

Strategy: Research and technology innovation and transfer

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The complete strategy can be downloaded from www.winetech.co.za.

The core focus of this strategy is the establishment of problem solving, market directed and socially and environmentally responsible technology invention, commercial development and transfer systems.

PROGRAMME SCOPE

The long-term global competitiveness of the South African wine industry depends critically on its ability to learn and innovate faster than its competitors. This implies that the industry's research and technology invention and commercial transfer programme should be clearly focused on the kind of activities that hold the best promise in this aspect and be based on four principles, viz.:

- A well-designed, well-financed and well-executed programme of research and technology development and transfer is absolutely essential for building innovativeness and international competitiveness in the South African wine industry.
- In view of South Africa's relative limited research capacity the motto "adapt – not invent" should partially drive the application of this programme.
- The programme should cover all the links in the wine industry's value chain, from terroir and plant material selection, via viticulture practice, to wine making and cellar practice, logistics, economic analysis, etc.
- The programme must be market-directed, but should also support national policy towards R&TD in agriculture and industry development, in particular appropriate technology systems to integrate new farmers into the wine industry.

This programme should broaden and integrate its almost exclusive focus on the wine farm and the cellar, towards (and with) other value chain activities in the wine industry i.e. brandy and concentrates and also focus on aspects related to human resources development and logistics. It places a strong emphasis on the operational application of wine industry R&TD. All of this implies enhancing inventiveness and innovation in the wine industry through technology transfer. This will be achieved through initiatives to:

- enhance South Africa's global competitiveness;
- enhance natural resource sustainability in the winelands;
- enhance financial sustainability of producers by developing best practice technologies;
- improve the quality of life of all who are associated with the industry;

- empower resource poor persons in order to increase their effective participation in the industry through improved access to appropriate technology;
- aim at the transfer of appropriate technology in the industry with new entrants from historically disadvantaged groups as a pertinent target group;
- affirm the integrity of the South African “Wines of Origin” system.

A successful outcome in a particular R&TD programme focus area is, nevertheless, also dependent on its potential contribution towards innovation in the other business unit strategies – or, at the very least, that it will not subtract from these other focus areas.

For example, a R&TD programme result that significantly enhances the South African wine industry’s global competitiveness while also increasing inequity and destroying water resources through pollution, will not pass the criteria for a successful outcome. Broadly speaking, the sustainable success in a particular programme focus area depends on its contribution towards other programme focus areas and on the contribution of other programme focus areas to it.

Direct interaction with other SA wine industry bodies strategic programmes to enhance and, where possible, develop integration and complementary activity will be implemented. Each activity will require a unique and particular target setting process. However, technical innovation should set the tone for most as technology is viewed as a critical enabler for international competition.

Within the R&TD framework of the wine industry BEE and HRD should also be addressed through objectives which focus on resource limited producers with the aim of broadening access to the industry by:

- The development and transfer of affordable and effective technologies for resource limited producers.
- The identification of training needs and facilitating the training of resource poor producers.

Transformation (exposure, training and research support of previously disadvantaged groups) should be supported by:

- Making bursary funds available for PDI students participating in wine industry related research projects.
- Funding wine industry related research projects where PDIs are involved as project leaders and/or technicians.

This programme will furthermore find its rationale in a focus on technology which could mitigate risk factors in the wine supply chain. These will include:

- natural factors;
- technology/production factors; and
- trade and retail factors (safety).

Research projects/themes should address the following issues:

- Climate change
 - Global warming
 - Water use
- Environmental sustainability/sustainability of natural resources
 - Water availability
 - Soil use

- Cellar effluent
- Disease management and viruses
 - Quality of plant material
- Organic cultivation/production and wine making
- Mechanisation vs labour employment
- Health consciousness
 - Lower alcohol wines
 - Food safety
- Methods of Technology transfer
 - ICT (Information Communication Technology)
 - New entrants

The following research programmes have been identified:

1. Vine Virus Programme that focuses on limitation and extermination, etiology, virus resistance and support studies

Program co-ordinator: Prof Johan Burger

The Grapevine Virus Research Programme aims to alleviate the serious virus disease problems in the South African wine industry by thorough characterisation of grapevine viruses, to develop strategies to manage the diseases they cause, to prevent further spread of these diseases, and to use the latest technologies for the establishment of genetic virus resistance in wine grape cultivars in the longer term.

Grapevine virus research in the South African context is of a multidisciplinary nature and comprises projects addressing the focus areas that make up the three corners of the virus disease triangle. These are the different Viruses, the Vitis host and the insect Vector(s), which all play equally important roles in the complex nature of virus diseases. Within these focus areas, cross-cutting themes like identification and characterisation, control, detection, epidemiology and transformation are used to encompass existing funded projects, while it makes provision to include future projects on high-throughput biology, typical of the “omics” era. The components of the Grapevine Virus Research Programme are summarised in Figure 1 below.

