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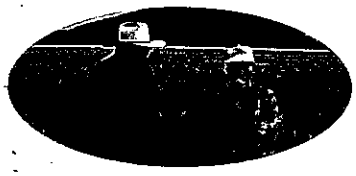

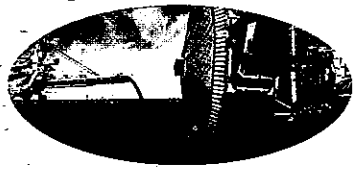

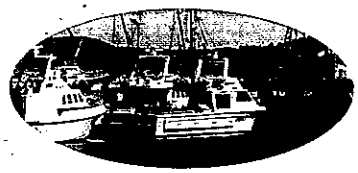

Report to client

Australian wine grape industry: benchmarking farm performance

ABARE
Innovation in Economic Research

Australian wine grape industry: benchmarking farm performance

A framework for approaching a benchmarking study

Angela Shepherd
Vince O'Donnell

January 2001

ABARE
Innovation in Economic Research

AUSTRALIAN WINE GRAPE INDUSTRY

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Australian Bureau of Agricultural and Resource Economics
GPO Box 1563 Canberra 2601

Telephone +61 2 6272 2000 Facsimile +61 2 6272 2001
Internet www.abareconomics.com

ABARE is a professionally independent government economic research agency.

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Foreword

Expansion in the Australian wine grape industry in recent years has created a number of opportunities and challenges for growers, wineries, distributors, input suppliers and policy makers. Since reaching a peak in 1997 prices have been falling back toward historical levels as the production of quality wine in the world increases. Increased international competition is likely to place further pressure on wine grape prices in coming vintages. This in turn will increase the need for growers to improve their efficiency of production to remain profitable.

There is currently little information generally available to growers allowing them to compare their efficiency with that of other growers, either within Australia or overseas. The Grape and Wine Research and Development Corporation commissioned ABARE to develop a framework to assist all groups in the industry interested in undertaking a benchmarking study. The resultant framework will be particularly useful for small and medium wine grape growers. As part of this work, ABARE survey data have been used to demonstrate what data may be available at a regional level for three case study regions.

The results from benchmarking exercises will enable growers, industry representatives and policy makers to compare the efficiency and financial performance of different businesses. In moving toward best practice the financial, social and environmental sustainability of Australia's wine grape industry can be improved, increasing the international competitiveness of the industry.

BRIAN S. FISHER
Executive Director

January 2001

Acknowledgments

This study was funded by the Grape and Wine Research and Development Corporation. The project also involved consulting with researchers, consultants and industry representatives who answered questions and provided input into the development of this study. Their assistance was much appreciated.

The assistance of Tim Goesch and Duane Riley in reviewing the report and compiling the survey data is gratefully acknowledged. The ability to use the survey data depended on the cooperation of growers, their accountants and marketing organisations in generously providing information. Without this assistance, the surveys would not be possible.

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Background

The rapid expansion in the Australian wine grape industry over recent years has created challenges for growers, wineries, distributors, input suppliers and policy makers. Large increases in plantings are projected to result in further big increases in Australian wine production in the medium term.

Increased emphasis on export markets will continue because there is little room for expansion on the domestic market. World supply of quality wine grapes is expected to increase by more than world demand, resulting in falling wine grape prices in Australia. As the production of quality wine increases and international competition intensifies, Australian growers must be able to compete effectively with their counterparts overseas in the production of quality wine grapes.

There is currently little information generally available to growers allowing them to compare their efficiency with that of other growers either within Australia or overseas.

With the rapid expansion in the industry over the past decade and the changes occurring in international markets, growers, industry organisations and policy makers will require information against which to benchmark performance. As such, selected benchmarks may need to be developed at the property level, the regional level or at the industry level. Different sectors of the industry will place greater value on various benchmarks than others.

The aims in this report

The key objectives in this report are:

- to provide producers with a framework that will enable them to use available information to compare their efficiency with that of other wine grape producers in the region and in other regions; and

- to assist producers to identify where productivity improvements and more sustainable management practices can be adopted. This in turn will improve the international competitiveness of the wine grape industry and resource conditions.

The report provides a framework for addressing the benchmarking process and some suggestions on the most appropriate measures to use and how to collect and analyse data. This report is not intended to provide a definitive list of parameters that growers can benchmark themselves against, or that industry representatives should be considering. It is aimed mostly at small and medium wine grape producers who may be considering participation in a benchmarking study.

A number of performance indicators are identified, under the headings of physical, financial, social and sustainability variables. By standardising the approach, benchmarking, particularly financial analysis, can be improved and results can be better compared between growers and regions.

In addition to the development of a framework, ABARE farm surveys data have been used to provide key performance indicators for three wine grape producing regions — the Murrumbidgee Irrigation Area, private diverters in Victorian Sunraysia and the Loxton region of South Australia. These case studies have also been used to illustrate some of the traps of analysing benchmarking data.

The framework

In developing the framework, a comprehensive literature review was undertaken to look at previous benchmarking studies, not only in the grape and wine industries but in other agricultural sectors as well. The framework includes a list of key variables that managers should consider when undertaking a benchmarking study. This list was developed in consultation with various industry representatives.

The process for undertaking a benchmarking study involves six steps:

- identifying the purpose of the study;
- variable selection;
- organisation of the data;
- analysis of the farm business; comparisons and evaluation; and
- taking the appropriate actions.

In undertaking each of these steps, growers will gain a greater understanding of their business goals and their financial situation and be better able to identify areas where actions can be taken to improve performance. An important part of benchmarking is to continuously monitor the enterprise to determine if changes to the business are achieving the desired results.

Changes in the market and technological advances will combine with climatic differences and differences in the resource base to affect the importance of variables over time.

Limitations

A range of factors can limit the potential benefits of benchmarking. As no single indicator will fully reflect best practice, a number of different performance indicators should be chosen to compare farm performance. The most meaningful comparisons are made when the enterprises are similar in nature and have similar business goals.

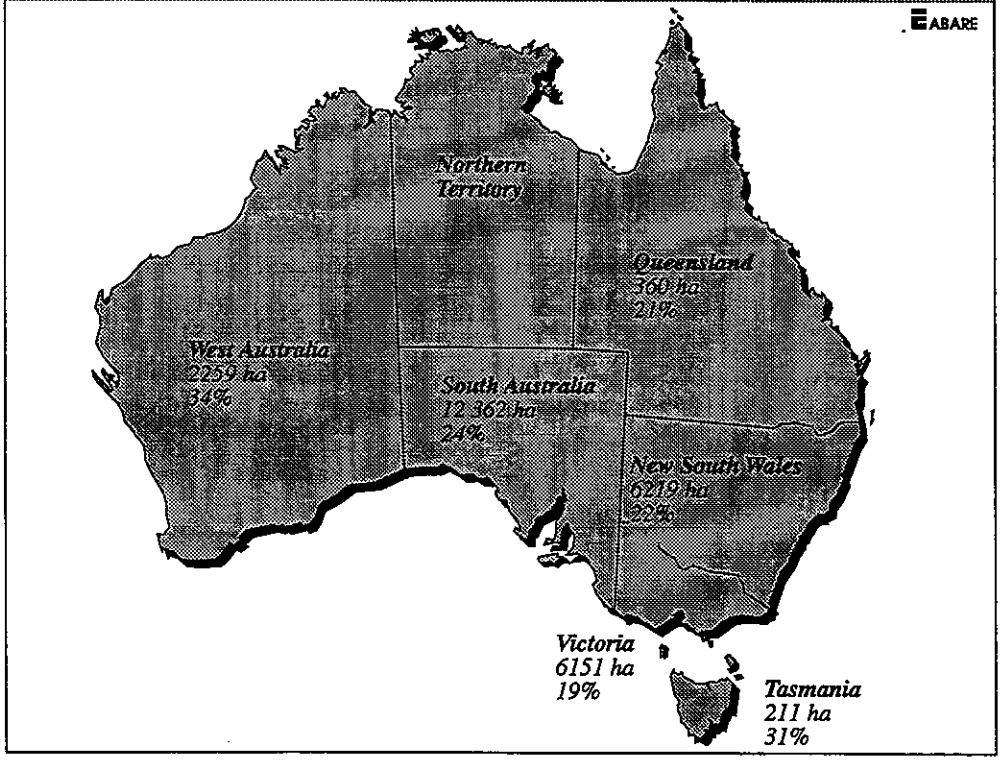
It should also be remembered that in any study, benchmarks are calculated using historical data. However, the wine industry operates in a dynamic environment: relative input prices change, new technologies are adopted, quality parameters change and other demands from wineries alter. The relevance of indicators should be reassessed against these changes. Developments in technology not only change the relevance of benchmarks but can also make some variables obsolete.

1. Introduction

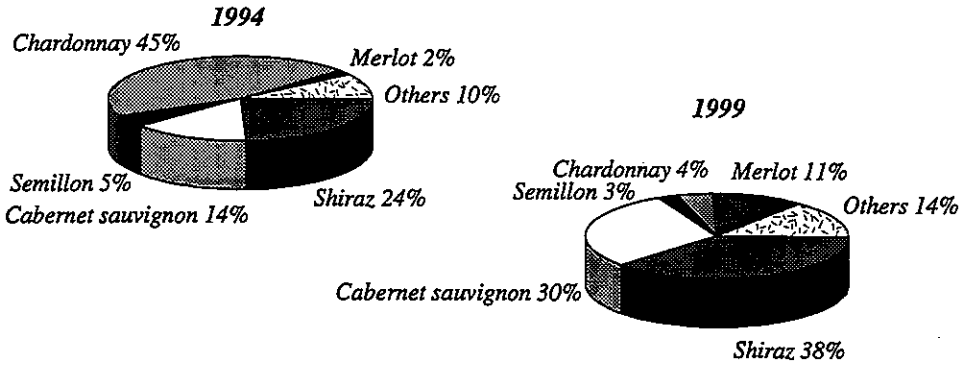
The Australian wine grape industry

Rapid expansion has occurred throughout the Australian wine grape and wine industries over the past five years. Over that time wine grape production more than doubled to around 1.2 million tonnes in 1999-2000. Wine now contributes around $1.5 billion a year to Australian exports and is set to increase further in coming years. The number of growers has increased by more than 30 per cent to 4822 between 1994 and 1998. At the same time, the number of wineries has increased by nearly 50 per cent to 1197 establishments and production has increased by 46 per cent to 1.1 million tonnes. This expansion in production was fueled by a 55 per cent increase in bearing area to 95 301 hectares in 1999. Further expansion is expected, with an additional 27 614 hectares of vines expected to commence bearing over the next three years (figure A).

A ***Areas of young vines, by state, 1999***
Area and share of nonbearing vines in total planted area



B *Varietal mix (plantings)*



Industry expansion has not been confined to the traditional wine grape growing areas. A number of new districts are emerging as important wine grape growing regions and some smaller producing regions are experiencing significant expansion in bearing areas. For example, in New South Wales, winery intake outside the traditional wine grape growing regions of the Hunter Valley and Riverina accounted for 18 per cent of the New South Wales wine grape crush in 1999. This is forecast to rise to 28 per cent by 2004.

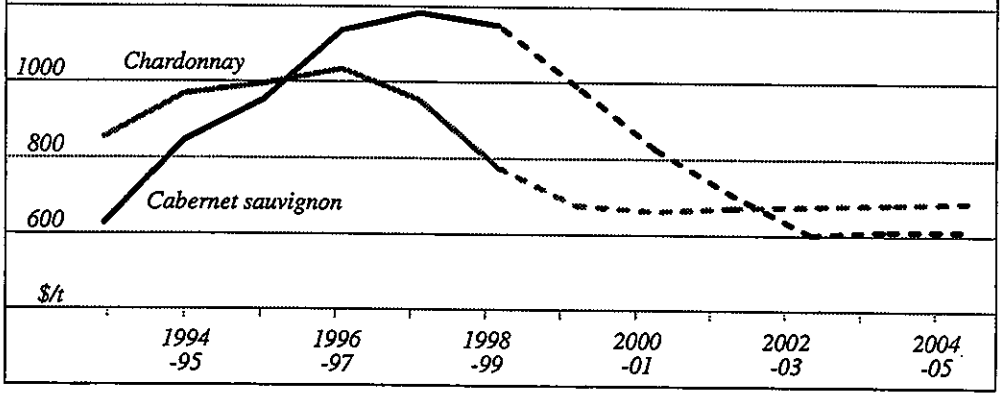
The expansion that has occurred in the industry has also been accompanied by a dramatic change in the varietal mix of plantings. For example, in 1994 half of all new plantings were to the white varieties of chardonnay and semillon, whereas in 1999 nearly 80 per cent of new plantings were to the red varieties shiraz, cabernet sauvignon and merlot (figure B). This reflects the change in consumer demand in the major markets away from white wine toward red wine. It is worth noting that this contrasts with the shift in plantings that occurred in the 1980s, when red varieties were being replaced with the more 'fashionable' white varieties such as chardonnay.

In 1998-99, wineries sourced over a quarter of premium wine grapes from their own vineyards (Shepherd 1999). This level is likely to remain fairly stable for at least the next three vintages. Over the same time period, wineries are likely to source a higher percentage of minor varieties from their own vineyards, to ensure a consistent supply.

