained as a sector resource.	•	The microbial germplasm collection held at the AWRI continues to expand, with new isolates added from AGWA-funded research projects.	
Efficient winery production			
Sensory impact of polysaccharides used to heat- stabilise wines is understood.	•	Descriptive sensory analysis indicated that Sauvignon Blanc wines fined with carrageenan had more tropical fruit characters and a higher viscosity mouthfeel than wines fined conventionally with bentonite. No taints were observed in any wines fined with carrageenan.	
Information on how oxygen exposure in juice and ferments can affect final wine style is made available.	•	A workshop was held at the 16th AWITC, an article was published and individual wineries were supported in their adoption of oxygen management practices. The greatest stylistic differentiation can be achieved in red wines with oxygenation during fermentation, while for white wines the primary benefit appears to be ensuring fermentation efficiency.	
Framework created to develop an activity-based costing tool to allow process efficiency improvements.	•	The database framework and activity-based costing tool was created and populated with existing sector data averages, to establish an initial (core) dataset. The database is ready for data population in consultation with participating wineries.	

Strategy 7: Market access

2016–17 targets	Result	2016–17 achievements	
Market access			
Progress is made on the Regional Comprehensive Economic Partnership Agreement.	•	A draft Wine and Spirits Annex has been provided to DFAT and our preference noted for this to be a separate item rather than included in a specific chapter.	
The Trade Barriers Report is updated twice during the year.	•	This report is continuously updated and shared with our World Wine Trade Group colleagues twice a year.	
DFAT is supplied with a draft model wine standard for possible inclusion as an annex to any future FTAs.	•	DFAT was provided a draft standard for inclusion in the potential FTA with Hong Kong. Submissions were also made in support of an FTA with Indonesia and background material supplied to inform scoping activities towards an eventual agreement with the UK, if and when that country leaves the European Union.	

• Achieved • In progress / partially achieved • Not achieved

Strategy 8: Building capability			
2016-17 targets	Result	2016-17 achievements	
Developing people			
At least 15 members of the grape and wine community commence leadership and personal development training in 2016–17.	•	16 members of the grape and wine community commenced the Future Leaders program in June 2017.	
The capacity of the next generation of researchers is developed through at least 12 scholarships for PhD, Masters and Honours study.	•	7 new postgraduate scholarships were offered and accepted, taking the total number of postgraduate scholars supported by AGWA since July 2015 to 53.	
Support is extended to at least 8 incoming or outgoing scholars.	•	Support for travel was extended to 20 outgoing scholars.	

Strategy 9: Business intelligence and measurement

2016–17 targets	Result	2016–17 achievements		
Business intelligence				
Produce, deliver and communicate region-specific statistics and reports to support business decisions.	•	The Australian wine sector was provided with a wide range of reports and statistics including:		
Produce, deliver and communicate market-specific statistics and reports for the sector that guide business decisions and our investments in marketing and RD&E.	•	 2016 National Vintage Report the inaugural 2016 Small Winemakers Production and Sales Survey Report 2016 Production, Sales and Inventory Report quarterly Export Reports Market Insight reports on key markets such as the UK, the US, Canada, China and Australia regular analysis through the Weekly Market Bulletin. 		
Deliver targeted presentations aimed at increasing the awareness of the global wine sector information that is available.	•	Presentations were delivered at various wine sector forums such as the Murray Valley Winegrowers Information Forum, NSW DPI Chardonnay clonal workshop, NSW DPI Shiraz clonal workshop, Drinks Association Credit Forum, NSW Innovators Forum, Wine Intelligence China Research Workshop, Alternative Varieties Workshop, Asian Cultural Workshop, Export Forum and Regional Roadshows.		
Timely and accurate responses are provided to ad hoc questions.	٠	Over 2000 queries were responded to in a timely and accurate manner.		
Monitoring and evaluation				
75% of stakeholders indicate a high level of satisfaction with the services provided across the business.	•	87% of stakeholders indicated a high level of satisfaction with the services provided across the business.		
CBAs indicate 75% of programs measured achieve a positive return on investment.	•	The aggregated cost-benefit ratio on the selected R&D projects was 2.4 to 1.		