Grapevine Virus Research Programme

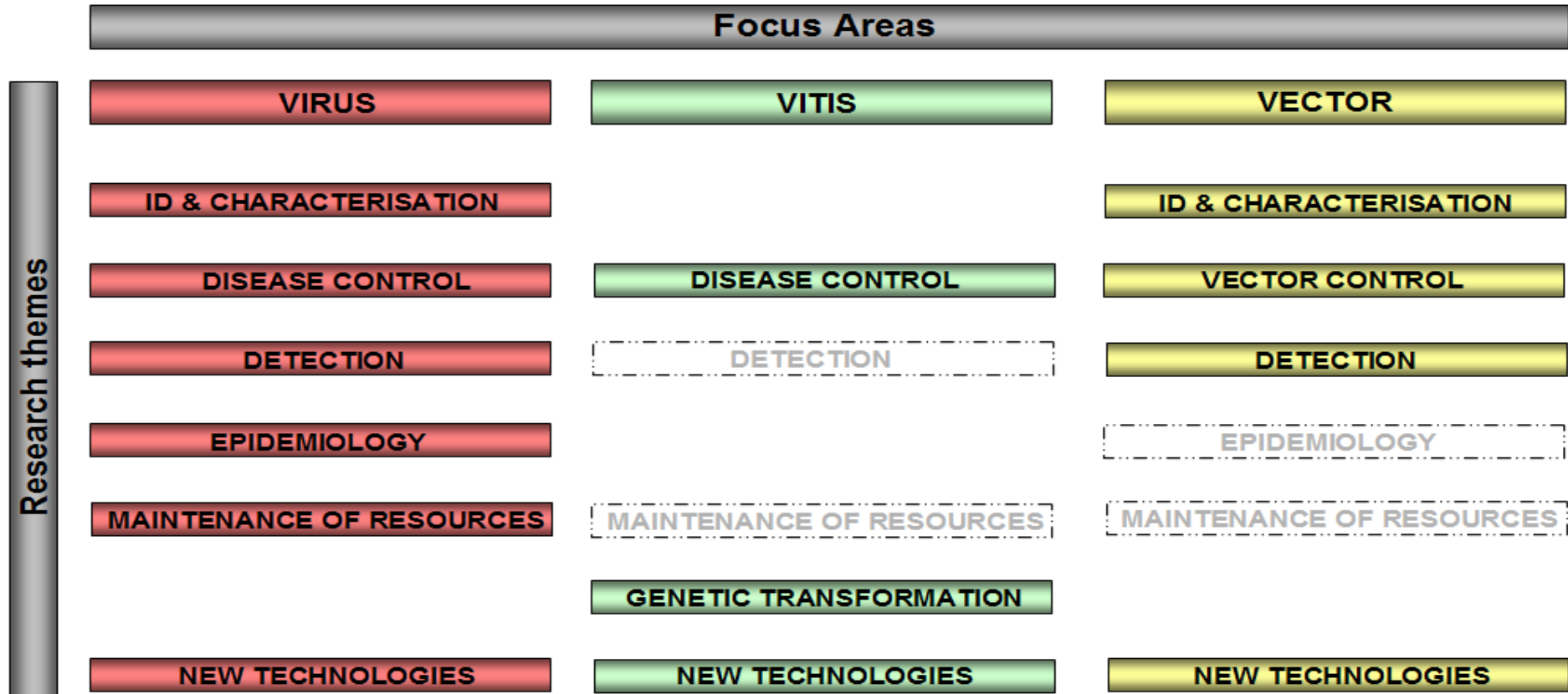


FIGURE 1. The Grapevine Virus Research Programme. Colour-shaded boxes indicate cross-cutting research themes where current Winetech-funded research projects reside. Non-shaded boxes indicate scope for future expansion of the programme.

2. Optimal grape composition to reach specific wine objectives

Program co-ordinator: Prof Eben Archer

This programme focuses on the quantitative and qualitative development of the various grape components and the use thereof as singular or compound indexes by which to determine the optimal ripening periods for the various product categories. Research done in this programme will address the influence of soil, climate and other cultivation practices, and in so doing, inevitably correspond to other Winetech programmes.