The competitive environment

The rapid increase in the Australian wine grape industry over recent years has created challenges for local growers, wineries, distributors, and input suppliers. Large increases in plantings are projected to result in further big increases

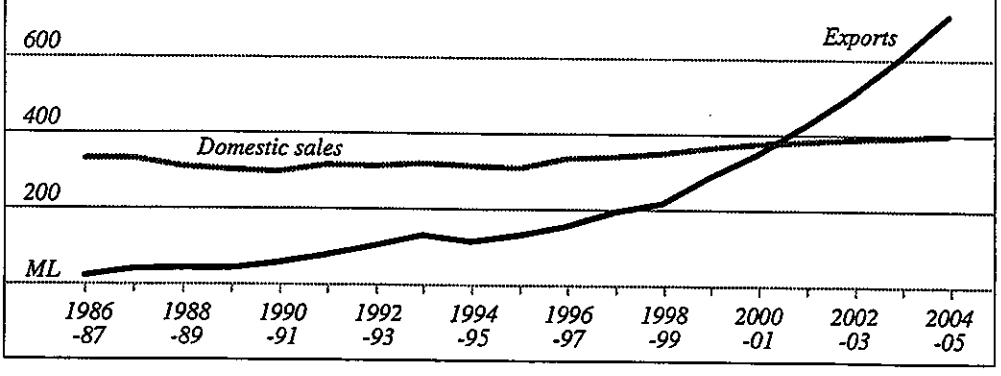
C ***Riverland indicator prices for chardonnay and cabernet sauvignon***



in wine production in the medium term. Also, world supply of quality wine grapes is expected to increase by more than world demand, resulting in falling wine grape prices in Australia (figure C). World consumption is expected to remain fairly stable in the medium term. Increased emphasis on export markets will continue because there is little room for expansion in the domestic market (figure D). As the production of quality wine increases worldwide, Australian wines will need to become more internationally competitive. In order for this to occur, Australian growers must be able to compete effectively with their counterparts overseas in the production of quality wine grapes.

Markets require a reliable supply of consistent quality wine and, as a result, wineries are placing increased emphasis on the quality characteristics of the grapes they purchase. In the past, wineries may have been more willing to accept grapes of lesser quality to obtain the necessary supplies to meet market

D ***Sales of Australian wine***



demand. However, the rapid expansion in production of quality wine grapes has allowed wineries to be more selective in what fruit they accept and has resulted in large penalties and bonuses being paid according to quality parameters.

The need for best practice

In order to remain internationally competitive, wineries need access to a consistent supply of high quality grapes at internationally competitive prices. Increased international competition is likely to place further pressure on wine grape prices. This in turn will increase pressure on growers to improve their efficiency of production to remain profitable.

The environment that growers now find themselves in is one where continuous improvement is required. Key challenges to this will include:

- meeting the increasing quality specification demanded by wineries;
- reducing input costs;
- adopting new technologies;
- reducing chemical use;
- dealing with environmental factors such as salinity, water quality etc; and
- remaining viable.

The aim in this study

There is currently little information generally available to growers allowing them to compare their efficiency with that of other growers either within Australia or overseas. This study provides a framework under which benchmarking exercises can be undertaken for farm performance and farm operations. It is aimed at small and medium wine grape growers who may be considering participating in a benchmarking study.

This study does not seek to provide a definitive list of parameters. However, a number of the most important performance indicators have been identified.

2. Remaining competitive in the current environment

The international environment in which the Australian wine industry is now operating has major implications for how growers are approaching or should approach their business. To remain in business, growers need to be able to match management practices with the best in the world. The changes that the industry has seen over the past decade are likely to continue, with every element of grape growing and wine making being challenged.

A benchmarking study can assist growers to move toward best management practices. Understanding the relationships between production costs and income and comparing efficiency and financial performance with others can help to increase productivity, profitability and environmental sustainability. In turn this can help increase the international competitiveness of the Australian industry.

Benefits of benchmarking

Benchmarking is a practical tool that allows growers to get a better understanding of their business by comparing their performance with other growers. As long as the differences between the enterprises contributing to the benchmarks are well understood, undertaking a benchmarking exercise can help growers identify areas to improve management practices or adopt different technologies to achieve the goals they have set for their business.

Generally, the aim of benchmarking is to maximise the returns from the existing resource base by comparing the practices and performance of one farm business against others in the industry, and identifying changes in management practices that will enable growers to move toward best practice.

Best practice has been defined as 'a comprehensive, integrated and cooperative approach to the continuous improvement of all facets of an organisation's operations' (Vast, Langley and Hurford 1997). It is associated with quantifiable better business performance that can be measured using a number of variables, including rate of return.

Continued monitoring of the business will indicate if the changes in management practices achieved their objectives. These objectives could include such things as improving water use efficiency or achieving a higher rate of return on capital.

The benefits gained from undertaking a benchmarking exercise are likely to be incremental. The gains made are likely to be small as best management practices are gradually adopted and adapted to the individual property's resource base and the skill level of the operator/manager.

Benchmarks are also useful for comparing a farm's performance between years where performance will be more closely related to management than when using interfarm comparisons. The variation caused by factors such as soil types and varietal mix and business structure are eliminated.

However, growers are not the only ones to benefit from benchmarking studies. Other groups associated with the industry can use the results.

> ***Industry groups*** such as industry organisations, wineries, input suppliers, service providers and the tourism industry are interested in the overall growth and viability of the industry. A viable industry is better able to attract investment and provide benefits to a wide range of businesses. Industry representatives can also use the results from a benchmarking study in their planning processes and in discussions with associate groups to provide more benefits for growers.
>
> ***Policy makers*** including federal, state and regional governments and industry peak bodies can use the results of benchmarking studies to gain an indication of how effectively the resource base is being used and to assist in planning. Policy makers could also use the results of benchmarking exercises to analyse: the contribution of the wine grape and wine industries to the economy; the impact of changes to government policies and regulations; and the infrastructure needs of the communities in wine grape growing regions.

Resource sustainability is becoming increasingly important, with competing demands between the environment and agriculture, limitations on water extractions and declining water quality. The expansion of irrigated agriculture has resulted in an increase in environmental problems, such as salinity, which has the potential to reduce production in the long term. The adoption of best management practices by wine grape growers will help to ensure the long term sustainability of wine grape production through efficient and responsible use of the resource base.

Limitations of benchmarking

While benchmarking can be useful in identifying areas of farm performance that can be improved, users need to be aware of the potential pitfalls in trying to attribute an outcome to an action, such as improved profitability. Hence, care will be needed when comparing farm performance.

While benchmarking studies can provide a number of benefits to participants, their usefulness can be limited by a number of factors. For the data from a benchmarking study to be useful, all participants must provide accurate data on their particular enterprise. The terminology and form of measurement used needs to be consistent, to allow for effective comparisons. In turn, the user must understand the key issues and the meaning behind the numbers. Only then is it possible to prioritise the areas where improvements should be made to match the business goals.

Benchmarking is most useful where the number of differences between enterprises are small. When this is the case there is more potential to identify cause and effect. Where there are significant differences between enterprises, the ability to identify practices that will lead to improved performance will be more difficult. Hence, while benchmarks can provide useful information on performance, they need to be used with caution when setting targets.

A further distorting factor when analysing benchmark data is where the business is in its life cycle as that can cause apparent wide differences in farm performance. For example, some farms will have large areas of nonbearing vines and high debt as a result of recent expansion in vineyard area. In contrast other farms may be fully bearing with little debt. These differences need to be taken into account when making comparisons.

Benchmarking studies within the wine grape industry

A number of consultants and groups both in Australia and overseas have already gone through the process of conducting benchmarking studies. The results of some of the studies are only available to those participating in the group; however, other studies have been published and references for these are contained in the back of the report. This is not a definitive list and growers are encouraged to contact their local wine grape growers associations, state department of agriculture, the Grape and Wine Research and Development Corporation and wine grape publications for details of any local benchmarking studies or grower groups.

One of the most widely known benchmarking studies in the wine grape industry undertaken to date was conducted in Victoria as part of the Bizcheck program between 1996 and 1999. Results are available for three regions: Griffith (one season only), Sunraysia and the rest of Victoria (which is covered by the regions of Mornington/ Yarra, North East Victoria and Central Victoria) (Rendell McGuckian 1999; Rendell McGuckian 2000). The results are further discussed in industry journals, including a number of articles in The Australian Grapegrower and Winemaker (Hill, Leamon and Thompson 1998; Small and DeGaris 1999; Thompson and Hill 1999a,b).

Benchmarking studies within the wine grape industry *continued*

Although Branson et al. (1997) is somewhat dated now, it does contain a short section on gross margins for the wine grape industry in the Kerang–Swan Hill area.

Specific practices of grape growing have also been benchmarked, such as irrigation practices. Skewes and Meissner (1997) benchmark the performance of irrigators in South Australia relative to a range of irrigation performance indicators and identify the best practices used by top performers within the industry in 1997.

A similar methodology has been used in other regions. In 1998-99 a study was undertaken by the Murray Valley Wine Grape Industry Development Committee in Sunraysia to develop irrigation benchmarks. Factors such as gross margin per megalitre, tonnes per megalitre and megalitres used per hectare were assessed. Data collected included crop age, type, rootstock and spacing, irrigation system, performance and management, grapevine yield, soil formation and sugar levels (baumé).

A number of grower groups have also been formed at the regional level to undertake benchmarking exercises. Some are based on specific varieties, while others are more holistic.

The Department of Natural Resources and Environment in Victoria has funded the 'Grapecheque' initiative. Through this program, groups of growers are able to meet regularly to exchange ideas, hear expert opinions and report on different techniques they have applied to improve their business.

Grower groups at Yenda, Leeton, Hanwood and Yoogali have been formed to assess current practices and benchmark costs. Practices of irrigation, spray application, pest and disease control, fertiliser use and crop forecasting are being addressed.

Groups in Sunraysia and the Riverland have been formed to focus on a single variety, such as shiraz or cabernet sauvignon. Growers monitor around twelve vineyard sites and meetings are held at each site. Input and output data are collected as growers measure input use and the size and density of the canopy and grape bunches. These data are then analysed and presented to growers who can use them to determine where their site fits within the context of the rest of the group. This assists growers to determine how they can improve the management of their vines to achieve greater returns per hectare, by improving fruit quality and optimising yields.

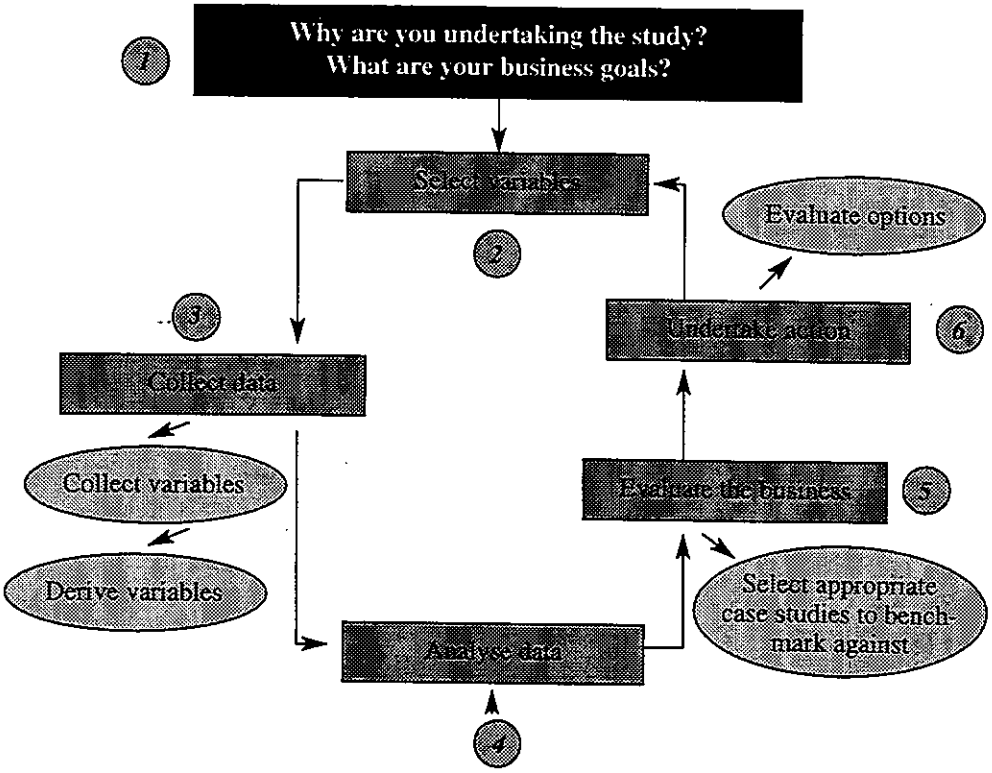
Wineries are also organising grower groups. For example, industry funding has been provided to Tyrells in McLaren Vale who have organised around fifteen growers to undertake a local benchmarking exercise. As mentioned earlier, these are just some of the groups currently working on projects designed to get a greater understanding of the business and improve its overall economic performance.

3. Undertaking a benchmarking exercise

The process of undertaking a benchmarking study can be divided into six main steps (figure E).

1. ***Identify the purpose of undertaking a benchmarking exercise***
2. ***Select the variables***
3. ***Organise the data***
4. ***Analyse the farm business***
5. ***Compare and evaluate***
6. ***Take action and move toward best practice***

***E** The benchmarking framework*



Step 1: Identify the purpose of benchmarking

Identifying the purpose of undertaking a benchmarking study will ensure that the process is relevant and the resulting actions are appropriate. This will include the identification of the goals of the business and the aims of the study.

Understanding the business goals before undertaking a benchmarking exercise is essential to help focus the analysis and maximise the potential benefits. The business goals can be either economic or noneconomic and will vary according to a number of factors, including the debt and equity situation of the enterprise as well as any lifestyle requirements.

Business goals need to be documented so that they can be reviewed in the light of changing circumstances and to assist in ensuring that decision making is focused on the end result.

The return on investment is an important economic indicator of business performance and achievement of the highest possible rate of return on capital invested may be the overall goal. However, for some growers, enjoying the lifestyle and receiving the majority of their income from off-farm sources may take a higher priority than maximising returns. There are others who are prepared to accept lower returns on capital as they prefer working for themselves. Therefore, these businesses may be willing to accept a lower rate of return than corporately owned investment vineyards.

Benchmarking – a two farm example

To illustrate the differences that need to be considered in a benchmarking exercise, consider the following two farms. These two farms will be used throughout the paper.

Both farms are in the same district, of a similar size with a similar area of wine grapes planted and much the same varieties.

Farm 1 has only come into the business in recent years. All the vineyard has been recently established, the business has high debt levels and many vines are still to come into bearing.

