

Grape and Wine Research and Development Corporation

**5 YEAR RESEARCH & DEVELOPMENT PLAN
2012-2017**

Submission by
WINEMAKERS' FEDERATION OF AUSTRALIA
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1. INTRODUCTION

Research, development, extension and innovation are fundamental to a successful Australian wine sector and we have been well served by:

- world-class institutions such as the AWRI and CSIRO, State government research agencies and a vibrant university sector
- a framework under which one central body, the GWRDC, allocates funding and coordinates project delivery based on the needs and priorities of the sector and the Australian Government.

Central to this process is the wine sector taking an active role in determining research directions to maximise its short, medium and long-term objectives.

In 2006, WFA, WGGGA and GWRDC developed a Research Prospectus to inform investment decisions. It stated that:

“Research must be better integrated across the whole supply chain and the results better communicated. There is no commercial gain in making the best wine in the world if consumers do not want to buy it at a profitable price, so industry R&D must emphasize the need to understand and meet consumer demands. This is essential if the industry is to continue to grow and prosper, with benefits flowing to all parts of it.”

The critical goals identified at this time were:

- understanding and meeting consumer preferences
- ensuring consumer understanding that Australian wines are excellent at every price point
- clearly defining and communicating the Australian unique sales proposition
- improving profitability throughout the supply chain
- ensuring capacity to meet grape and wine specifications to provide consumer surety and achieve higher prices
- using accurate forecasts of market requirements to manage production (quantity and styles)
- preserving and enhancing quality at all stages of the supply chain, and
- improving and demonstrating environmental sustainability.

Since then, the sector’s thinking has advanced substantially and a second prospectus released in December 2009 (entitled *Innovation driving sustainable success*) increased emphasis on value chains, with research targeted toward efficiency and value adding at all steps of the value chain to enhance business profitability.

This submission, prepared by WFA on behalf of the nation’s wine producers, builds on the work carried out in the preparation of that prospectus and makes specific recommendations for consideration by the GWRDC. It addresses three key areas: the overall strategy that will underpin the five-year plan, related policy issues and the key priorities identified by WFA members.

2. BACKGROUND AND CONTEXT

2.1 National Strategic Framework

The Primary Industries Ministerial Council has called for the development of national strategic frameworks for primary industries' RD&E. The aim is to ensure Australia's capacities are aligned with future sector needs, to initiate collaboration that strengthens Australia's international position and to ensure that RD&E delivery is both more efficient and effective. Strategic frameworks are being developed for each of Australia's major primary industries and for cross-sectorial collaboration.

The driving forces behind this initiative were decisions made by State jurisdictions not to directly invest as much in research and extension as previously and to focus on sectors that offer maximum returns to their jurisdictions.

At the same time, the Australian Government has been keen for agricultural industries to collaborate on research projects so that limited research dollars can have maximum effect. Many of the issues we face in the wine sector are shared by other industries: understanding and serving international consumers, managing our environment in a responsible manner for future generations, knowledge about the value chain and consumer preferences, and adding value wherever possible to ensure a positive farm gate return. Cross-sectorial collaboration in areas such as climate change, water usage and bio-security are good examples of where synergies can be made.

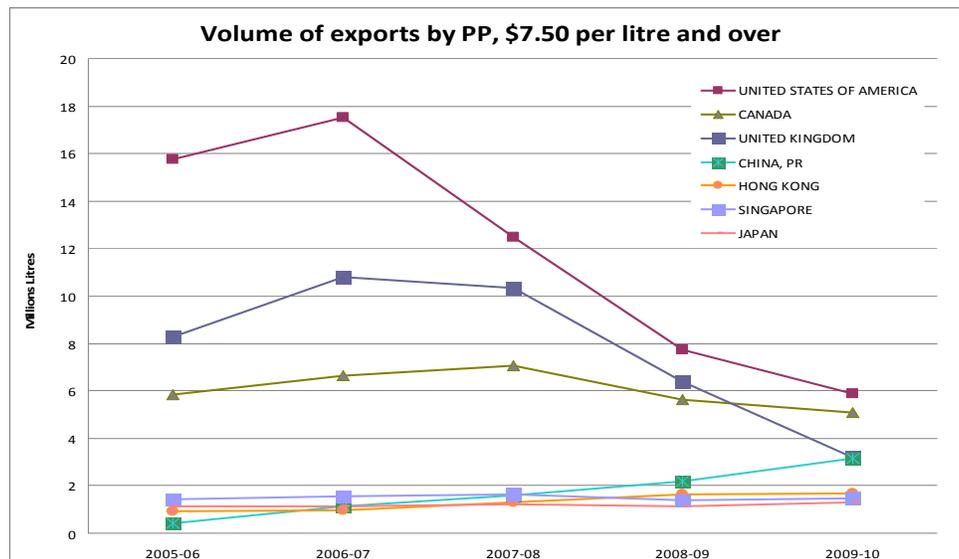
The development of this strategic framework has been led by the GWRDC, WFA and Primary Industries and Resources South Australia (PIRSA) with support from CSIRO and the State Governments of New South Wales and Victoria. The structure is designed to allow a better flow of communication between the sector, funding bodies and research and extension providers.