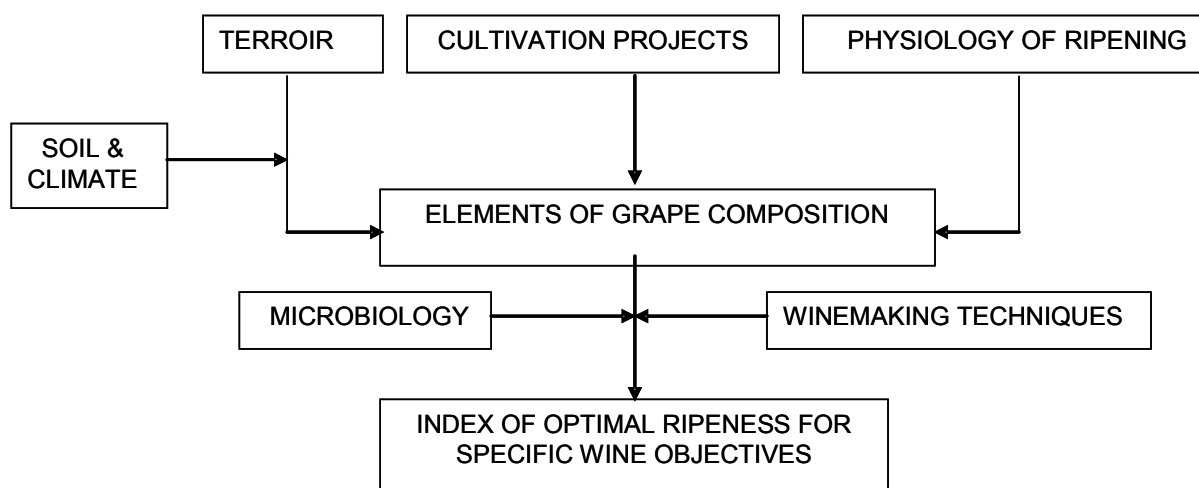


FIGURE 2. Current structure of this programme.

3. Terroir identification and utilisation

Program co-ordinator: Dr Victoria Carey

The overarching aim of the wine grape terroir program is to integrate all data pertaining to the interaction of different cultivars with their growing environment in a data base and GIS platform in order to be able to formulate a model to serve as a decision aid for site selection.

Generic objectives for the related projects are:

- To better understand the terroir/vine/wine interaction for optimal choice of cultivar, vineyard and cellar technology, in order to:
 - improve wine typicity and quality and/or
 - improve economy of production and/or
 - improve sustainability of agricultural practices and/or
 - be better able to adapt to global climate change.
- To improve local knowledge with regard to natural resources to aid in terroir demarcation.
- To assist a global and national marketing campaign for South African wines based on the terroir concept and natural biodiversity.
- To advance the scientific basis for the demarcation system.
- To add value to the notion of terroir in South Africa.

4. **Grapevine and Wine Biotechnology: Improvement of viticulture, wine yeasts and bacteria for a quality focused, market directed wine industry**

Program co-ordinator: Prof Florian Bauer

This programme focuses on the improvement of grapevine, wine yeast and bacteria, and aims to promote environmentally friendly, quality driven, sustainable and cost-effective production of grapes, wine, brandy and other grape-derived products.

All projects must address one or more of the aspects listed in the overall aim of the programme and fall into any one of the following categories:

- **The improvement of grapevine (*Vitis vinifera* and rootstock cultivars)**
 - The improvement of disease and pest resistance.
 - The improvement of virus resistance and diagnosis.
 - The improvement of stress tolerance, including drought resistance.
 - The improvement of plant/fruit metabolism and quality characteristics.
 - The improvement of nutritional value.
 - The development and improvement of support technologies.
 - The evaluation and risk assessment of transgenic grapevines.

- **The improvement of wine yeast (*Saccharomyces cerevisiae*) and bacteria (*Oenococcus oeni*)**
 - The improvement of wine yeast and bacterial culture management.
 - The improvement of the fermentation performance of wine yeast and bacteria.
 - The improvement of wine processing.
 - The improvement of wine preservation.
 - The improvement of wine wholesomeness.
 - The development of yeast strains with low ethanol yields.
 - The improvement of the sensorial quality of wine.
 - The development and improvement of support technologies.
 - The evaluation and risk assessment of transgenic wine yeast and bacteria.

5. **Research projects not included in programmes 1 to 4**

Program co-ordinator: Anel Andrag

Specific projects identified by industry as being problem solving or enhancing sustainability and competitiveness.

Include projects in the areas of:

- Cellar effluent
- Wood maturation
- Climate change
- Health benefits of brandy/wine
- Trunk- and soil borne diseases
- Cultivation

- Vinification technology
- Soil Science/Irrigation

6. Wine Industry Technology Transfer

Program co-ordinator: Gerard Martin

The Technology Transfer programme forms a very important and crucial part of Winetech's research, development and technology transfer goals, because it ensures a strategic advantage to the end-users of the technology in the wine industry.