Farm 2 has also only come into the business in recent years but purchased an established vineyard with only 10 per cent nonbearing vines, has off-farm income and has little debt.

Each of these farms will use the data coming from a benchmarking exercise in different ways and both are likely to take different actions as a result of undertaking an analysis. This will reflect the different priorities and goals of each of the farm businesses.

Noneconomic business goals may include factors relating to environmental sustainability such as lowering input use, particularly water use, or achieving catchment goals such as lowering water tables or salinity levels through a group project such as those run by Landcare.

The process of establishing business goals may prove to be just as important as comparing the performance of the business. Business goals may also include vineyard expansion, improving fruit quality or changing the varietal mix to meet winery demands, which may in turn increase grape income.

Once these business goals are established, the aims of the benchmarking exercise can be specified. These aims are generally more specific and are measurable against other farms, regions or districts. One aim may be to get a better understanding of the business as a whole and identify strengths and weaknesses. This allows managers to adjust to a changing business environment and to improve the economic performance. A benchmarking exercise provides growers with the opportunity to critically analyse the costs and returns of the farm business and make adjustments accordingly.

Benchmarking may be used to determine which areas are likely to achieve the greatest increase in returns from investment in equipment such as irrigation technologies or other infrastructure. By studying all areas that make up the business, growers are better placed to determine where to make changes in the farm operations and how that will affect the entire enterprise. Benchmarking also allows managers to monitor changes made to the business and determine if they achieved the desired results.

Step 1 and the two farm example

Farm 1 has high debt levels and therefore may have the main business goal of maximising returns in order to repay debt and make sufficient income to support the farm household. In later years when vines are bearing and debt levels lower, the business goals may also change.

Farm 2 has no debt and has income from outside the farm. The goals for this farm may be to make sufficient returns for the farm to pay its way while using the additional income from off the farm to enjoy the lifestyle.

Step 2: Select the variables

A key factor in identifying the most appropriate variables to include in the analysis is to identify who is going to use the information gained and how the information is going to be used to address the aims.

Once the business goals have been identified and the aims of undertaking a benchmarking exercise established, the next step is to select the variables. Selecting the most appropriate variables and ensuring that they are relevant to the business is essential to obtaining a successful outcome.

Variables can be split into four main categories

- ***physical*** – the natural environment
  – vineyard management
- ***financial*** – vineyard establishment costs
  – performance indicators
- ***sustainability*** – economic, social and/or environmental
- ***socioeconomic***

The variables need to be able to provide information to form benchmarks or provide information that allows for the identification of like farms for comparison.

There are three principal types of variables:

- those that indicate a level, such as tonnes per hectare, income per hectare, water used per tonne or rate of return;
- those that identify the use of particular management practices, such as the type of irrigation system used; and
- environmental variables, such as the region, rainfall or water quality, that are useful for comparisons.

The value and priority given to each variable will depend on the aims identified in step 1 and the particular group using the benchmarks, such as growers, industry representatives or policy makers. A number of variables are likely to be useful to all three groups, while others are likely to be specific to growers only.

To be most useful, the selected variable must be measurable. Also, it must be possible to influence the variable by altering management or business practices within an acceptable time frame.

Step 2 and the two farm example

Farm 1 needs to nurture the young vines and bring them into production as soon as possible. The important variables to consider would include debt servicing ratio and labor costs, both hired and family. However, variables related to such things as fertiliser and water are likely to increase in importance as the vines mature and the farm continues to move toward or maintain best management practice.

Farm 2 has an established vineyard with little debt so the key variables may be fertiliser and water costs per hectare and returns per hectare per bearing area, which will reflect fruit quality. Data on these variables will be necessary when making an assessment of the changes required to move toward best management practices.

Some of the variables that are useful in developing benchmarks are outlined in the remainder of this chapter.

Physical indicators

The physical indicators can be subdivided into a number of categories such as the land, soil and climate. The natural environment influences where and how vines are grown and the management practices required to establish and maintain a vineyard. The natural environment has a large impact on yields and fruit quality and, as a result, on the financial performance indicators. Important variables in this category are listed in table 1 and illustrated in figure F.

1 Physical variables that characterise the natural environment

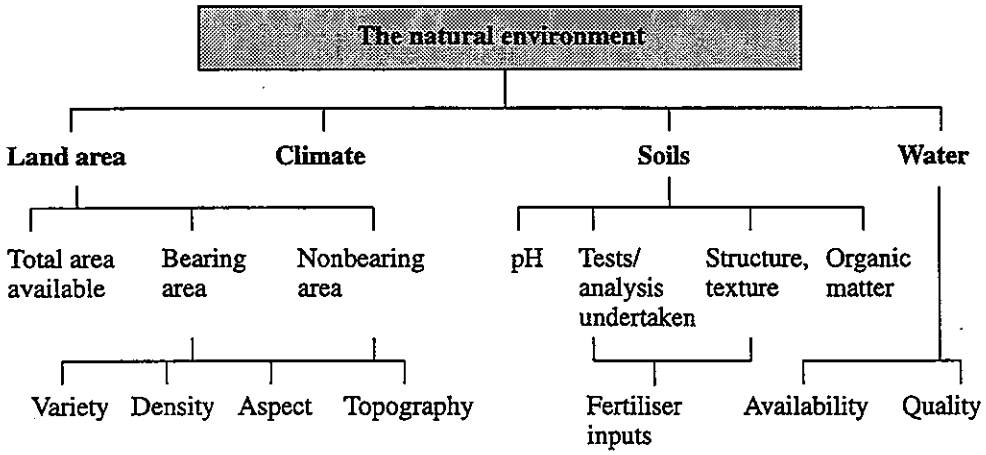
Variable	Comment
Total farm area (ha)	***Includes all land operated by the farm business, whether owned or rented by the business. Land sharefarmed on another farm is excluded and needs to be examined separately.***
	This can be an indicator of a constraint on possible expansion or diversification.
Bearing area (ha), by variety	***Includes the area of each variety that is bearing.*** Can be used to estimate tonnages for each variety and assess any economies of scale that may influence input costs.

Continued ⇨

1 *Physical variables that characterise the natural environment* *continued*

Nonbearing area (ha), by variety	***Includes the area of each variety that is not yet bearing.*** This will provide an indication of possible tonnages for the next three years — particularly important for wineries in their planning process. This is an important factor to bear in mind when doing comparisons with other vineyards as it may explain some of the differences in performance.
Density (vines/ha)	***Number of vines per hectare.*** Costs of establishment increase with density of vines. Density also affects yields and the ability to mechanise the vineyard.
Topography	***A description of the area where the vines are planted*** This needs to be taken into account as topography influences the use of machinery as well as the risk of erosion and frost. It may be an important factor to consider when making interfarm comparisons.
Soil characteristics	***Soil types and the general physical condition of the soil that influences the areas where wine grapes can be grown.*** The suitability of the soil for irrigation, the cost of ameliorative measures if soil is degraded and the inputs and management required to grow grapes are also important. Soil types may also have a bearing on yield, quality and varietal choices
Soil type and fertility, organic matter (%), pH, soil moisture devices used	***Objective measurement of these variables will require soil tests to be undertaken.*** There are a number of variables that can be used to determine soil fertility and the management practices required for input use.
Climate	The effect of climate variability can be minimised with improved management practices. There are many climate related variables that may influence quality, yield and cost outcomes.
Rainfall, humidity (%), temperature	***Both seasonal and annual rainfall need to be measured.*** Rainfall influences the need for irrigation and suitability for growing vines. This is a consideration when both setting up a vineyard and in undertaking comparisons. Humidity will influence the management of disease control. ***Average seasonal temperatures and the variations, minimums and maximums need to be recorded.*** These will be required to indicate frost risk and the risk of 'cooking' fruit on the vine in summer.

F *The natural environment*



Vineyard management

Vineyards are expensive to establish in terms of both time and money. Careful vineyard management has the potential to greatly influence the profitability and long term sustainability of the operation. The variables to be considered in vineyard management are listed in table 2 and illustrated in figure G.

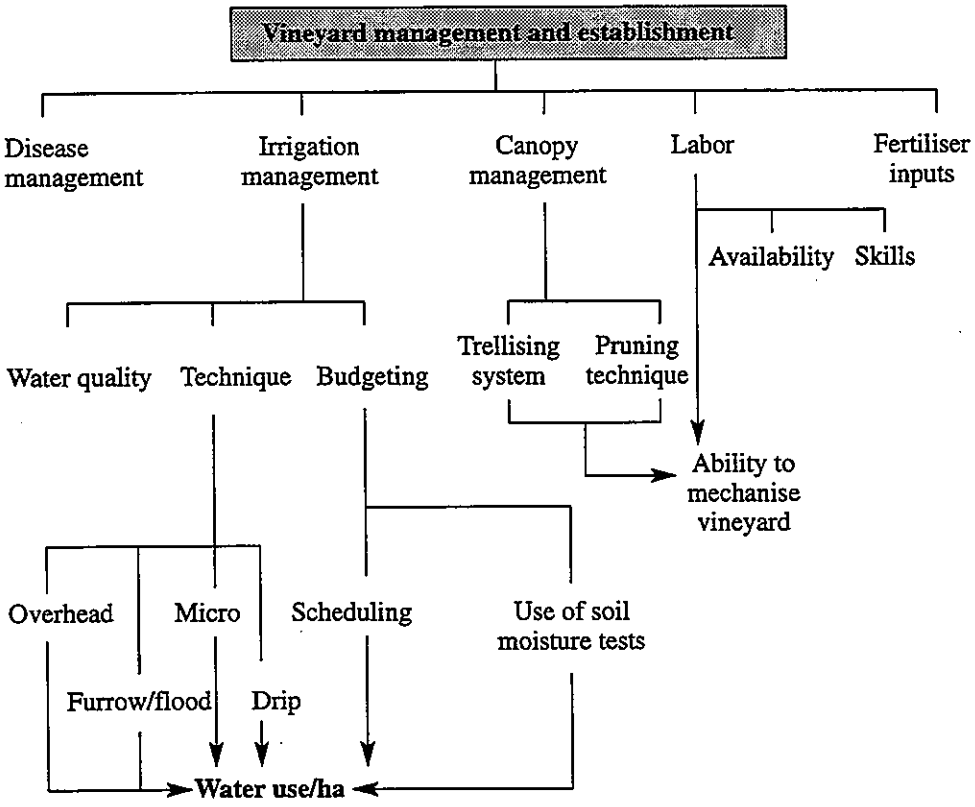
2 *Vineyard management*

Variable	Comment
Yield	***Tonnes per hectare for each variety*** The yield per hectare needs to be monitored as the tradeoff between quantity and quality is assessed.
Use of mulches and cover crops	Interrow management influences fruit quality and input costs and therefore may assist in identifying possible changes to management practices.
Chemical/ha or $ chemical /ha	***Measured on a $ per hectare basis or particular chemical use per hectare*** Use per hectare is often determined by the seasonal conditions. It is important to determine if the benefit of using chemicals is greater than the cost of doing so. Use per hectare may indicate environmental sustainability of management practices.

2 *Vineyard management* *continued*

Nutrient/ha or $ nutrient/ha	***Measured on a $ per hectare basis or particular nutrient use per hectare — for example, N, P or K per hectare*** The method of application and timing may also be useful. Once again, it's important to determine if the benefit of using fertilisers is greater than the cost of doing so. Use per hectare may indicate environmental sustainability of management practices.
Labor	***Measured in work-weeks, as estimated by the operator or manager. It includes all work on the farm by the operator, partners, family, hired permanent and casual workers, and sharefarmers but excludes work done by contractors.*** ***Work weeks based on a 40 hour week so that measurements can also be made on a per hectare or per tonne basis.*** ***Expenditure on contract services should appear as a cash cost.*** Labor is an important input cost. Comparison of labor use and cost may reveal where productivity improvements can be made. Key questions that can be asked include: Can labor be reduced by vineyard mechanisation? Is there labor available to maintain the vineyard? Does the workforce have the necessary skills?
Trellising system used	This influences fruit quality, ability to mechanise the vineyard and labor requirements and as a result is important in comparisons and in determining management practice options.
Pruning system used	Influences canopy management, incidence of disease and color and yield of fruit and therefore input costs. Important in comparisons and in determining management practice options.
Fruit quality ***Baumé, pH, color, maturity (%), acid, disease (%)***	Careful vineyard management is required to produce fruit of the required quality. The quality specifications will be determined by the wineries and will involve balancing the costs of achieving the desired outcome. These are important factors in monitoring the impact that management changes are having on different aspects of the fruit and the end profitability of the enterprise.

G Vineyard management



Financial indicators

Performance indicators

The financial performance of an enterprise is what underlies its viability and future sustainability. Prices for grapes will vary between varieties and seasons and are influenced by quality characteristics, their end use and the world demand for the various wine varietals.