2.2 State of the industry

The Australian wine sector in 2011 finds itself in a very different situation from that which characterized its major expansion phase up to about 2005:

- competitiveness in global markets has declined dramatically due to a combination of exchange rate fluctuations, competitor countries' enhanced performance and erosion of the Australian wine brand reputation.
- demand in export markets has fallen by \$1 billion in sales value as a consequence of this change in competitiveness.
- demand in the domestic market has been strongly contested by the dramatic increase in the share of imports and margins eroded by the growth in retailers private brands.
- supply factors have exacerbated the loss of profitability by grapegrowers and wine brand owners.
- the determinants of this adverse environment are unlikely to be reversed in the next five years.

One of the most disturbing trends, because it is the reverse of the objective espoused in *Directions to 2025*, has been the dramatic decline in the export sales of higher value wines. The graph below illustrates the decline over the last 5 years of export volumes over \$7.50 per litre in each of Australia's major markets with the exception of China.



One of the major challenges to the industry over the next decade is to reverse that trend, and to do so in a competitive environment where Australian wine starts from a substantial cost disadvantage in the production of high quality branded wine.

Some of the factors contributing to that cost disadvantage, and that are assumed in this submission to shape the future outlook for the Australian wine sector include:

- AUD exchange rate will remain well above its historical average driven by terms of trade (commodity and energy boom) and capital inflows
 - Australian wine priced out of some current markets and price segments
 - cost disadvantage of small producers will limit their global market opportunity to small fragmented niches, hence limits scope for volume growth
- Imports share of the domestic market will continue to increase as will the incidence of overseas bottling of exports
 - loss of value adding in Australia will threaten wine sector support infrastructure and services, thereby increasing costs and reducing capability
- Frugality will have a permanent influence on consumer purchase behaviour and will encourage “trading down” to a greater extent
 - this tendency will counter the previous dominant “trading up” trend
- Capital will become difficult to access and more expensive
 - it will become increasingly difficult to maintain the current degree of capital intensity of wine businesses
- Energy and water costs will increase faster than inflation generally
- Retail concentration and market power will continue to intensify
- Social responsibility, environmental sustainability, health
 - community expectations of social responsibility performance will rise and Governments will respond with further regulation
- Weather conditions will become more variable, extreme conditions more frequent
 - requiring better responsiveness and adaptability from grape growers
- Production of commodity grapes at below the sustainable cost of production will remain a feature of the wine sector
 - supporting opportunistic traders whose business models and commercial interest will be at odds with the rest of the industry

2.3 Current initiatives

A Wine Restructuring Action Agenda was launched in November 2009 (by WFA, WGGA, GWRDC and the then AWBC) as a first response to the difficult position the sector now finds itself in. Robust and practical research is needed to underpin this ongoing restructuring agenda and enable the sector to rebuild itself and prosper in the new environment.

At the same time, new solutions are needed for the new challenges confronting wine businesses right through the supply chain. The sector needs to aspire to *reclaim leadership in consumer relevance and consumer value for all occasions; innovate world leading lean production systems to deliver improved competitiveness; achieve the ranking as the most accessible luxury wine in Asian markets and expand into new markets, either geographic, channel or price segment based.*

In order to drive such a focus and outcome for the industry, later this year WFA will release an industry statement outlining a clear industry strategy that provides a context on future opportunities and challenges that could be amenable to value creation through investment in RD&E. We will then engage in processes to gain industry buy-in to the strategy's implementation, which will entail greater alignment of all industry sector agendas and priorities. Without such a process it becomes very difficult to develop a shared purpose for research programs or to agree priorities for research activities.

