Grape growing at the edge

The are two edges in agriculture. One is the cutting edge at the forefront of an industry using the newest and greatest technologies and ideas. The other edge in agriculture is the precipice reached as commodity prices decrease and market expectation for increased quality causing a trend toward survival and the necessity for more economically sound decisions.

The Australian wine industry has until recently been on the rise. Experience shows that economic efficiency is not always the primary driving factor in a business when commodity prices and the rate of expansion are high. The growers that are at the cutting edge during these phases of industry development are usually the voluntary risk takers and innovators.

Over the past two years there has been a downward pressure on prices together with increased focus from wine companies on lower yields to increase quality. At the same time in the last two seasons weather conditions have adversely affected yield. There is now increasing and continual pressure to reduce irrigation use and meet environmental constraints. No longer are wineries so desperate for grapes that they will buy all grapes including those surplus to contract. Last season many growers had grapes unsold because they were surplus to contract, uncontracted or rejected for failing to meet quality standards. In a number of cases growers resorted to making wine from their grapes without a market in the hope that bulk wine sales will return an income at some later point. This often results in reduced cash flow for operating the vineyard.

These combined factors are forcing growers to become economically efficient and placing them in a situation where they cannot afford the risks resulting from making unsound decisions. Many growers will now be forced to the edge and will need to make decisions based on well founded knowledge and experience coupled with the implementation of new technologies in the vineyard.

The wine industry is now entering exciting times where growers must take up new technologies but at the same time seriously question their usefulness and seriously assess the outcomes of any changes made.

Gathering New Technologies — Where has the information come from?

Before rapidly importing information and implementing new technologies in the vineyard, the source of information, its validity and the potential economic benefits should first be appraised. Some of the factors to be considered are presented below.

Published Information

When an article is published in popular and often informative industry magazines, it is wise to question whether any peer review has been applied. Are statistics available to support an experimental conclusion? Is this a single trial? Over how many regions and seasons has this work been conducted? A successful research outcome may not always be economically viable in the vineyard, although small modifications may allow significant savings.

New products

Where are the research trials and the statistical data? Typically miracle cures appear either when prices are high and extra money is available for development or when prices are down and profitability is squeezed.

Analytical Testing

Is the laboratory independent and how good is its reputation? More importantly is the interpretation truly independent or is there potential financial benefit to the service provider?

Advice

Vineyard advice can come from a number of sources: grower liaison officers, resellers, sales representatives, consultants and other growers. Is the person providing advice appropriately qualified? Do they have the experience that will best suit and benefit the operation?

Implementing New Technologies in the Vineyard

Being at the cutting edge of viticulture does not necessarily mean that every new idea and technology should be adopted. Instead all viticultural options available and those currently being used in the vineyard should be assessed to determine which are the most appropriate to maximise the potential and economic return of the vineyard whilst meeting any personal goals of the owner.
In order to achieve this, the grower must implement a system of assessing each of the major activities that occur in the vineyard.

**How decisions are made in the vineyard**

Monitoring is a tool that can be used to assess the effectiveness of current activities in the vineyard, and to determine if there is a positive benefit to any change introduced.

**What is a monitor?**

- a pupil in school with disciplinary duties
- one who listens to and reports on foreign broadcasts
- detector for induced radioactivity
- tropical lizard supposed to warn of crocodiles
- television receiver verifying picture being transmitted
- to act as a monitor is to keep under observation

All of these definitions from the *Concise Oxford Dictionary* point to one thing—the collection of information to use as a warning system. An effective monitoring system therefore must have the following components:

1. systematic approach to data collection
2. repeatability
3. the ability to account for variability in the data collection area
4. recording system
5. easy-access recall system
6. provision for interpretation

**Why Monitor?**

Monitoring in a vineyard is useful for a number of reasons.

- when an outstanding wine is made from a specific block in a specific season, and it would be advantageous to try to repeat the same growing conditions;
- to compare between current practices and a new practice to be implemented on the vineyard;
- to accurately compare yield components between seasons; and
- to implement specific cultural practices based on action thresholds.