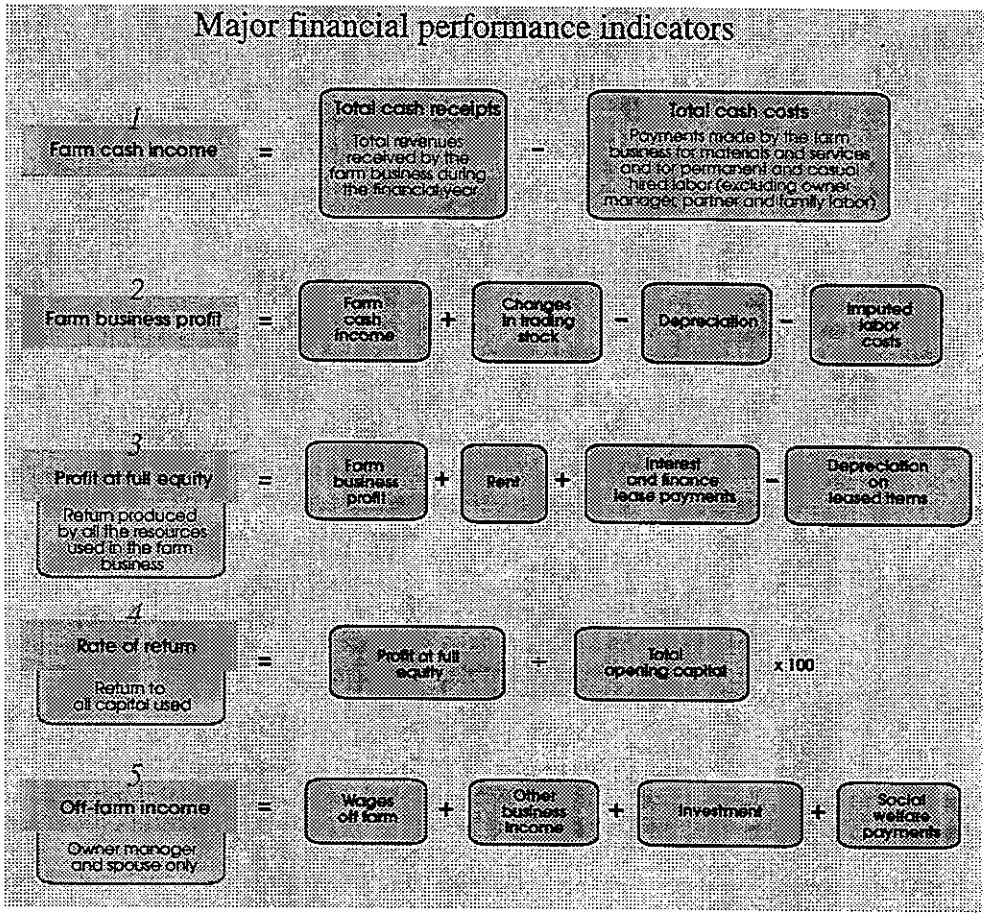
While managers have little control over the season or world markets, they do have control over the management of irrigation, diseases, pests and the canopy which can all influence quality. Moreover, growers can use their resource base, physical environment and management skills to target end use markets for their grapes, thereby influencing their income from grapes.

Profitability will be a major influence on growers' attitudes to capital expansion and technology adoption as well as the environment and is an indicator

of the economic health of the individual enterprise. It influences investment at all levels of the industry as well as the capacity of growers to increase grape quality. Policy makers are likely to be interested in the flow-on effects to the surrounding communities.

The selection of appropriate financial variables will ensure that maximum benefit can be obtained from benchmarking (tables 3 and 4). For example, by analysing the rate of return, it is possible to compare the investment opportunities of different businesses both within the wine grape industries and between other industries. An analysis of all costs may allow the identification of areas where costs may be reduced and overall profitability increased. However, one of the difficulties of benchmarking is that it is sometimes difficult to determine cause and effect.

The major financial performance indicators used in ABARE's farm surveys are shown below.



3 Financial variables

Variable	Comment
Income	
Grape income ($)	***Sum of receipts from sale of grapes, by variety. This may need to be estimated by multiplying the price received for each variety by the quantity delivered.*** Grape prices vary according to season, winery demand, marketing, variety and quality. This can be expressed as either total grape income, income per tonne, by variety, or income per hectare, by variety.
Other farm income ($)	Other enterprises on the farm may contribute significantly to the overall financial performance of the farm and therefore may be an important factor in explaining apparent differences in performance between farms. This figure may also include such things as sale of water.
Total cash receipts ($)	***Total of revenues received by the farm business during the financial year, including revenues from the sale of grapes and other crops and from other enterprises. It includes revenue received from agistment, royalties, rebates, refunds, plant hire, contracts, sharefarming, insurance claims and compensation, and government assistance payments.*** This is a combination of all sources of income derived from the farm business.
Off-farm income ($)	This is not a benchmark variable as such but can be an important indicator of the reliance of growers in particular regions on the local community.
Total cash costs ($)	***Payments made by the farm business for materials and services and for permanent and casual hired labor (excluding owner manager, partner and other family labor). It includes the value of any lease payments on capital, produce purchased for resale, rent, interest, livestock purchases and payments to sharefarmers. Capital and household expenditures are excluded from total cash costs.*** • ***Administration costs include accountancy fees, banking and legal expenses, postage, stationery, subscriptions and telephone.*** • ***Contracts paid refers to expenditure on contracts such as harvesting. Capital and land development contracts are not included.*** • ***Other cash costs include stores and rations, seed purchased, electricity, advisory services, motor vehicle expenses, traveling expenses and insurance. While 'other cash costs' comprise a relatively large proportion of total cash costs, individually the components are relatively small overall and, as such, are very often not listed separately.***

3 *Financial variables* *continued*

There are numerous ways to break up the costs associated with an enterprise. For example, overhead and variable operating costs, input costs per hectare/variety or per tonne/variety, total cash costs etc. The breakup used is most likely to depend on the detail of records kept and the breakups that occur in the farm accounts.

The level of detail required will depend on the type of analysis being undertaken and how well the data can be compared with other available data. However, in general the greater the level of disaggregation available the easier it will be to manipulate the data to make valid comparisons.

Major capital expenses for items that have a life longer than one year are usually excluded from operating costs.

4 *Calculated / derived financial indicators*

Variable	Comment
Farm cash income (operating surplus)	***The difference between total cash receipts and total cash costs.***
Depreciation	***Depreciation represents an allowance for plant and equipment replacement.*** It is best to make no allowance for the depreciation of fixed structures as it is too difficult to value many of the items in isolation from the land.
Operator/family labor	***This is an allowance made for work done by owner manager, partners and family members. It is calculated by multiplying the number of weeks worked by the relevant award rate. The rate used may vary between regions but when comparing vineyards the same rate should be used.*** Payments for owner manager, partner and family labor may bear little relationship to the actual work input. It is important to place an estimated value on this work so as to measure the 'true' return being made from the resources. It will also assist in comparing the returns from alternative agricultural industries. ABARE uses a limit of 40 hours per week to calculate this figure. It may be the case that more than 40 hours are spent in the vineyard. However, it should be assumed that this is the value of the opportunity cost of undertaking alternative employment. The value attributed to unpaid labor does, however, have the potential to greatly alter the bottom line.
Buildup or rundown in trading stocks	***This is the imputed value of all changes in the inventories of trading stocks during the financial year. It includes the value of any change in stocks of fruit, grains or livestock held on farm. It is negative when stocks are run down.*** Note that 'buildup in trading stocks' refers to the change in trading stocks, not the level of inventory.

4 Calculated/derived financial indicators *continued*

Farm business profit	***Farm cash income plus buildup in trading stocks, less depreciation, less the imputed value of the owner manager, partner(s) and family labor.***
Profit at full equity	***Farm business profit, plus rent, interest and finance lease payments, less depreciation on leased items. This can either include or exclude capital appreciation depending on the desired measure.*** This is the return produced by all resources used in the farm business and assumes all assets
Rate of return (%)	***Computed by expressing profit at full equity as a percentage of total opening capital. The following rates of return can be estimated:*** • ***rate of return excluding capital appreciation; or*** • ***rate of return including capital appreciation.*** This indicates how efficiently resources are used. The rate of return on capital is not influenced by how the farm operations are financed. It represents the ability of the business to generate a return to all capital used by the business, including what is borrowed or leased. A low rate of return should indicate that farm assets could be used more efficiently. These growers need to look at their costs. However, a low rate of return in the short term could indicate a number of other possibilities, such as low grape prices or the planting of new vines (which are expensive to establish and may not bear fruit for several seasons).
Equity ratio (%)	***Calculated as farm business equity as a percentage of owned capital at 30 June.*** Low equity can correspond to difficulty in servicing debt. However, this may be offset by a higher level of off-farm income.
Disposable income per household ($)	***Farm cash income divided by the number of households sharing in that income.*** This variable may provide growers with a reality check on their financial performance and also provide policy makers with some key indicators of the sustainability of the industry in a particular region. It is the amount of income left per family available for living costs after operating expenses, interest and lease costs are removed. If this is low, there may be little or no money available to be set aside for replantings, machinery upgrades or acquisition. This can have long term affects on the ability of the enterprise to generate future profits and maintain productivity.

Vineyard establishment

Vineyard establishment is costly in terms of both time and money. However, management practices and decisions at establishment can influence the potential productivity of the vineyard. Vineyard establishment and management influence not only initial costs, but also the annual ongoing costs.

An analysis of these issues will assist in understanding how best to minimise the cost of future plantings. A list of important factors in establishing and managing a vineyard can be found in tables 2 and 5 and figure G.

5 *Vineyard establishment*

Variable	Comment
Capital costs ($/ha)	Initial capital costs must be offset against annual costs of maintenance
Labor cost ($)	Labor is the most expensive input needed for the first two years
Labor availability (hrs)	Need to ensure adequate labor is available for the area being established.

Sustainability indicators

Although it is important to be conscious of performance and perhaps aim to increase profitability, it is critical that the levels of profitability can be sustained. This is also important for policy makers, industry groups and service providers. Sustainability can have a number of elements, including economic, social and environmental. This section concentrates on environmental sustainability — a number of indicators are listed in table 6 and their relationships are shown in figure H.

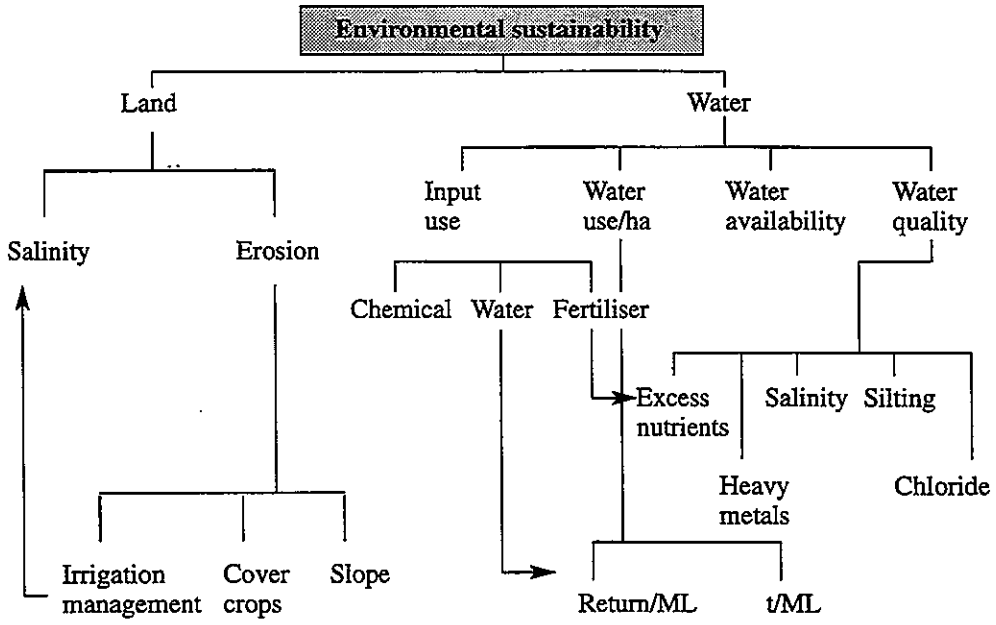
Socioeconomic indicators

While the physical and financial variables show the health of the business, the socioeconomic indicators can indicate the health of the industry in terms of its workforce and how well placed it might be to accept and adapt to new technology. Social indicators (table 7) can describe aspects of the workforce and working conditions. They are generally used to assist the industry and policy makers to provide training for growers, improve occupational health and safety provisions in the sector and to demonstrate the importance of membership to networks and groups.

6 *Sustainability indicators*

Variable	Comment
Selected inputs/ha	Includes water, fertiliser and chemicals.
Water quality ***Salinity (ds/m), pH, chloride (mg/L ppm), sodium (m mole/L)$^{1/2}$, alkalinity (mg/L ppm), iron (mg/L ppm)***	Water quality and availability are important issues not only to growers but also industry groups and governments. These measures may help in setting goals with respect to potential yields and management practices. Water quality influences the ability to irrigate and the type of filtration and drainage system required. It can also influence what cultivars and rootstock are grown.
Irrigation ***Irrigation systems***	These include flood, micro, sprinklers and drip. Knowing the type of irrigation can be an indicator of the level of investment and the ability of the grower to control water application and thereby influence grape quality.
Water use	***Either tonnes per megalitre or returns ($) per megalitre.*** Maximising the effectiveness of water use will continue to be an important factor as water becomes more expensive. This is a measure of the return from the application of irrigation water.

H *Relationship of the environmental indicators*



7 Socioeconomic indicators

Variable	Comment
Age of manager (yrs)	Also important is the age at which the manager assumed financial responsibility for the vineyard. It may also be an indicator of the stage in the business/investment cycle.
Training (days) ($)	Both on the job and formal training should be listed. This may include information days run by wineries, formal training courses or attendance at field days. One of the issues facing the wine industry is ensuring the supply of sufficient numbers of skilled staff to cope with the increased production and competition from overseas countries.
Group memberships	Better outcomes result when people share their knowledge and skills.
Number days lost to illness or injury	These can indicate OH&S attitudes and practices of the manager.
Holidays per year (days)	

Step 3: Organising the data

Once the most appropriate variables have been identified, the data must be collated. Some variables such as farm areas, key income items and costs will be readily available from farm accounts or other documents. However, other variables such as returns per hectare, yields and rate of return will need to be calculated.

A lot of the data required to undertake a benchmarking exercise will be readily available from existing records. These records include: financial accounts, cash books, sales dockets, rates notices, delivery/weighbridge dockets and diaries. The key to undertaking the exercise successfully is to collect and record the components accurately. In doing so it will be possible to calculate the derived variables when required and make valid comparisons.

There are numerous ways of approaching this task either in hard copy or electronically. Inputting the data into a spreadsheet or other electronic tool has the advantage that any calculations can be done quickly and easily. They also have the ability to handle large amounts of data — for example, collating all the deliveries of grapes to the winery by date, variety and specifications.