3. STRATEGIC ISSUES

3.1 Role of innovation and RD&E investment in restructuring

The restructuring imperative dictates that the focus of the wine sector's innovation efforts needs to be on rapidly improving competitiveness and on accessing new sources of value growth. This entails:

- specifying market opportunities (geographies, channels, price segments) to replace existing unprofitable markets
- identifying product innovation that unlocks new demand or taps unrealized value
- defining re-engineering changes in winemaking processes and practices that can achieve same or superior quality at lower cost, especially lower capital costs per litre of wine produced
- specifying vineyard parameters and practices that can drive quality enhancements at the same time as yield improvement. Also codifying best practice for vineyard economic and environmental sustainability, with defined benchmark metrics

The scope and degree of innovation required to formulate and implement this transformational change extends beyond the boundaries of current wine sector RD&E programs and their timelines. Nevertheless, RD&E has a crucial role to play and in order to do so will require unprecedented realignment of its priorities to the wine sector's restructuring imperatives.

Consequently it is industry's responsibility to request RD&E investment that will achieve a specified objective or will solve a defined problem, rather than rely on researchers for their direction.

An example of a relevant industry objective would be to reduce the cost base for the production of high quality wine ("affordable fine wine") by 20% or 25% to compensate in part for the up to 40% loss of cost competitiveness due to the strengthening of the Australian dollar. Although this is only one dimension of the solution to Australian wine's poor penetration of the higher priced segments in export markets, it is necessary because marketing alone cannot, at least in the medium term, bridge such a gap in competitiveness.

Specification of such an explicit target for problem solving would galvanise research, encourage a multidisciplinary approach and provide a focus on the most relevant parts of the value chain, resulting in the highest return on the RD&E investment.

A further illustration of how specific industry objectives might be identified and addressed is the definition of **Flagship Projects** that enable focus of long-term strategic RD&E effort on critical value chain performance improvements. For example, a designated **Winery of the Future** Flagship Project would specify the physical design, process technologies, capital investment, operating protocols and so on that would enable such a winery to perform at lower capital cost, lower operating cost, higher quality potential, lower environmental footprint per litre of wine produced. The adoption of visionary targets for the performance parameters would motivate some transformational innovation as distinct from incremental innovation around established technologies and processes.

The foregoing understanding suggests a shift in emphasis away from **production technical efficiency to business effectiveness performance improvements**. Technical efficiency improvements may not translate into any material impact on business sustainable profitability, in which case the corresponding research investment would be difficult to justify.

3.2 Change in project assessment

Given the wide variety of research required across the value chain, a skills-based GWRDC Board is essential for final determination of priorities and resource allocation. However, a process that engaged third-party expertise would also assist the Board to deal with the complexity and range of research objectives. In order to establish an appropriate mechanism, a transparent framework to prioritise projects is required.

Projects should be judged on their contribution to sustainable business value outcomes and their priority assessed according to an estimate of **realised value**, which is a function of potential value created **and the likely speed of take-up**. To illustrate, a RD&E result potentially worth \$100 million with a 5-year take-up rate of 10% has an inferior priority ranking to a \$20 million potential value result with a 90% 5-year take up.

This value assessment should become the process for determining eligible RD&E projects and their relative priority. It is acknowledged that the longer-term strategic projects (so called “blue sky research”) require additional considerations and criteria in their assessment, with the key differences being an ability to quantify value creation and the time horizon for realization of that value.

The value assessment framework should include the following:

1. **Relevance**

Industry to define where research is required to solve an industry sector problem or identify an industry sector opportunity:

- specification into research briefs required
- this is a new process that is purely an industry responsibility
- necessary to mobilize the expertise and commercial nous required (forward looking business strategy, technical expertise in process and operations, marketing strategy, value chain knowledge, financial and risk analysis).

2. **Value test**

Each research proposal will have to pass the value test: it is capable of increasing value in the wine sector; it is feasible to implement; and there is a financial incentive to adopt it (eg commercial payback periods).

3. **Value Ranking**

The priority of each project will be determined by ranking the estimated value created.

4. Application

The results of the research will be integrated with existing bodies of knowledge or practice to formulate updated or new solutions that can be formatted as applications.

5. Adoption

The extension process has to be user friendly in terms of demonstrating relevance and benefit, convenient access and practical application. An extension component should be built into all research projects. It is not presumed that extension will always be undertaken by the research agency. In many cases it would be anticipated that the GWRDC would engage either internal or third party extension strategies. Extension should ensure research is business-ready; and include a strategy for dissemination of business-ready research.