The following are examples of vineyard management components where monitoring systems can provide information to assist the decision making process.

- **Pruning**
  - Bud dissection
- **Nutrition**
  - Soil tests and petiole tests
- **Disease**
  - Monitoring for pests and disease and resistance testing
- **Yield**
  - Yield component measuring
- **Irrigation**
  - Water monitoring

**Designing a monitoring system**

The most important component of a monitoring system is to determine the question or questions that need to be answered.

1. **Identifying the issue**

A monitoring system is without purpose unless the main issues are identified and questions about the vineyard and its performance or potential outcomes are clearly identified,

e.g. what is the effect of garden weevil in the vineyard and is the treatment being applied effective?

2. **Understanding the objective**

What is the raw data that needs to be collected, how will it be processed and what are the decision thresholds? Decision thresholds occur when the economic threshold (a measurable point at which the benefit of taking action is greater than the cost of taking action) is modified to allow for business philosophies. They should be determined before the monitoring commences and will vary between businesses, vineyards and crops.

3. **Variability**

When determining the sampling procedure, the variability within the sampling area, the acceptable level of error in the data and how much risk the grower is prepared to take all need to be considered. Software has been developed to help determine the appropriate sample sizes in any monitoring program or trials established.

4. **Timing**

Determining when to commence monitoring and the interval at which monitoring should occur will affect the accuracy, efficiency and economics of the system.

5. **Repeatability**

Once the frequency of data collection is determined, the format of the data collection should be documented clearly so as it can be repeated from one collection event to the next. Consideration needs to be given to how the data is collected and whether specific training or programming is necessary.

Most monitoring requires some form of calibration, which should be completed before each collection. In some cases the data is subjective and it may be necessary to use the same person for a full season or from season to season. In these cases calibration charts can be helpful (e.g. leaf colour charts). Alternatively ensure that more than one person can collect the data or operate the system rather than relying on one person who may leave the project before completion.

6. **Record Keeping**

**Data collection in the field**

It is essential that all data collected is recorded in a clear, legible and concise manner which can be stored and easily retrieved when needed. A number of options are available including data loggers, hand held processors that can be downloaded directly to PCs, radio-linked telemetry in addition to the tried and tested pencil and paper. It is critical that adequate back up is available for any of these applications and that a manual system is not based on scraps of paper that are easily lost.

**Storage in the office**

Once the raw data is collected it will generally require processing into a useful format. A computer system (either database or spreadsheet) is the most commonly used alternative now. Computers will also allow data to be processed to create graphs, charts or tables. As the data will
be used for decision making, it should be processed on a regular basis. When long periods elapse between data collection and data entry, it becomes increasingly more difficult to remember circumstantial or external details.

7. Interpretation

There are a number ways of utilising data collected from a monitoring system. They can be based on comparative trends e.g. bud dissections, seasonal trends e.g. light brown apple moth flights, or predetermined thresholds e.g. presence or absence of powdery mildew.

The commercial reality of monitoring

The following points should be considered when implementing a monitoring system.

- **Who will monitor?** The person conducting the monitoring needs to be dedicated to the procedure and trained accordingly. This may be a staff member or a commercially available service.
- **Time:** It is essential to ensure that the person conducting the monitoring procedure has dedicated time available to perform the required tasks in a timely fashion without being distracted by other vineyard activities.
- **Cost:** The cost of monitoring should not outweigh the benefits of monitoring. Costs can often be reduced by omitting a particularly slow activity or modifying the system slightly while minimising the effect on the quality of the data required. Alternatively employing experienced people can reduce the cost significantly.

Summary

With current industry trends, there is increasing pressure to maximise vineyard performance and reduce costs. Implementing change for the wrong outcomes can be expensive and detrimental to meeting economic efficiency and increasing quality standards. It is essential to critically analyse information provided to the vineyard and to constantly review current and newly implemented vineyard practices. The use of monitoring systems is a useful tool which can be used to identify the “bugs” within the system and assist with decision making.