Once the appropriate variables for an enterprise have been identified they should be listed in a logical order and then a gap analysis undertaken that will identify the data items that will require some additional work. For example, a soil test might be required to input certain variables. A sample list appears on the next page.

It is important to identify the period covered by the data. Usually this is a full financial year. This needs to be recorded as well to assist later in analysis and comparison.

To measure the performance of the business, relative quantitative measurements are needed to make meaningful comparisons. Once collated, these data should be checked/validated and the most appropriate group or region to benchmark against identified. Differences in the resource base and physical environment occur across individual farms, let alone between regions. These differences along with differences such as the stage of development of the business, must be accounted for if the comparisons are to be meaningful.

The availability of data may determine what variables can be calculated. In addition, technology is constantly changing and these changes can alter the relevance of some variables and the resulting benchmarks.

Remember, consistent definitions are essential to allow comparisons to be made between growers, regions and even industries. If variables are standardised, the differences being measured are real and true comparisons between farms can be made.

Step 3 and the two farm example

Both farms 1 and 2 will have similar requirements for organising the data.

Farm 1 perhaps has a greater opportunity to record the history of the vineyard from a very young age and therefore has greater potential to do more with shaping the future productive capacity of the property.

Farm 2 will need to ensure that data relating to off-farm income is clearly identified and separated from farm business income.

Sample benchmark worksheet

Variable		**Unit**	**Your farm for 1999-2000 financial year**
Total farm area at 30 June		ha	
Area under vines	Variety 1	ha	
	Variety 2	ha	
	Variety ..x	ha	
Area bearing	Variety 1	ha	
	Variety 2	ha	
	Variety ..x	ha	
Area nonbearing	Variety 1	ha	
	Variety 2	ha	
	Variety ..x	ha	
Quantity harvested	Variety 1	tonnes	
	Variety 2	tonnes	
	Variety ..x	tonnes	
Yield	Variety 1	tonnes/ha	
	Variety 2	tonnes/ha	
	Variety ..x	tonnes/ha	
Total area irrigated		ha	
Water applied this season		ML	
Irrigation systems used 1		ha	
2		ha	
Receipts from crops:			
– wine grapes		$	
– citrus		$	
– other grapes		$	
– other		$	
– total from crops		$	
Other receipts		$	
Total cash receipts		$	
Hired labor costs		$	
Fertiliser		$	
Crop and pasture chemicals		$	
Fuel, oil and grease		$	

Repairs and maintenance	$	
Other materials	$	
Contracts paid	$	
Water and drainage costs	$	
Other services	$	
Interest paid	$	
Rent	$	
Other cash costs	$	
Total cash costs	$	
Estimated horticultural costs per hectare	$/ha	
Farm cash income	$	
Estimated farm cash income per hectare	$/ha	
Buildup in trading stocks	$	
Depreciation	$	
Operator and family labor	$	
Farm business profit		
Profit at full equity	$	
Farm capital at 30 June	$	
Rate of return excluding capital appreciation	%	
Net capital purchases	$	
Farm business debt at 30 June	$	
Change in debt during year	$	
Farm equity ratio	%	
Off-farm income	$	
Returns per hectare	$/ha	
Other variables		
Soil characteristics		
Climate data		
Trellising system		
Chemicals applied		
Fruit quality characteristics		

Steps 4 and 5: Analysis and evaluation of the farm business

All aspects of the business, including farm enterprises other than wine grapes, should be analysed together. When undertaking comparative analysis it is important to be aware of the potential dangers of setting targets based on inappropriate data.

Once all the data have been organised and some of the higher level variables (eg rate of return) calculated/estimated the next step is to compare that data with other available data.

Overall performance of the business, reflected in the rate of return, is a good variable to start with as it provides an indication of the return on investment. This return can be compared not only with other wine grape producing properties but also with other agricultural and nonagricultural investments.

The average rates of return for other agricultural industries in Australia in 1996-97, estimated by ABARE, were:

	Wheat and other crops	Mixed livestock –crops	Sheep	Beef	Sheep –beef	Dairy
Rate of return	6.2%	1.4%	–0.5%	–0.6%	0.0%	1.6%

Within each of these industries the rates of return will vary significantly, with the top performing farms in each category recording significantly better returns than those shown in the averages.

The rate of return being achieved by wine grape growing properties is also going to vary considerably between regions and between farms within regions. This can be illustrated using ABARE survey data for the three regions MIA, Sunraysia and Loxton. The average rates of return for wine grape properties in these regions in 1996-97 were:

	Loxton	Victorian Sunraysia	MIA
Rate of return average	3%	–1%	22%

As can be seen the range is very large between regions so it will be important for farm managers to align themselves with the most appropriate region.

Once data have been collected for a region, or another region that is more appropriate, the task is to identify the top performing farms, as even within a region the range can be broad. For example, in Loxton, although the average

rate of return is 3 per cent, the top quarter of farms surveyed had an average rate of return of nearly 14 per cent whereas the bottom quarter averaged a rate of return of –12 per cent.

It may be necessary to further choose a group of farms within the region that is most applicable. For example, farms with a similar proportion of nonbearing vines. Appendix A provides a sample of data from farms with different rates of return and varying proportions of nonbearing vines.

The next task is to begin to ***fine tune the data*** so they can be compared with the data available for the top performing farms. It may be necessary to calculate variables such as returns per hectare of bearing grape,s by variety, yield in tonnes per hectare, by variety, particular cost items per hectare and labor units per hectare. This will be part of the 'gap' analysis mentioned in the previous step of organising data.

When all the necessary data are available, there are some key questions that need to be addressed.

- Why are results different from the top performers?
- What is being done differently?
- Is it the quality and or variety of the wine grapes being produced?
- Is it the different cost structures, fertiliser per hectare, sprays and chemicals per hectare, the labor units per tonne of grapes or perhaps the water use efficiency?

Some of these issues can again be illustrated using the ABARE survey data. Some variables estimated from data collected from wine grape properties in the Loxton region in 1996-97 are shown in table 8 (and appendix A). The data are for farms with 25–50 per cent nonbearing vines (similar to example farm 1) and farms with less than 10 per cent nonbearing vines (similar to example farm 2). Each group is then split by rate of return into the top 50 per cent of farms and the bottom 50 per cent of farms, by rate of return.

It is important not to jump to conclusion. Approach the analysis with an open mind and in a logical manner as there will not be one key driver of profitability. It will be a combination of factors that together make up the performance of a property.

A farm in the lower performing end of the scale may be tempted to think that the way to improve performance is to cut costs. However, it may not always be the case that lower costs per hectare are better either. The better perform-

8 Survey data for the Loxton region, 1996-97

Variable	Unit	25–50% of vines nonbearing		Under 10% of vines nonbearing	
		Top 50 per cent of farms	Bottom 50 per cent of farms	Top 50 per cent of farms	Bottom 50 per cent of farms
Yield for bearing area of wine grapes	t/ha	17.2	10.9	16.0	12.0
Receipts per hectare of wine grapes harvested	$/ha	11 860	6 290	12 120	5 970
Proportion of income from all grapes	%	85	77	88	79
Costs per hectare of total horticultural area					
Hired labor	$/ha	850	310	460	790
Fertiliser	$/ha	130	130	270	240
Chemicals and sprays	$/ha	250	220	390	300
Repairs and maintenance	$/ha	630	410	490	840
Water and drainage	$/ha	260	320	300	260
Total cash costs	$/ha	4 320	3 560	3 860	5 020
Operator and family labor	$/ha	1 030	2 050	1 960	2 740
Rate of return excl. capital appreciation	%	7.9	–4.3	11.8	–6.2

ing farms in this example have fertiliser costs higher per hectare than the lower performing farms.

Therefore other factors need to be questioned when using these results. What is the mix of varieties and or qualities? Are the better performing farms producing a higher quality grape which is being reflected in better returns per hectare? Is it the age of the vines or are the large difference in receipts per hectare a reflection of marketing arrangements?

There is a need to question overall management practices. In this example the income from citrus per hectare is also higher on the better performing farms.

The larger hired labor costs on the lower performing farms need to be balanced against the estimated value of family labor and possibly the relative amounts of off-farm income being received. In this example the combined hired labor and family labor is much the same.

This example illustrates the need to take care when analysing data and to look at the whole farm operation and performance before setting targets. It also points to a closer examination of the combination of factors that may be helping one group out perform the other.

Steps 4 and 5 and the two farm example

Farm 1 — when analysing variables like rate of return it will be important that it be done on the basis of full equity. This will ensure that the effect of the debt is excluded from the calculation for comparison purposes. It will also be useful to compare against farms with a similar high level of nonbearing vines so as to maximise the benefit of measuring such things as labor input, water use and fertiliser use per hectare. There are also likely to be significant differences in the returns per hectare from young vines depending on their age, variety, density of planting and quality of grapes being produced.

Farm 2 is near full bearing and therefore will need to consider different aspects of the operation. A higher water use per hectare and/or tonne may indicate the need to upgrade the irrigation system. High labor costs compared with other farms may indicate a need to improve the mechanisation and/or adoption of technology on the property. Lower returns per hectare per tonne may mean a need to address fruit quality through better management practices.

Both farms' returns will also be influenced by the contracts or lack of contracts with the wineries. Meeting the quality specifications of these contracts is likely to become increasingly important for both farms.

Traps to be aware of when undertaking comparisons

There are a number of traps to be aware of while undertaking an analysis and comparisons with other sources of data.

- Make sure like enterprises are compared. While this may not always be feasible, it is important to be aware of any differences that occur.
- Understand the underlying structure of the business.
- Be aware of the life cycle of the business.

There are a number of other factors that can limit the potential benefits of benchmarking. The purpose of undertaking a benchmarking exercise and the business goals of participants should be clear and consistent for meaningful comparisons to be made. For example, businesses are going to be in different phases of their life cycle. One may be trying to build a reputation for producing quality wine while another may be maintaining production at minimum cost. Also, the correct performance indicators should also be chosen to compare farm performance. For example, it is useful to assess the costs of production in the context of quality. An enterprise producing premium grapes will have different yields and costs per hectare than a producer of low quality grapes for the cask market.

No single indicator fully reflects excellence in farm performance. Results can be presented in a number of ways, such as average per farm or on a per hectare basis. In appendix A, results are presented on an average per farm basis. Most of the differences in results between regions are caused by the size of the enterprise and the large areas of new plantings in Sunraysia. These factors are not immediately apparent by using averages per farm. The results would be more informative when presented on an average per hectare basis.

Loxton farms are generally smaller than farms in the MIA or the Victorian Sunraysia district and hence there is less opportunity for expanding the enterprise and some of the economies of size do not exist. This may mean growers are less able to take advantage of new technologies that have been developed for large scale farms. In addition, farm debt levels in Sunraysia are higher than in the other two regions as there are many new developments in the region (Topp and Danzi 1998). Hence these differences in the resource base must be kept in mind when analysing indicators using these variables.

Regional infrastructure and target markets should also be considered. Moreover, water prices and irrigation infrastructure, both on and off the farm, are different between regions and the different wine grape varieties require varying levels of inputs. As input prices, technology and infrastructure change, the relevance of indicators should be reassessed. These differences between enterprises need to be considered before sensible comparisons can be made.

In appendix A the farms are ranked according to the rate of return. However, a number of financial indicators — such as return on total assets, net profit, gross margins and profit per bearing hectare — could be used to sort farms into different performance groups. Some indicators are more informative — for instance, net profit and gross margins are highly correlated with farm size. For the case studies, rate of return was selected as it is possible to compare the performance of farms despite differences in the natural resource base or target product markets. It is also possible to make comparisons between industries. Differences in the productive capacity of the land are reflected in the land value, which is the major component of total farm capital.

In some regions, particularly those near large urban centres, nonagricultural factors have stronger influences on land values than the land's productive capacity. Ranking farms at the regional level helps to minimise this influence on the measures of farm performance (Martin et al. 2000). Also, return on total assets is calculated using profit before allowance is made for interest and taxation payments, enabling comparison between all farms regardless of financing arrangements. This is important as the farms in Sunraysia have high debt levels because of their large levels of new plantings.

Step 6: Taking action and moving toward best practice

Actions taken: The purpose of undertaking action is to increase the long term economic viability, productivity or environmental sustainability of the grape growing enterprise.

The final step in the benchmarking exercise is that of taking action to move the farm toward best practice. However, this is not where the process finishes. Further evaluation will be required in the future to determine how successful any actions undertaken were in achieving the initial goal. Moving toward best practice is an iterative process that will require many adjustments to practices followed by re-evaluations. The result should be an economically viable, productive and environmentally sustainable grape growing enterprise.

There are a number of factors that will influence benchmarks in the future. For example, technological changes can be adopted to increase efficiencies in farm operations, prices constantly change, quality parameters and other demands from wineries alter. It is important to account for these changes when evaluating benchmarks based on historical data. Benchmarks based on historical data can also expose areas where technological change could be useful. Exposing the current business weaknesses or constraints gives indicators of

Step 6 and the two farm example

Farm 1 needs to maximise returns as soon as possible to service the debt. This will require assessing the quality specifications being demanded by the winery and adopting management practices that will maximise the returns per hectare as early as possible. It may also be useful to consider the 'best practice' of best performing farms that have mature vines to ensure that future demands on labor, water, fertiliser etc can be anticipated.

Farm 2 may need to evaluate the variety mix currently existing on the property. There may be a need to introduce 'new' technology into the management — such things as mechanical harvesting, pruning, spraying and/or water use. The opportunity cost of labor needs to be examined when considering the balance between working on or off the farm. There is also a need to obtain the quality specifications of the winery for the fruit being produced. There may be a management practice that would enable the quality to be lifted at a small price that would in turn raise the returns per hectare. This may be the case where there is a balance between quantity and quality.

Ultimately both farms need to decide if the returns from the property are meeting their needs. If they are not then a decision needs to be made about where to get a better return. This may be by diversifying the farm operation, moving industries or location and/or investing the funds in nonagricultural pursuits.

types of opportunities for change to watch for. Developments in technology not only change the relevance of benchmarks but can also make some variables obsolete.