Consequently four fundamental changes are required in existing RD&E process arrangements to optimise the effectiveness of the wine sector's RD&E investment:

- Fully articulate the industry strategy and scope - what are the key parts of the value chain that will provide the greatest potential for sector advancement.
- Research briefs that specify the problem to be solved and target outcomes sought would become the basis for seeking researcher funding submissions:
 - to be developed by the wine sector for the designated projects within each of the GWRDC programs
 - value test and ranking to be included in this process.
- Research findings from funded projects to be integrated into the existing body of knowledge, practices or protocols to constitute a best practice reference:
 - a process of interpretation is required to translate the findings of each research project into accessible and implementable applications for industry users;
 - current technology may enable some of these applications to be made available as downloadable "apps".
- Extension activities need to be coordinated by reference to the preferences of the target audience:
 - provide context and subject linkage;
 - coordinate all industry extension providers and all content to optimize timing convenience for users;
 - ensure efficiency of delivery.

4. POLICY ISSUES

4.1 Wine sector priorities

The wine sector's research priorities must be clearly stated and they must meet national and regional needs across the entire supply chain.

Given the GWRDC's decision to no longer support the Strategic Directions Group model, it is recommended that GWRDC receive strategic advice from key stakeholders during the preparation of each Five Year Plan and that WFA and WGGGA contribute to GWRDC's annual operations plan. As mentioned previously, it is critical that an all of sector strategy be developed to inform the research process and the operations of government, Wine Australia, WFA and WGGGA.

WFA has a number of policies relating to R&D capacity and capability extension, intellectual property, innovation, priority setting and reviewed these to inform the preparation of this submission.

4.2 Capability and capacity support

Research requires a mix of tactical research and long-term strategic research and needs to take into account capability and capacity maintenance and development.

The GWRDC invests largely in four research providers – AWRI, CSIRO, The University of Adelaide (likely to include SARDI) and NWGIC. At current levels of investment, and taking into account rapid rises in research costs, long-term funding to these institutions over the life of the next Five Year Plan would rapidly consume most of the GWRDC funding available each year.

WFA recognises that core capability funding of research facilities is necessary to maintain capacity and capability. However, the current level of funding for capability and long-term strategic research significantly impacts on the GWRDC ability to fund alternative research, minimises flexibility and leaves very little resource to redeploy to new priorities. The objectives outlined in this submission will not be fulfilled if existing investment allocations are not altered dramatically.

We also need to recognise that the current mix of research skills may not be what is required into the future. In fact, in moving to more of a problem-solving approach across the entire value chain, it is evident that there will be a shift in the research skill mix towards a wider range of skills and with greater utilisation of multidisciplinary teams. We do need to retain the institutional capability to commission and manage research projects; to retain an overview of the relevant fields of research; and to provide some technical problem solving and rapid response capacity. However this role could possibly be met with fewer dedicated inhouse researchers and increased contracting out to global networks in some of the specialist viticulture and oenology fields.

WFA believes that an industry-wide review of core capability requirements should be conducted, which will then be matched to providers' capabilities. For example, GWRDC will shortly be reviewing the AWRI's seven-year plan, and in the context of that review a capability audit of AWRI should be undertaken to identify the core capabilities required by industry. This will then ensure that funding for these can be maintained.

The timing of all core capability funding should be aligned to GWRDC's Five Year Plans. Funding allocation must take into account five areas:

- GWRDC administration
- GWRDC operational + extension projects
- Core capability funding
- Longer-term, strategic contestable funding (5-15 year projects)
- Shorter-term contestable funding (1-3 year projects)

Core capability funding should cover maintenance of capabilities, as well as instruments and other capital investments for organisations that provide unique services to industry that cannot be provided by others on a contestable basis. (Examples of core capabilities are AWRI's Technical Services, maintenance of germplasm, human assets and the capability to respond to crises.)

Cost recovery is also a consideration in determining the resources dedicated to service provision, with the emphasis on pricing as a rationing device rather than revenue raising per se. For example it is questionable whether a **no cost universal access** technical problem solving service can be justified in an environment of constrained funding.

Longer-term, strategic initiatives must still be undertaken within a framework that supports the objectives of the GWRDC 5 Year Planning framework.

Accordingly, all long-term programs should have periodic reviews and 'cut and run' trigger points that support discontinuation of programs if:

- program outcomes are unlikely to be realized; or
- GWRDC investment priorities change

While core capability funding of key research facilities is necessary to maintain capacity, firm numbers cannot be allocated in the absence of an assessment of industry's core capability requirements. However, the following funding allocation is proposed in the interim:

	<u>Option 1</u>
GWRDC administration	up to 10%
GWRDC operational + extension projects	up to 15%
Core capability funding	up to 30%
Longer-term, strategic contestable funding	up to 20%
Shorter-term contestable funding	around 25%

5. RESEARCH PRIORITIES

The emphasis on R&D should be on **business effectiveness performance improvements** right through the value chain and research priorities need to be informed by a single industry vision and strategy which links in with the activities undertaken by the sector and its industry led bodies – Wine Australia, WGGGA and WFA. Different bodies and individuals have different priorities.