The function of the Technology Transfer programme is to ensure that all Winetech funded research results are transferred effectively to all role-players in the wine industry. It also needs to ensure that research priorities as identified by industry are addressed.

This programme endeavours to make available procedures by which appropriate technology, developed at the research centre, could be communicated in a workable format to the transferors and users thereof. The procedures for technology transfer as well as the technology being transferred, should be technically and economically feasible. This transfer, be it by means of extension officers, consultants, researchers, lecturers or other role-players, could take place on an individual basis or in a group or community context and could be done either free of charge or at a fee.

7. Training

Program co-ordinator: Gerard Martin

The objective of the training committee is to ensure that a sufficient number of South Africans in the wine industry on all levels be furnished with the appropriate knowledge, skills and insight on educational, scientific, technological, management and practical levels, and that these human resources of international format be maintained so as to be conducive in implementing a market-driven, cost effective and innovative wine industry.

This committee, firstly, has the responsibility to ensure that world class means – i.e. manpower, facilities, funds – be available for the training and development of human resources so as to further the rest of the Winetech programmes. These means should be cost effective, focused on the South African wine industry and applied to train and develop the following:

- Educators at universities, technicons, technical colleges and schools.
- Creators of technology (students in research and science).
- Transferors of technology (e.g. consultants, information officers, technical field personnel).
- Practitioners of technology (e.g. producers, wine-makers).
- Managers/workers.

The full spectrum of viticulture (e.g. soil science, vine-growing, plant physiology, plant improvement, etc.), vinification (e.g. oenology, wine biotechnology, microbiology, cellar technology, etc.), by-product and waste

product processing (e.g. effluent flow-off management), product development and processing, as well as the transfer of technology should be addressed via a specific training level within this programme. This programme should include actions such as the involvement in:

- Syllabus development / training support / professional services.
- Appropriation of bursaries.
- Development of existing manpower potential.
- Tutoring / instruction and testing.
- Recruiting and screening of students, starting at school level.

Strategic programmes, activities and tasks

The operational focus of this strategic programme is to become the key co-ordination and facilitating institution in industry innovation through research and technology development and transfer. This programme will create an interactive network of service providers, strategic planners and the users of technology and contribute to the funding of the required technical innovation. Entrants from historically disadvantaged groups will be a particular priority. To this end Winetech should attend to the following:

- To support the wine industry with expertise, enabling it to be cost effective while producing quality wines and other grape based products through the application of environmentally friendly technologies.
- To support relevant training and education of individuals for the R&D sector of the industry – at all levels in terms of skills, knowledge and insight development – in order to ensure the practical implementation of the best knowledge and most advanced technologies in viticulture, wine making and other grape based products.
- To establish a culture of technological innovation, to ensure the ongoing utilisation of the best technology within the industry, and to facilitate its dissemination to all the sectors of the industry.
- To facilitate the development of resource poor and previously disadvantaged producers and to improve their access to the industry by making appropriate cutting edge technology available to such producers.
- To promote sustainable natural resources management practices and product systems.
- To establish world leadership in selected niche areas of the wine industry through a network of scientific and technological expertise.
- To commission relevant and thoroughly planned research, technology development and technology transfer in the promotion of the industry's technological capabilities and in the attainment of the other objectives.
- To support innovation to affirm the integrity of the "Wines of Origin" programme.
- To interact in the global environment in order to develop a productive network and alliances (i.e. the OIV, etc).

The following strategic programmes will direct these activities:

- **Setting a strategic agenda and operational plan**
 - To develop a wine industry technology innovation strategy and plan in collaboration with the industry stakeholders and service providers and R&D institutions.

- **Expertise network development**
 - Establish leadership in selected areas of the wine industry through a network of scientific, technological and economical/social expertise.

- **Commissioning of research and development**
 - Commission relevant (in terms of the strategic plan) and thoroughly planned research, technology development and technology transfer in the promotion of the industry's technological capabilities and in the attainment of its objectives.
 - To develop policy analysis and advice to support the strategic development of the industry in its economic, social, financial, institutional and environmental context and impact.

- **Technical expertise and skills development**
 - Support the wine industry with the development of the required expertise at all levels in terms of skills, knowledge and insight development – in order to ensure the practical implementation of the best knowledge and most advanced technologies in viticulture, wine making and other grape based products.
 - Facilitate the development of resource poor and previously disadvantaged producers and to improve their access to the industry by making appropriate cutting edge technology available to such producers.
 - Promote economic and social analysis skills.

- **Business planning**
 - An annual business plan will be required from the business unit.
 - The operational tasks should be to define a strategic approach and targets, facilitate the necessary opportunities and support activities to achieve these and measure, monitor and evaluate outcomes.