However, benchmarking can provide useful data for individual farms if it is carried out over a number of years and comparisons are made. The variation from factors such as soil types and varietal mix can be reduced or eliminated and the difference in comparisons will more closely relate to performance management. However, differences caused by climate and markets should still be accounted for. Interyear comparisons can be made to see the effects of any changes in management techniques.

Some of the recent technological changes and the costs and benefits of adopting them are outlined below. The changes discussed do not represent a definitive list of technological advances but outline the key areas where changes are taking place and some examples for each area. The management techniques and technologies outlined in this section can act as a starting point in deciding where and what actions can be undertaken to increase long term productivity of the enterprise.

Also, a number of grower groups have been established to trial more efficient technologies that have been developed to control diseases and weeds, new irrigation technologies and to control salinity at regional levels. Conditions are different in each region and more region specific research is likely to increase grower's input efficiency and grape quality.

Technological advances in vineyard establishment have allowed vines to bear fruit after just 18 months. Better soil management, advances in vine guards and vine nutrition and more time spent in training and pruning vines has meant the vineyard can become profitable more quickly. There are also likely to be corresponding changes in the costs of establishment and annual operating costs.

An integrated approach to ongoing vineyard management can improve the profitability of grape growing. Advances in pest and disease control, canopy management, pruning and trellising can all increase the quality of grapes harvested. In recent years wineries have placed increased emphasis on improving the quality of fruit rather than the quantity through an incentive and bonus system. Technological advances have resulted in growers being able to test for quality measures such as sugar and pH levels in the vineyard and mechanical harvesting can allow for more timely harvesting that can ensure grapes are picked at peak quality.

Precision agriculture and low cost weather stations allow decision making to occur at a more micro level and the increased information available from both technologies allows greater control over input use and hence production costs.

Improvements in irrigation technologies allow for more efficient water use which benefits both enterprise profitability and environmental sustainability. Mulching systems also assist in conserving water as well as improving vine nutrition.

Great technological advances have also occurred in the development of new grape cultivars. Gene technology may have the capacity to reduce input costs, reduce losses in yield and quality from pest and disease incursions and may be used in the future to improve quality characteristics such as flavor and color.

Appendix A: The case study regions

In this section, the results are presented from an ABARE farm survey of three wine grape growing regions — the Murrumbidgee Irrigation Area, Victorian Sunraysia and Loxton.

Background information and regional summaries containing information on bearing areas, production levels, soils, climate and water availability for all three regions is also provided. These summaries can assist in explaining the ABARE survey results that follow.

ABARE collected data in these regions for 1996-97. Farm averages for a number of variables are supplied; however, the detail of the analysis is restricted by a small sample size, particularly for the MIA and Victorian Sunraysia.

A larger survey sample for the Loxton area allowed for a more detailed analysis of farms. For this region the percentile range is given that shows the performance of the top and bottom 50 per cent of growers according to proportion of nonbearing vines, as well as the average for the regions. The ranking is based on rate of return.

For benchmarking studies to be useful, an adequate number of farms need to participate. This would better enable farmers to compare their enterprises with similar enterprises and identify management practices that may be beneficial.

Murrumbidgee Irrigation Area

The region is located on the south west plains of New South Wales. Griffith is the focal point of the MIA. The region is part of the greater Murray Darling Basin, lying within the Murrumbidgee and Lachlan catchments. The MIA is flat and in the past has been known as a quality wool and grain growing district. The MIA produces 10 per cent of national red grape production and 12 per cent of white grape production. Forty per cent of the national semillon crop is produced in the MIA (Shepherd 1999).

Soils and climate

Soils in the region consist of highly variable alluvial soils with sands and gravels embedded in clays. The main soil type is red-brown earth with a loamy

surface 10–35 cm deep that passes abruptly to a reddish brown clay to a depth of 70 cm. Most vines are grown on these soils that are generally free draining.

The region has an annual rainfall of just over 400 mm, which is evenly spread through out the year. High growing season temperatures are common, with the mean daily temperature for January being 32°C. For economical grape production, and to ensure vines receive adequate watering throughout the growing season, all vines must be irrigated.

Water availability

Water is drawn from the Murrumbidgee River at Berembed Weir and is directed through the main irrigation canal to a system of secondary channels. Water flow is by gravity and water quality is generally high. Originally, flood irrigation systems were used; however, environmental concerns and the rising cost of water have resulted in the emergence of new farm designs, recycling systems, the use of microirrigation systems, siphons and farm laser leveling to keep water wastage to a minimum. Hence while the use of flood irrigation is still widespread, this is changing.

Area planted and quantities produced

In 1999, there were 7856 hectares of bearing vines in the MIA, of which 56 per cent were white varieties. Semillon made up more than 20 per cent of total bearing area and is by far the greatest produced variety. A further 1885 hectares had been planted but were not bearing in 1999, with more than 85 per cent of this nonbearing area planted to red varieties (Australian Bureau of Statistics 1999).

The MIA produces more specialist wine grapes than any other region in Australia and produces more than 50 per cent of the wine grape crush in New South Wales. Between 1994 and 1999 production increased by around 47 per cent to around 133 000 tonnes (Shepherd 1999). It is thought that further increases occurred in the 2000 vintage, although increases were not as great as forecast because of lower yields, particularly for white varieties, as a result of poor seasonal conditions during the growing season.

Victorian Sunraysia

History and background

The Victorian Sunraysia district is located in the far north west of the state, with irrigated horticulture and viticulture being the major industries in the

region. The main town is Mildura and the principal crop is grapes that are used for drying, wine and fresh consumption.

The private diverters on the Victorian side of the Murray River pump water directly from rivers rather than obtaining water from constructed irrigation channels. This has allowed the vineyards to be larger than in many other irrigation schemes, with large areas of arable dryland available to be developed into irrigated vineyards.

Soils and climate

The region is part of a very old landscape of sand dunes covering clay. Soils are generally saline and alkaline and some parts of the region are not suitable to irrigation. Summers are generally dry and hot followed by a cool winter. Annual rainfall is 250 mm and is winter dominant and highly variable. The climate is not conducive to many pests and diseases, resulting in lower costs of production than in some other areas.

Water availability

The Murray River is the main source of irrigation water, although the Darling River sometimes supplies part of the area. Ground water is also used to a limited extent. Ground water is highly saline (30 000–40 000 mg/L) and under certain conditions can enter the Murray River. The risk of increasing salinity from irrigation depends largely on the soil types and soil profile. While the water supply from the Murray is reliable, salinity can reach critical levels at certain times of the year.

The Murray Darling Basin Ministerial Council has capped the volume of water available to be diverted from the river system for irrigation. This, combined with water trading is likely to result in an increase in the area of vines at the expense of other less profitable irrigation industries.

Most of the private diverters have a greater capability to install new irrigation systems than those in the irrigation schemes, as they are not restricted by off-farm infrastructure and have more potential to expand.

Area planted and production

In 1999, there were 17 645 hectares of grapes planted in Victorian Sunraysia, with about 16 per cent of these vines not yet bearing. Of the vines that were bearing, about 57 per cent were the multipurpose varieties of muscat gordo blanco, sultana and waltham cross (Australian Bureau of Statistics 1999).

Sultana grapes are the dominant crop in the area, making up around 53 per cent of the bearing area in 1999 (however, only 46 per cent of the total sultana production went into wine). As wine grape prices increased in comparison to prices for dried vine fruit, a significant shift occurred in the mid to late 1990s away from multipurpose varieties toward specialist wine varieties. However, in recent years, plantings to multipurpose varieties have again been increasing, with these varieties making up around 11 per cent of plantings in 1999. Chardonnay is the next most planted variety, accounting for nearly 12 per cent of total bearing area in 1999 (Australian Bureau of Statistics 1999).

In 1999, Victorian Sunraysia produced 24 per cent of the national white grape crush and 8 per cent of the national red grape crush. In the same year, the region produced 64 per cent of the national sultana crop and 19 per cent of the muscat gordo blanco crop used in wine making, 17 per cent of the national chardonnay crop and 9 per cent of the semillon crop. Production in the Victorian Sunraysia region accounted for around 67 per cent of the Victorian crush in 1999 (Shepherd 1999).

Riverland and the Loxton region

History and background

The Riverland district is 200 kilometres north east of Adelaide and extends along the Murray River for 330 kilometres. Loxton is located on the southern side of the river. After World War 2 the area was split into soldier settlement blocks, with an irrigation scheme set up to water 4000 hectares. At this time only 22 per cent of South Australia's allocation of water from the Murray was being used (Loxton District Council 1982). The allotted blocks were between 20 and 30 hectares. In 1952 the Loxton Co-operative Winery crushed the first vintage of 800 tonnes.

The economy of the region is based on irrigated horticulture, with important contributions from both dryland farming and tourism. During the 1990s wine grapes, apricots and cereals (especially wheat) increased their contribution to the gross value of agricultural production at the expense of vegetables, oranges and wool.

Many farms have undertaken replanting and reworking in recent years, planting premium varieties and allowing farms to be mechanised. High prices in the past ten years have given growers the incentive to upgrade irrigation systems and plantings and to concentrate on management practises to increase quality.

Soils and climate

The water needs of the region are met almost exclusively by irrigation, so a good knowledge of soil type and its water holding capacity are very important. There are two main soils types in the Riverland, namely river valley soils that consist of loams and clays, and mallee soils on higher ground. The higher land is made up of depressions and rises consisting of windblown sands over lime and clay layers. These soils require greater management to prevent wind erosion. In some areas the clay layer is impermeable. The depth of top soil is very important as is drainage in determining irrigation scheduling. Nematodes pose a large problem in the region, particularly on land that has previously grown fruit.

Water availability

For most of the history of irrigation in the region, growers have had very little say in when they receive their water; however, this is now changing. Significant expenditure on water resources infrastructure has been undertaken in recent years.

New vineyards often use drippers instead of furrow or sprinkler systems, not only as a major water saver, but also for better control and to reduce evaporation losses. However, efficiently managing whatever system is in place tends to be more important than the type of system used.

Area planted and production

Planting and production figures are based on the South Murray region as ABS figures are not available for just Loxton.

In 1999, there were 4100 hectares of grapes planted in the South Murray region, and of this about 27 per cent of the area planted was nonbearing. Of the total bearing area, shiraz made up 22 per cent and chardonnay 18 per cent (Australian Bureau of Statistics 1999).

The South Murray region produced just 6 per cent of the national wine grape crush in 1999, and 13 per cent of the South Australian crush. Red grapes accounted for 42 per cent of the region's wine grape production, with specialist white wine grapes accounting for a further 32 per cent of production. The South Murray region produced 10 per cent of the national grenache crush in 1999 and 14 per cent of the ruby cabernet crush (Shepherd 1999).

ABARE data collection

Only data from the specialist wine grape growers who received at least 60 per cent of their income from wine grape production are used in this analysis except for some water and irrigation indicators that use the results from all horticultural farms.

Estimates of physical and financial variables for 1996-97 are provided so that a comparison of performance can be made with the farms in other regions. These estimates are based on a 1994-95 survey of the farms in the region.

Only a small proportion of the total number of farms in each region are used to produce the survey estimates. The differences between these estimates and the estimates that would have been obtained if information had been collected from a census of all farms are called sampling errors. The more farms there are in the sample, the lower the sampling error is likely to be. The samples used here are relatively small.

To give a guide to the reliability of the survey estimates, sampling errors have been calculated for the 1996-97 estimates. These estimated errors, expressed as percentages of the survey estimates and termed 'relative standard errors', are given next to each estimate in italics.

Survey results

Physical indicators

The average total size of farms in the Victorian Sunraysia area was 182 hectares, more than five times greater than the other two regions. While the irrigated area was only marginally greater than the MIA, it suggests that there may be significant scope in the Victorian Sunraysia to expand the area planted to grapes by irrigating the arable dryland areas in the future, depending on water availability. The private diverters pump water directly from the river rather than from irrigation schemes and hence are not restricted by a lack of off-farm infrastructure or when water is delivered. However, in recent years, the availability of water for expansion has fallen.

The average irrigated area in Loxton (15 hectares) was about half that of the other two regions and there is little opportunity to increase this. The farms surveyed in Loxton were irrigated from a series of channels and pipelines that diverted water from the Murray River. Two small privately run irrigation trusts in the Loxton area were also included in the survey.

Loxton was originally set up as soldier settlement blocks and as a result the farm blocks are small and expansion is restricted. The total area irrigated is also constrained by the existing off-farm irrigation infrastructure that is one of the few in the Riverland that is still to be privatised and has not yet undergone major refurbishment.

Financial indicators

Many of these physical indicators as well as receipts and cash costs are needed to derive some financial indicators. However, when analysing these financial variables, it is very important to remember what the goals and lifestyle requirements for the vineyard are, so that like enterprises are being compared. Also, the target end use for grapes should be similar as this will influence fruit quality and hence the price received.

Despite a higher bearing area in the Victorian Sunraysia, grape receipts were below those of the MIA while cash costs were far higher. This is likely to be a result of a higher proportion of younger vines and nonbearing vines, as well as a higher proportion of lower valued fruit. In the first two years after planting, labor costs are far greater than for mature vines, with 250–300 hours of labor per hectare required just to train vines (Davidson 1999). This will greatly increase input costs, with little or no income from these vines.

The farms in the MIA had higher farm cash incomes than the other two regions due to lower costs per tonne of production and higher receipts per hectare of grapes. Lower costs were recorded for hired labor, repairs and maintenance, water charges and interest payments (Martin 1998). However, chemical use in the MIA was higher, which may be a reflection of the climatic conditions in that region for 1996-97.