For GWRDC to adequately determine where the best value lies in research expenditure it needs to identify critical elements of the different dimensions of the value chain (financial, logistics, marketing, regulations, consumers, community) that add value to wine for the consumer or impose costs in the production cycle (from cradle to grave), as well as where investment can generate high returns.

A summary of WFA's proposed refocusing agenda (Appendix 2) can be found on page 17.

Specific areas requiring a greater share of RD&E spend are:

- assessment for performance improvement through measurement of all aspects of the value chain as a means of driving quality and cost improvement
- product offer innovation, including packaging, as a means of differentiation
- production systems and processes and whole-of-supply-chain approaches to reduce capital and operating costs whilst enhancing quality potentials
- route-to-market alternatives, including logistics, acknowledging distributor and retail consolidation
- market intelligence and country competitor analysis, as a means of targeting marketing activity
- risk assessment initiatives designed to influence more sustainable investment decisions

5.1 Measurement and metrics

The ability to assess performance against standards (such as best practice) or against competitors has been recognised as one of the strongest motivators for businesses to embrace change, therefore prompting uptake of new technologies and/or improved methods to improve performance.

Measurement and performance assessment can be applied to all aspects of the wine sector including:

- Vineyards and grape growing practices
- Environmental impacts such as water use, energy efficiency, emissions
- Wine production and packaging
- Marketing and sales
- Financials
- Competitiveness against other producer countries

Although individual producers can undertake benchmarking on their own initiative, there are considerable benefits from specifying sector-wide best-practice benchmarks. This can be a powerful driver of best-practice uptake, thereby capturing the latent benefit of the RD&E investment that has generated the best practice standard.

While much of the best-practice knowledge in grape growing and wine production areas already exists, it has not been codified in easily accessible, calibrated and quantified standards suitable for benchmarking applications. In other areas, such as environmental impacts, marketing/sales and financials, there are substantial knowledge gaps in what constitutes best practice performance.

In addition, measurement of current performance on each of the sector benchmark parameters falls short of what is required. Existing ad hoc data needs to be adapted and formalised, and supplemented where necessary, to become the recognised performance measures.

5.2 Foundation data

Foundation data enables more effective decision making at every level of the wine sector. It is more efficient to provide such data centrally rather than every producer, region, State and national organisation investing in collecting and compiling the same data. Not only would the latter situation generate costs for the data collectors, it would impose an intolerable time and cost burden on survey respondents. The inevitable outcome would be less reliable data at far higher cost. The resulting fragmented proprietary data would also destroy a shared platform for industry planning, debate and performance measurement.

Consequently there is a high return from investment in category level foundation data because it focuses and frames all business decisions. It also constitutes an invaluable asset for category planning and reporting, without which many individual research projects would have to collect data on a one off basis.

5.3 Leadership

The GWRDC has made a substantial investment in industry leadership over the last five years. This investment is an important initiative as the industry tackles restructuring and generational change. A continuation of these initiatives is strongly supported.

5.4 Value chain research

Appendix 1 summarises input from WFA committees in relation to value-chain research requirements. These insights are offered as a collective view of key stakeholders with specialist capabilities. They have not been subjected to the processes recommended in this submission, and accordingly, should not be interpreted as a prioritized list of objectives. Some attempt at prioritising activity across the value-chain is offered below.

Viticulture

The ability to undertake relevant viticultural research and leverage research capability from core providers in Australia and offshore remains important. In the context of the framework identified above, the following priorities exist:

- Development of real-time vineyard performance monitoring. Research in this field would aid the objectives of quality and productivity improvements and potentially provide key links to the commercial aspirations to reward grapes grown to specification.
- Objective and affordable maturity, purity and condition measurements for grapes. This remains a priority research field where advances would potentially lead to dramatic quality improvements and greater commercial certainty. This program would suit a collaborative research agenda with industry commercial operators.
- Germplasms. An investment in expanding and cleaning up the Australian germplasm collections and the links with other international breeding and evaluation programs will support a range of initiatives from new varieties to drought resistant rootstocks.
- Biosecurity. Investment in the systems and capability to monitor biosecurity risks, and current research.