Achieved
 In progress / partially achieved
 Not achieved

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Strategy 10: Extension and adoption				
2016-17 targets	Result	2016–17 achievements		
Extension and adoption				
R&D project assessment criteria includes evaluation of the extension plan and the likelihood of adoption by levy payers.	•	The extension and adoption potential of all R&D project applications submitted in 2016-17 was assessed and this score contributed to the overall ranking of the proposals.		
The Regional Program delivers at least 80% of activities across the 11 regional clusters.	٠	More than 80% of planned activities were delivered by the regional clusters.		
At least 85% of survey respondents who attend workshops provide an overall rating of at least 4 out of 5.	•	46 roadshow workshops and seminars were delivered by the AWRI, attracting 1152 participants. Survey feedback collected at these events demonstrated that 87.1% of participants gave the seminars and workshops an overall rating of 4 out of 5 or higher.		
At least 80% of survey respondents indicate that information provided at workshops is useful.	٠	80.5% of the survey respondents who participated in AWRI roadshow seminars and workshops rated their usefulness at 4 out of 5 or higher.		

Strategy 11: Corporate Affairs and Strategy			
2016-17 targets	Result	2016-17 achievements	
Corporate affairs			
Timely, fit-for-purpose, accessible and appropriately targeted wine sector information and analysis is available to the wine sector through a range of channels.	•	We continued regular communications with the sector and engaged with stakeholders through 73 e-newsletters, 41 media releases and 11 campaign emails. Our monitoring measured 3352 articles about AGWA in print, broadcast and online media.	
Sector engagement			
Engage in effective two-way dialogue and understanding with national, state and regional representative bodies.	•	We delivered a program of engagement activities across 2016–17, including state and regional wine strategy development.	
Increase sector and stakeholder awareness of our activities and outcomes from benchmark in 2015.			

Achieved
 In progress / partially achieved
 Not achieved

Strategy	12:	Corporate	services
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2016-17 targets	Result	2016-17 achievements
Finance and administration		
Balance of reserves at 30 June 2017 in adherence to reserves policy.	•	Balance of reserves at 30 June of \$13.1 were above the \$3 million minimum requirement.
Reserves greater than \$3 million at 30 June 2017.		
All commercial contracts and arrangements are prepared with considered and detailed statements of the parties' intentions and commitments, and reviewed by legal counsel prior to being executed.	•	The parties' intentions were clearly set out in each commercial contract and arrangement and staff training was delivered by the General Counsel to ensure best practice in this area. All commercial contracts were considered by the General Counsel prior to being executed.
Regular dissemination of single policies and procedures where adherence is identified as an issue to highlight the importance of compliance.		
People and culture		
Integrated internal communications are used to build engagement and disseminate information.	•	We share our values, what's happening and what's important using a variety of internal communications tools, including face-to-face and video updates, team and one-on-one meetings, social media and email.
Personal development plans are developed and actioned.	٠	Personal development plans were developed and a wide range of personal development activities were funded.
Zero incidences of non-compliance with all statutory requirements.	٠	All statutory requirements were complied with.
ICT		
In 2016–17, we will complete the rollout of Office 365 and deliver a new web presence.	•	The new web presence went live early 2017 and continues to evolve in look, feel and content. This has successfully integrated a range of web sites into one. The migration to Office 365 for mail services and collaboration through messaging has been completed globally.
The results of a pilot will be incorporated in the national release of a data collection system.	•	Work continues on the development of the system with research into technical capability for determining vineyards from satellite images and ongoing work with regions and states to refine the data collection method.
We will maintain ICT systems for our team.	•	ICT systems maintenance is continually improving the stability and availability of services to internal and external users. One out-of-hours unplanned outage occurred and was managed well, with a roll over to our redundancy systems completed within the expected timeframe.

Achieved
 In progress / partially achieved
 Not achieved



Wine Australia for Australian Wine

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