Growers in the MIA received $12 290 per hectare for horticultural crops compared with $7680 per hectare in Victorian Sunraysia and $8110 per hectare in Loxton in 1996-97. This is likely to be a reflection of the crop mix, grape varietal mix (with very few multipurpose grape varieties grown in the MIA), yield, grape quality and the relationship between growers and wineries. This is despite growers in the MIA receiving on average less per tonne for most varieties than growers in the other regions according to official sources of wine grape prices in 1996-97 (table 9). This could indicate a higher production per hectare in the MIA or the MIA survey sample may be skewed toward better performing farms and growers of higher quality fruit in the MIA. Lower valued fruit may be grown on survey farms in Victorian Sunraysia. Sultanas make up more than 50 per cent of the bearing area in Sunraysia (Australian Bureau of Statistics 1999) and in 1996-97 they averaged $262 a tonne compared with $1013 for chardonnay in Sunraysia (table 9).

Substantial redevelopment of vineyards took place in the second half of the 1990s in Sunraysia. This was promoted by low prices for valencia oranges and resulting government schemes to assist growers to move out of valencia production and to upgrade irrigation systems and the relatively high returns available for premium wine grapes. As a result, large areas of citrus trees and lower valued grapes such as sultanas were replaced by premium wine grape varieties that offered higher returns. Also, irrigation and drainage systems were upgraded to increase the efficiency of water use. Hence the private diverters in the Victorian Sunraysia were experiencing a period of lower incomes and higher investment at the time of the surveys.

9 Average farm gate grape prices, 1996-97

	Riverland	Sunraysia	MIA
	$/t	$/t	$/t
Chardonnay	1 033	1 013	800
Semillon	560	544	450
Cabernet sauvignon	1 136	1 062	750
Shiraz	1 120	995	600
Sultana	248	262	270

Sources: Wine grapes Marketing Board, Phylloxera and Grape Industry Board of South Australia and the Murray Valley Wine Grape Industry Advisory Council.

These redevelopments are the likely cause of a lower (68 per cent) equity ratio for Victorian Sunraysia, and the very high farm debt levels of $314 310. If another survey was conducted now, it is likely to produce somewhat different results to these as these vines would now be producing grapes. As the nonbearing area reported in the survey starts producing, the rate of return that was negative in 1996-97 is likely to become positive, with investment in farm capital likely to fall as plantings slow. As a result, caution must be shown when analysing the results of benchmarking studies.

Loxton on the other hand has a smaller bearing area with less redevelopment. Debt levels are more manageable at $66 660, cash costs were less than half those of the MIA and a third of those in Victorian Sunraysia (however bearing area was also about half that of the other two regions). The equity ratio was 83 per cent; however, some replanting had taken place with an average 2.8 hectares of nonbearing vines per farm (a figure similar to that of the MIA). Hence while profits are lower, so are costs and debt in Loxton.

Farm business profit was very high ($159 040) in the MIA and the rate of return averaged 22 per cent, suggesting very efficient use of capital and good financial management by the growers surveyed.

Sustainability indicators

The main variables available from the survey indicating environmental sustainability are concerned with irrigation and water use. The survey results

compare the differences between the regions. However, the distribution of water use within the regions was also large due to differences in irrigation technologies, soils and irrigation management between farms (Danzi 1999).

Out of the three regions, Loxton had the lowest water allocation per farm (164 ML), but also the smallest irrigated area (15 hectares). However, Loxton used the greatest amount of water per hectare of wine grapes, using 8.3 megalitres per hectare (table 10). This may be because 76 per cent of the average farm was irrigated by overhead and low sprinklers (table 11). Also, the shallow mallee soils may have a lower water holding capacity than soils in the other two regions.

Victorian Sunraysia farms used 92 per cent of their water allocation, suggesting that further expansion of irrigated horticulture in the area may be limited by water availability. However, on average, 61 per cent of farm area was irrigated by overhead sprinklers, so by adopting more efficient irrigation systems (such as drip irrigation), or by improving irrigation management (such as better irrigation scheduling), water use per hectare may be reduced. The water saved could then be used to plant additional areas.

As water reforms take place, it is likely that more water will be made available to users other than agriculture, such as the environment. In the MIA, horticulture is a high security water user and hence growers water use is little affected by lower allocations (Danzi 1999). It is more likely to be rice growers and irrigated broadacre agricultural users that face lower water allocations. However, since horticultural growers can sell their excess water on the temporary water market any decrease in allocations will mean that there will be less water for them to sell, which will negatively affect their incomes. Any increase in the price of water caused by reduced allocations, however, should create an incentive to reduce on-farm water use through improved scheduling and budgeting or upgraded technologies, with farmers able to sell the excess water. In 1996-97, 90 per cent of growers with an allocation greater than their water use sold water. On average they sold over 100 megalitres at around $1450 per farm (Samaranayaka et al. 1998).

On average, farms in the MIA used only 59 per cent of their water allocation (table 10). Their other farm receipts are higher than those in both Loxton and the Victorian Sunraysia, reflecting in part the trade of excess temporary water. Also, it would appear that at the current price of water there is little incentive for irrigators to upgrade to more efficient irrigation systems. Currently, 74 per cent of farm area is flood irrigated (table 11).

10 ***Water use, by irrigation district, 1996-97*** *Average per farm*

		Loxton	Sunraysia private diverters	MIA
Wine grapes	ML/ha	8.3	7.2	7.1
Water allocation	ML	164	234	291
Water used	ML	136	216	171
Proportion of allocation used	%	83	92	59

Source: Danzi (1999).

11 ***Proportion of farm area irrigated, by type of irrigation system (for all horticultural farms, not just wine grapes), 1996-97*** *Average per farm*

	Loxton	Sunraysia private diverters	MIA
	%	%	%
Low sprinklers	36	16	0
Microjets	5	3	3
Overhead sprinklers	40	61	3
Flood	14	1	74
Drip	5	19	20

Source: Danzi (1999).

These measures are not an indication of water use efficiency. Although the majority of farms in the MIA use flood irrigation, water use per hectare was estimated to be lower than in the other two regions. Farms in the MIA generally require less water because they have different soil conditions, higher average rainfall and lower temperatures.

Distribution of farms in Loxton

Large differences in variables occur not only between regions, but within the same region. In this section, the 34 wine grape farms surveyed in Loxton have been analysed and split up to show the characteristics of the top performing 25 per cent and the bottom performing 25 per cent of farms, based on their rates of return (table 12). While the sample size was not big enough to do a similar analysis with the other two case study regions, large differences between the top and bottom performing farms are likely.

As expected, the top performing farms had greater irrigated area and area of wine grapes harvested than both the average and the bottom 25 per cent of growers. The lowest 25 per cent of growers had more nonbearing area (2.9 hectares) than the average (2.8 hectares) the top 25 per cent (2.1 hectares) and

12 *Farm performance of irrigated wine grape farms in Loxton, by proportion of nonbearing grapes, 1996-97* *Average per farm*

		Less than 10 per cent of grape area nonbearing		
		Average	**Top 50% a**	**Bottom 50% a**
Total farm area at 30 June	ha	16 (21)	20 (16)	14 (38)
Total area irrigated	ha	12 (15)	18 (19)	8 (23)
Area harvested				
– citrus	ha	1.6 (41)	2.6 (58)	1.1 (52)
– wine grapes	ha	6.4 (15)	9.5 (15)	4.4 (28)
– other grapes	ha	2.8 (16)	5.1 (17)	1.4 (35)
– total grapes	ha	9.1 (12)	14.6 (13)	5.8 (22)
– other horticultural crops	ha	0.1 (80)	0.0	0.2 (80)
Nonbearing area				
– wine grapes	ha	0.3 (27)	0.6 (27)	0.1 (102)
– other grapes	ha	0.1 (73)	0.1 (94)	0.1 (99)
– total grapes	ha	0.4 (29)	0.7 (29)	0.2 (71)
– total horticulture	ha	0.5 (29)	0.8 (29)	0.3 (60)
Receipts from horticultural crops				
– citrus	$	9 370 (42)	16 720 (54)	4 860 (65)
– wine grapes	$	60 310 (15)	115 730 (17)	26 270 (29)
– other grapes	$	15 370 (19)	29 840 (17)	6 490 (53)
– total grapes	$	75 680 (14)	145 570 (16)	32 760 (28)
– other	$	1 980 (86)	0	3 200 (86)
– total	$	87 040 (16)	162 290 (18)	40 820 (30)
Other receipts	$	2 460 (45)	3 790 (61)	1 640 (64)
Total cash receipts	$	89 500 (15)	166 080 (18)	42 470 (28)
Expenses				
Hired labor costs	$	6 690 (32)	8 250 (17)	5 740 (59)
Fertiliser	$	2 920 (20)	4 850 (25)	1 740 (36)
Crop and pasture chemicals	$	4 000 (25)	6 970 (34)	2 170 (33)
Fuel, oil and grease	$	2 320 (21)	3 130 (35)	1 830 (21)
Repairs and maintenance	$	7 150 (29)	8 850 (14)	6 100 (54)
Other materials	$	4 560 (30)	4 900 (29)	4 360 (47)
Contracts paid	$	4 060 (24)	4 700 (33)	3 660 (34)
Water and drainage costs	$	3 240 (22)	5 440 (24)	1 890 (46)
Other services	$	11 600 (22)	18 180 (33)	7 560 (23)
Interest paid	$	2 480 (38)	3 940 (43)	1 590 (69)
Rent	$	120 (65)	280 (70)	10 (60)
Other cash costs	$	20 (39)	50 (39)	0
Total cash costs	$	49 160 (15)	69 550 (16)	36 640 (28)
Farm cash income	$	40 340 (23)	96 530 (23)	5 820 (107)
Buildup in trading stocks	$	460 (89)	0	740 (89)
Depreciation	$	7 180 (16)	9 390 (19)	5 820 (27)
Operator and family labor	$	25 850 (19)	35 340 (18)	20 020 (34)

Continued ⇨

12 *Farm performance of irrigated wine grape farms in Loxton, by proportion of nonbearing grapes, 1996-97* *Average per farm continued*

		Less than 10 per cent of grape area nonbearing		
		Average	Top 50% a	Bottom 50% a
Farm business profit	$	7 770 (88)	51 800 (30)	–19 280 (29)
Profit at full equity	$	10 790 (60)	57 150 (26)	–17 670 (29)
Farm capital at 30 June	$	358 900 (17)	488 740 (17)	279 170 (31)
Rate of return excluding capital appreciation	%	3.0 (60)	11.8 (12)	–6.2 (28)
Net capital purchases	$	300 (72)	0	490 (72)
Per hectare benchmark indicators				
Yields per hectare harvested				
– wine grapes	t/ha	14.3 (11)	16.0 (9)	12.0 (26)
– other grapes	t/ha	14.9 (18)	16.6 (21)	11.1 (29)
Receipts per hectare harvested				
– wine grapes	$/ha	9 490 (8)	12 120 (6)	5 970 (13)
– other grapes	$/ha	5 550 (11)	5 900 (13)	4 760 (28)
– citrus	$/ha	5 710 (16)	6 440 (20)	4 600 (31)
Horticultural receipts per hectare harvested b	$/ha	8 000 (6)	9 430 (7)	5 840 (12)
Number of vines per hectare planted				
– wine grapes	no/ha	1 120 (7)	1 100 (7)	1 150 (13)
– other grapes	no/ha	1 200 (7)	1 170 (8)	1 270 (10)
Costs per hectare planted				
Hired labor costs	$/ha	590 (27)	460 (15)	790 (45)
Fertiliser	$/ha	260 (24)	270 (35)	240 (28)
Crop and pasture chemicals	$/ha	350 (24)	390 (35)	300 (18)
Fuel, oil and grease	$/ha	200 (12)	170 (18)	250 (20)
Repairs and maintenance	$/ha	630 (27)	490 (21)	840 (45)
Other materials	$/ha	400 (30)	270 (11)	600 (55)
Contracts paid	$/ha	360 (24)	260 (29)	500 (40)
Water and drainage costs	$/ha	280 (13)	300 (12)	260 (31)
Other services	$/ha	1 020 (22)	1 010 (33)	1 040 (21)
Interest paid	$/ha	220 (40)	220 (51)	220 (65)
Rent	$/ha	10 (57)	20 (56)	0 (46)
Other cash costs	$/ha	0 (45)	0 (49)	0 –(99)
Total cash costs	$/ha	4 320 (12)	3 860 (14)	5 020 (19)
Estimated horticultural costs per hectare planted c	$/ha	4 160 (12)	3 770 (14)	4 750 (18)
Operator and family labor (imputed) per hectare	$/ha	2 270 (9)	1 960 (4)	2 740 (16)
Other indicators per hectare (total farm area)				
Farm cash income	$/ha	2 540 (28)	4 910 (10)	430 (120)
Profit at full equity	$/ha	680 (61)	2 910 (14)	–1 300 (42)

Continued ⇨

12 *Farm performance of irrigated wine grape farms in Loxton, by proportion of nonbearing grapes, 1996-97* *Average per farm continued*