Winemaking

Researchable questions in winemaking and process engineering abound. In our view, the emphasis should be on applied research that delivers productivity improvements in a short time frame. The key exception would be the **Winery of the Future** Flagship Project. International collaboration is strongly supported and current initiatives in collaboration are acknowledged. Recommended priorities are:

- process engineering initiatives targeted at reducing costs, improving winery efficiency and lowering energy inputs
- maintain base level capability in fundamental oenological research, with an emphasis on collaborations
- retain the industry support technical services framework commitment, but develop a user-pays model that reflects the relativity between individual commercial risk and industry-wide risk. Within this framework, continue to undertake applied research in areas such as smoke taint, and residue measurements
- research into low alcohol wines
- research extension using existing proven models

Environment

Adaptation, research extension and programs aimed at measuring and improving environmental performance are the priority. Research in support of informed policy development is also required:

- a shift in emphasis on climate change research to a focus on adaptation and communication. Analysis of impacts and temperature change scenarios is seen as a diminishing-return endeavour
- international analysis of market-based or government- regulated environmental performance developments and expectations in support of industry and enterprise environmental assurance programs
- development of environmental performance benchmarks at the national and regional level in support of continuous improvement programs
- analysis of emission mitigation opportunities, ideally in collaboration with other stakeholders

Marketing

Arguably there has been a long-term imbalance between the application of RD&E to the demand versus supply dimensions of the wine sector. However it is necessary to distinguish between marketing that is specific to an individual producer or brand and marketing of Australian wine generally (the Australian category). Marketing of the former is the responsibility of the brand owner, whereas the latter justifies, and will achieve the best results from, a sector-wide commitment.

Furthermore, category marketing remains the role of Wine Australia and the funding that is mobilized via its levies and programs. The core role of R&D relates to researchable questions in support of the broader marketing agenda.

The elements of marketing that require an R&D investment are:

- Market intelligence
 - ▣ market profile, wine penetration, trade structure, consumer preferences
 - ▣ sales volume/value by geographies, price points, channels
- Country of origin competitor analysis
 - ▣ market shares
 - ▣ market access
 - ▣ competitive advantages
- Route to market
 - ▣ retailer power and value chain redistribution
 - ▣ logistics efficiency
 - ▣ importer and distribution structure of the market; importer capabilities; importer country of origin portfolio profile; Australian wine gaps in importer portfolios; classification methodology; and self administered assessment tool for new entrant Australian wine export offerings for key developed markets.
- Product innovation
 - ▣ sensory testing
 - ▣ packaging innovation
 - ▣ benefits of quality assurance labeling
- Consumer attitudes and behaviours with wine
 - ▣ wine and public health social impacts in the context of the alcohol beverage category

The benefits that could accrue from this RD&E investment in marketing include a more targeted marketing effort, more value-chain capture, more competitive and differentiated products, superior market selection, better consumer preference matching, lower market information costs to all individual producers, stronger alignment of category marketing efforts.

A critical component of a targeted research program in support of category marketing objectives is a framework that agrees strategy, direction and resource allocation. It is strongly recommended that Wine Australia and the GWRDC establish new frameworks for these investments, as existing mechanisms have considerable shortfalls.

Alcohol and health

The policy framework around “risky” consumption is advancing rapidly, as is the research allocated towards these endeavours. However, significant gaps remain, specifically the relationship between patterns and population based policy measures and the respective impacts at community, demographic and specific risk category level. Furthermore, specific analysis of the role of wine in these broader contexts is required to inform industry and government strategy and policy.

Priorities include:

- emphasis on epidemiological research and its interpretation to answer the question of ‘who is drinking at risky levels’. This would capture age and gender data for respective alcohol types at a minimum
- analysis to inform the policy agenda in support of reducing risky consumption
- continuation of the analytical and overview capability at the AWRI, including an investment in collating and critiquing research.

Trade and market access

International trade reform offers continued upside for Australian wine exports. However, the increasing trend towards traceability of inputs, driven by governments, consumers and retailers, poses potential market access hazards. Furthermore, the highly regulated nature of wine, particularly in traditional European producing countries poses additional hazards as these countries have substantial influence in international policy-setting fora such as the OIV and WTO.

The priorities include:

- investment in rapid measurement capability for traceability issues and development of measurement protocols
- periodic industry-wide traceability measurement for potential market risk
- capability investment in technical input for compliance, trade reform and market access negotiations in international fora, particularly the OIV.

APPENDIX 1: Summary of WFA Committee input

Improve Viticulture efficiency and reduce manpower

- Develop robotic equipment for future activities when labor is short and \$ savings
- Non-GMO and GMOs for optimised targeted flavours (eg, Sauvignon Blanc)
- Develop recycling/reuse strategies for viticulture, eg, trellis systems
- Process grapes in the field – only bring juice to wineries

Enhanced winemaking

- Innovation vs. tradition – eg, lack of use of innovation in maceration of grapes for red winemaking (thermo-vinification, ultrasound, pulsed light) – this would interact with in-field grape processing
- Fermentation efficiency/optimisation of flavour impact of fermentation – continue the science
- Wine stability – effect of UV to sterilise
- Improved efficiency to cold stabilise
- Rapid analysis - industry needs a better (fast and cheap) method for SO₂ analysis

Packaging/Distribution

- Study the effect of temperature on wine so we know what is critical, important and not important – leads to efficiency gains. Promote passive refrigeration.
- Study the effect of Dissolved Oxygen on wine so we know what is critical, important, not important – leads to efficiency gains
- New packaging innovations – eg, new polymers

Industry Resource management

- Alternative uses for grapes;
- Better understanding of industry business cycles – drivers
- Scenario planning – track inputs leading to successes

Alcohol and Health

In recent times the Australian wine industry has been reluctant to support research into what it refers to as '*Wine & Health*'. As a result, all research related to the biology, molecular biology, biochemistry, physiology, epidemiology and other scientific studies, which is identified as carrying health implications, is viewed with suspicion by the industry; including those research projects which might potentially qualify for GWRDC funding. It is seen as carrying the political risks of simply being viewed by the broader community as identified above.

The industry has recognized the importance of addressing the role of wine in alcohol abuse but is constrained in policy formulation by the deficiencies in evidence about the incidence of abuse in wine consumption behaviour and therefore the most effective policy responses to address it.

On the research side, the following areas are of interest:

- the appropriateness of research into physiological, chemical, biological and behavioural impacts of the consumption of wine.
- terminology in describing any aspect of the biology, molecular biology, biochemistry, physiology, epidemiology and other scientific investigations, undertaken in relation to wine
- the correct lexicon of usage around this issue, which probably needs to be done by an industry-based process.

- Societal studies in addition to the traditional epidemiological studies focused on 'harm' that seek to identify underlying causes
- Research priorities – by way of example, some research issues that may be of interest include:
 - allergenic N-glycans from plant and invertebrate sources as well as other possible wine allergens needs further study
 - impact of alcohol abuse on pancreatic function - and endocrine control mechanisms generally
 - likewise for the human immune and inflammatory systems

Environment issues

- Benchmarking Whole of Life Packaging Costs
- Water use optimization
 - evaluate opportunities for better (targeted) delivery of vineyard water needs such as through the use of remote sensing
 - further development of knowledge on water efficient grape varieties and clones
 - investigate opportunities for low energy irrigation systems, including re-engineering and the use of alternative energy to reduce pumping costs and carbon footprint associated with irrigation.
 - efficient and effective water use in winemaking and packaging
 - better understand the relationships between variety, grape yield, irrigation method, vineyard area, fruit quality and financial return
- Land and biodiversity stewardship
 - the development and refinement of activities and property management approaches which protect or enhance the status of resources (such as soil, water and natural values) at the property and wine region scale
 - identify wine-region specific biodiversity and land stewardship goals and opportunities, such as specific actions to protect threatened species and contribute to landscape scale efforts

The impact of climate change on the sector

- Varieties/GMOs that will be suitable under climate change conditions and market implications
- Adaptation techniques and capacities are understood
- Regional viability assessment (severe weather events, water availability and needs, grape quality and disease pressure, smoke)
- Tools to address the impacts of carbon reduction measures such as regulations, taxes and market schemes on the sector
- Investigation of emissions mitigation opportunities in the vineyard-winemaking system, including fermentation, wastewater and nitrogen fertiliser emissions

Energy use optimisation, alternative energy and efficiency enhancing technology

- Alternative sources of energy
- Tools to measure energy usage
- Efficiencies through technology

Waste reduction and management

- Transfer of knowledge from other industries to wine and grape sector
- CCA post waste reduction (new technologies?)
- Re-use and cost recovery opportunities from waste streams

Communication and extension that improves environmental performance

- Understand retailer and consumer needs, interests and concerns regarding wine environmental stewardship
- Understand barriers to Entwine membership and likely methods to remove them

Compliance and Trade

The integrity of the wine supply chain is currently protected through the sectoral label integrity programme administered by Wine Australia. This program should, however, be regarded as just one component, albeit a critical one, of the industry's efforts to ensure the safety, quality and integrity of its products throughout the production and distribution cycle.

This programme could be augmented through the development and introduction of:

- new wine safety monitoring tools- new biological and chemical sensing technologies
- wine supply chain communication systems
- contaminant databases enabling rapid identification
- new transportation, storage and distribution mechanisms

Innovative analysis tools could be hand held or highly mobile and sensing technologies could be package based. In particular, to control wine substitution and fraud (activities becoming more prevalent as wine is increasingly being traded in embryonic and emerging markets) the development of chemical 'fingerprints' could assist in the rapid identification and investigation of counterfeiting allegations.

On a related matter, research funds could also be allocated towards ensuring the identity of grapevine varieties recently introduced to the Australian market, in order to avoid another "albarino" scenario.

Maintenance of Grapevine germplasm collections

Grapevine germplasm collections are a critically important resource for the Australian grape industries. The CSIRO and SARDI collections are the largest and most important of the collections operated and controlled by government agencies in Australia. These collections until now have served a dual purpose, namely a resource for (1) research and (2) for industry.

There is merit in bringing the collections under a single umbrella, either (a) as they exist or (b) in fused form, to create an "Australian" grapevine germplasm collection. This collection would be unique and distinguished from other collections in that it would move towards being a verified collection with respect to varietal identity. Advanced DNA typing methodology in the form of SNPs markers would be employed in the verification process. Such a collection would likely result in requests for inclusion of varieties currently not held in the CSIRO or SARDI collections to be verified and included in the 'Australian' collection, which would provide a foundation to support the label integrity program. Key benefits of an 'Australian' collection are:

- focus on variety integrity, with the validated collection built up over time
- resource for scientists and industry
- preservation of existing genetic diversity within Australia
- formal repository for future germplasm importations

Australian Wine RD&E 2012 – 2017: Summary of Refocus Agenda

RD&E Issue	From	To
Purpose		
Vision reference (context)	Growth	Restructuring
Innovation scope (emphasis)	Incremental	Game changing
Mission focus	Supply chain <ul style="list-style-type: none"> ▣ production efficiencies 	Value chain <ul style="list-style-type: none"> ▣ value accretion
Objective	Knowledge acquisition and dissemination	Problem solving
Time horizon	Mix of short term applied and longer term pure research	80% of investment in projects to pay off in the 5 year plan horizon
Stakeholder engagement	Technical expertise dominates wine sector input, strong research provider engagement	Wine sector strategic business expertise fully engaged
Specific R&D Issues		
Information	Range of data sources	Sector reports on key supply and demand variables relevant to business decisions and sector planning <ul style="list-style-type: none"> ▣ foundation data ▣ user friendly interpretation
Viticulture	Technical parameters of grape growing	Vineyard improvement
Wine production	Efficiency, risk and quality improvements	Redesign of production processes to achieve <ul style="list-style-type: none"> ▣ productivity targets ▣ environmental standards targets ▣ lower capital intensity
Competitors (Country of Origin)	Minimal effort <ul style="list-style-type: none"> ▣ China market was a first 	Relative performance rankings and competitive advantage factors
Consumer focus	Consumer preferences	Market opportunities to generate increased value returns to producers <ul style="list-style-type: none"> ▣ new markets ▣ new products ▣ new product benefits
Route to market	Minimal effort	Alternative distribution and retail route to market strategies to counter concentration and retailer market power
Marketing (category)	Limited market intelligence	Comprehensive market intelligence by price point, sales channels, brand reputation etc.
Priorities	Not specified	Reducing costs per quality category Increasing consumer valued differentiation Penetrating new markets Demonstrate how innovation can counter declining competitiveness (change agent role)
R&D Program Management		
Project proposals initiation	Research community	Wine sector briefs
Research outcomes	Stand alone reporting of research results	Integration into body of knowledge and practice
Development outcomes	Documentation of results	Creation of applications
Performance measurement of sector against best practice in sustainability dimensions of economic, environment, social.	Best practice not specified, measurement not feasible	Benchmarking against best practice across all stages in the value chain, for three dimensions of sustainability
Research capability	Block funding	Centres of Excellence networked globally, core competency but more outsourced research
Delivery		
Extension	Provider push perspective <ul style="list-style-type: none"> ▣ each function separate ▣ each provider independent 	User pull perspective <ul style="list-style-type: none"> ▣ coordination across all functions ▣ coordination of all industry providers
Accountability		
Alignment to industry sector priorities	Various Committees <ul style="list-style-type: none"> ▣ too diffuse and no agreed imprimatur 	Industry sector targets articulated, research briefs documented
Return on investment	Cost benefit assessment	Cost benefit assessment <ul style="list-style-type: none"> ▣ higher weighting on degree of application/ takeup
Government research priorities	Consistency achieved	Consistency achieved