		10–25 per cent of grape area nonbearing		
		Average	**Top 50% a**	**Bottom 50% a**
Total farm area at 30 June	ha	23 (18)	24 (26)	21 (23)
Total area irrigated	ha	16 (12)	14 (14)	19 (19)
Area harvested				
– citrus	ha	2.3 (37)	1.8 (54)	3.0 (49)
– wine grapes	ha	7.6 (18)	7.5 (24)	7.8 (26)
– other grapes	ha	3.8 (16)	2.9 (30)	4.8 (16)
– total grapes	ha	11.4 (11)	10.4 (13)	12.6 (18)
– other horticultural crops	ha	0.4 (49)	0.4 (56)	0.4 (84)
Nonbearing area				
– wine grapes	ha	1.8 (20)	1.2 (26)	2.5 (28)
– other grapes	ha	0.2 (66)	0.3 (87)	0.1 (87)
– total grapes	ha	2.0 (19)	1.5 (8)	2.6 (31)
– total horticulture	ha	2.1 (19)	1.7 (16)	2.6 (31)
Receipts from horticultural crops				
– citrus	$	13 310 (37)	12 930 (59)	13 760 (42)
– wine grapes	$	79 740 (21)	99 120 (28)	57 270 (29)
– other grapes	$	17 930 (16)	15 440 (32)	20 820 (11)
– total grapes	$	97 670 (16)	114 550 (21)	78 090 (23)
– other	$	5 420 (61)	8 200 (72)	2 190 (84)
– total	$	116 400 (11)	135 690 (14)	94 030 (20)
Other receipts	$	4 750 (53)	4 090 (68)	5 510 (80)
Total cash receipts	$	121 150 (12)	139 780 (13)	99 540 (23)
Expenses				
Hired labor costs	$	13 290 (33)	6 840 (23)	20 770 (45)
Fertiliser	$	2 960 (15)	3 930 (18)	1 840 (27)
Crop and pasture chemicals	$	4 090 (12)	3 470 (24)	4 800 (7)
Fuel, oil and grease	$	4 210 (25)	3 600 (26)	4 920 (40)
Repairs and maintenance	$	12 360 (27)	9 740 (17)	15 390 (45)
Other materials	$	5 030 (18)	6 510 (24)	3 310 (27)
Contracts paid	$	6 080 (22)	5 250 (30)	7 040 (32)
Water and drainage costs	$	5 590 (16)	4 900 (28)	6 390 (16)
Other services	$	13 850 (31)	10 980 (18)	17 160 (51)
Interest paid	$	7 660 (30)	7 340 (17)	8 040 (58)
Rent	$	70 (23)	90 (33)	50 (25)
Other cash costs	$	0	0	0
Total cash costs	$	75 180 (19)	62 650 (14)	89 720 (32)
Farm cash income	$	45 960 (21)	77 120 (18)	9 820 (132)
Buildup in trading stocks	$	0	0	0
Depreciation	$	9 190 (10)	8 640 (16)	9 840 (12)
Operator and family labor	$	27 580 (10)	30 030 (8)	24 750 (21)

Continued

12 *Farm performance of irrigated wine grape farms in Loxton, by proportion of nonbearing grapes, 1996-97* Average per farm *continued*

		10–25 per cent of grape area nonbearing		
		Average	Top 50% a	Bottom 50% a
Farm business profit	$	9 190 (95)	38 460 (33)	–24 760 (48)
Profit at full equity	$	19 450 (43)	46 280 (26)	–11 680 (102)
Farm capital at 30 June	$	415 040 (16)	391 820 (18)	441 980 (26)
Rate of return excluding capital appreciation	%	4.6 (40)	11.7 (20)	–2.6 (110)
Net capital purchases	$	4 720 (71)	8 010 (77)	910 (81)
Per hectare benchmark indicators				
Yields per hectare harvested				
– wine grapes	t/ha	15.0 (10)	19.7 (7)	9.8 (8)
– other grapes	t/ha	11.0 (13)	10.6 (18)	11.2 (19)
Receipts per hectare harvested				
– wine grapes	$/ha	10 450 (7)	13 280 (6)	7 310 (5)
– other grapes	$/ha	4 750 (15)	5 310 (26)	4 350 (16)
– citrus	$/ha	5 710 (15)	7 280 (9)	4 620 (16)
Horticultural receipts per hectare harvested b	$/ha	8 220 (9)	10 800 (12)	5 880 (12)
Number of vines per hectare planted				
– wine grapes	no/ha	1 450 (7)	1 410 (12)	1 480 (8)
– other grapes	no/ha	1 400 (7)	1 290 (12)	1 490 (8)
Costs per hectare planted				
Hired labor costs	$/ha	820 (28)	480 (15)	1 110 (37)
Fertiliser	$/ha	180 (12)	280 (14)	100 (17)
Crop and pasture chemicals	$/ha	250 (13)	240 (18)	260 (19)
Fuel, oil and grease	$/ha	260 (17)	250 (23)	260 (25)
Repairs and maintenance	$/ha	760 (19)	680 (5)	830 (32)
Other materials	$/ha	310 (14)	460 (15)	180 (19)
Contracts paid	$/ha	370 (17)	370 (30)	380 (20)
Water and drainage costs	$/ha	340 (10)	340 (20)	340 (6)
Other services	$/ha	850 (23)	770 (16)	920 (37)
Interest paid	$/ha	470 (24)	520 (18)	430 (46)
Rent	$/ha	0 (23)	10 (32)	0 (20)
Other cash costs	$/ha	0 –(99)	0 –(99)	0 –(99)
Total cash costs	$/ha	4 620 (8)	4 410 (4)	4 820 (14)
Estimated horticultural costs per hectare planted c	$/ha	4 380 (7)	4 250 (6)	4 500 (11)
Operator and family labor (imputed) per hectare	$/ha	1 700 (13)	2 110 (12)	1 330 (24)
Other indicators per hectare (total farm area)				
Farm cash income	$/ha	2 030 (21)	3 200 (11)	470 (145)
Profit at full equity	$/ha	860 (36)	1 920 (8)	– 560 (102)

Continued ⇨

12 *Farm performance of irrigated wine grape farms in Loxton, by proportion of nonbearing grapes, 1996-97* *Average per farm continued*

		25-50 per cent of grape area nonbearing		
		Average	Top 50% a	Bottom 50% a
Total farm area at 30 June	ha	21 (11)	31 (19)	16 (8)
Total area irrigated	ha	20 (11)	29 (19)	14 (4)
Area harvested				
– citrus	ha	2.5 (23)	4.8 (28)	1.2 (37)
– wine grapes	ha	8.2 (15)	13.1 (24)	5.4 (15)
– other grapes	ha	2.3 (21)	2.1 (38)	2.4 (25)
– total grapes	ha	10.5 (14)	15.2 (24)	7.7 (11)
– other horticultural crops	ha	0.5 (68)	0.3 (73)	0.6 (83)
Nonbearing area				
– wine grapes	ha	4.4 (12)	7.3 (15)	2.6 (22)
– other grapes	ha	2.1 (32)	1.6 (43)	2.4 (42)
– total grapes	ha	6.4 (10)	8.9 (16)	5.0 (10)
– total horticulture	ha	6.4 (10)	8.9 (16)	5.0 (10)
Receipts from horticultural crops				
– citrus	$	16 670 (24)	30 240 (29)	8 750 (43)
– wine grapes	$	78 710 (16)	155 700 (21)	33 720 (22)
– other grapes	$	16 770 (24)	23 090 (40)	13 080 (26)
– total grapes	$	95 480 (16)	178 790 (22)	46 800 (17)
– other	$	2 110 (72)	740 (73)	2 910 (83)
– total	$	114 260 (14)	209 780 (21)	58 460 (11)
Other receipts	$	2 270 (41)	1 550 (52)	2 690 (52)
Total cash receipts	$	116 530 (14)	211 330 (21)	61 140 (11)
Expenses				
Hired labor costs	$	11 960 (24)	24 700 (30)	4 520 (32)
Fertiliser	$	2 540 (21)	3 760 (24)	1 820 (37)
Crop and pasture chemicals	$	4 640 (25)	7 190 (38)	3 150 (29)
Fuel, oil and grease	$	3 790 (13)	4 860 (23)	3 170 (12)
Repairs and maintenance	$	10 630 (22)	18 500 (32)	6 030 (20)
Other materials	$	7 770 (28)	15 660 (35)	3 160 (34)
Contracts paid	$	5 030 (20)	10 740 (24)	1 700 (23)
Water and drainage costs	$	5 720 (19)	7 460 (38)	4 700 (9)
Other services	$	14 210 (17)	20 700 (29)	10 430 (15)
Interest paid	$	12 860 (17)	12 390 (38)	13 140 (17)
Rent	$	30 (40)	60 (46)	10 (85)
Other cash costs	$	50 (53)	0	90 (53)
Total cash costs	$	79 250 (13)	126 030 (22)	51 910 (8)
Farm cash income	$	37 280 (21)	85 300 (23)	9 230 (48)
Buildup in trading stocks	$	0	0	0
Depreciation	$	7 640 (16)	11 020 (28)	5 660 (11)
Operator and family labor	$	29 900 (8)	29 930 (14)	29 880 (10)

Continued ⟳

12 *Farm performance of irrigated wine grape farms in Loxton, by proportion of nonbearing grapes, 1996-97* *Average per farm* *continued*

		25–50 per cent of grape area nonbearing					
		Average		Top 50% a		Bottom 50% a	
Farm business profit	$	–250	(2656)	44 350	(36)	–26 310	(19)
Profit at full equity	$	13 060	(48)	57 440	(26)	–12 870	(35)
Farm capital at 30 June	$	460 540	(15)	741 510	(24)	296 370	(10)
Rate of return excluding capital appreciation	%	2.9	(42)	7.9	(20)	–4.3	(29)
Net capital purchases	$	3 790	(45)	9 220	(50)	620	(66)
Per hectare benchmark indicators							
Yields per hectare harvested							
– wine grapes	t/ha	14.6	(5)	17.2	(6)	10.9	(13)
– other grapes	t/ha	13.7	(11)	21.1	(8)	9.9	(16)
Receipts per hectare harvested							
– wine grapes	$/ha	9 560	(7)	11 860	(8)	6 290	(17)
– other grapes	$/ha	7 410	(20)	11 160	(13)	5 510	(29)
– citrus	$/ha	6 600	(9)	6 330	(10)	7 240	(17)
Horticultural receipts per hectare harvested b	$/ha	8 460	(7)	10 370	(4)	6 110	(16)
Number of vines per hectare planted							
– wine grapes	no/ha	1 490	(8)	1 470	(8)	1 510	(16)
– other grapes	no/ha	1 310	(13)	1 590	(10)	1 180	(17)
Costs per hectare planted							
Hired labor costs	$/ha	600	(18)	850	(20)	310	(31)
Fertiliser	$/ha	130	(20)	130	(20)	130	(37)
Crop and pasture chemicals	$/ha	230	(24)	250	(35)	220	(30)
Fuel, oil and grease	$/ha	190	(11)	170	(18)	220	(12)
Repairs and maintenance	$/ha	530	(14)	630	(19)	410	(18)
Other materials	$/ha	390	(23)	540	(28)	220	(32)
Contracts paid	$/ha	250	(10)	370	(7)	120	(21)
Water and drainage costs	$/ha	290	(17)	260	(34)	320	(7)
Other services	$/ha	710	(13)	710	(19)	720	(16)
Interest paid	$/ha	640	(16)	420	(32)	900	(16)
Rent	$/ha	0	(41)	0	(46)	0	(88)
Other cash costs	$/ha	0	(53)	0	–(99)	10	(50)
Total cash costs	$/ha	3 970	(4)	4 320	(3)	3 560	(6)
Estimated horticultural costs per hectare planted c	$/ha	3 880	(4)	4 280	(3)	3 400	(6)
Operator and family labor (imputed) per hectare	$/ha	1 500	(9)	1 030	(14)	2 050	(8)
Other indicators per hectare (total farm area)							
Farm cash income	$/ha	1 740	(16)	2 730	(14)	590	(51)
Profit at full equity	$/ha	610	(42)	1 840	(15)	–820	(30)

a Ranked according to return on capital. b Total horticulture receipts divided by total area horticultural crops harvested. c Estimated horticulture costs divided by total area under horticultural crops. d Responding farms only. *Note*: Figure in parentheses are relative standard errors expressed as a percentage of the estimate. ns Sample insufficient to provide estimates.

the need to train these young vines may partially explain why labor costs were higher per hectare on those farms. Moreover, the top 25 per cent used more family labor, while the bottom 25 per cent had ten times more off-farm income. This suggests that there may be different goals and business plans for the two groups, with the bottom group possibly containing more part time or hobby farmers who rely on off-farm income to remain viable.

Fertiliser and chemical use was highest in the top performers, as were the cost of other services which includes consultants. Most other cash costs were also higher for the top group; however, both the top and bottom groups paid less interest than the average. The top group had 91 per cent equity, compared with 83 per cent in the bottom group.

The top performers had a greater return on capital, with 13.6 per cent compared with –12.2 per cent for the bottom 25 per cent of growers, and 3 per cent on average. This may indicate an inability to exploit economies of scale on small farms, part time growers and possibly overcapitalisation. At the other end of the scale, the top performing growers are performing as well as some of the best managed farms in other industries. The top performing growers also had a greater level of farm liquid assets available to the farm. They include things such as shares, bank deposits, debentures and cash on hand.

References

Australian Bureau of Statistics 1999, *Australian Wine and Grape Industry*, cat. no. 1329.0, Canberra.

Australian Society of Viticulture and Oenology 1997, *Viticultural Best Practice*, Hamilton, R., Leske, P. and Hayes, P. (eds), Viticulture Seminar, Mildura, 1 August.

Branson, J., Bewsell, D., Hickey, T., Welsh, C. and Mason, L. 1997, *Horticultural Gross Margins for the Kerang/Swan Hill Region*, Natural Resources and Environment, Melbourne.

Davidson, D. 1999, *A Guide to Growing Winegrapes in Australia*, 2nd edn, Hyde Park Press, Adelaide.

Danzi, E. 1999, *Irrigation Water Reforms: Impact on Horticultural Farms in the Southern Murray Darling Basin*, ABARE Current Issues 99.2, Canberra.

Hill, M., Leamon, K. and Thompson, C. 1998, 'Major benchmarking project for Victorian grapegrowers', *The Australian Grapegrower and Winemaker*, December, pp. 23–6.

Loxton District Council 1982, *Loxton: The First 75 Years*.

Martin, P. 1998, 'Financial performance of surveyed industries', *Australian Farm Surveys Report 1998*, ABARE, Canberra, pp. 1–21.

Martin, P., Riley, D., Lubulwa, M., Knopke, P. and Gleeson, T. 2000, *Australian Dairy Industry 2000*, ABARE, Canberra.

Rendell McGuckian 1999, *Grape Benchmarking Report: Bizcheck 1996/97; Cost of Production 1997-98*, Natural Resources and Environment, Victoria.

—— 2000, *Grape Benchmarking Report – Year 2: Bizcheck 1997/98; Cost of Production 1998-99*, Natural Resources and Environment, Victoria.

Samaranayaka, D., Freeman, F. and Short, C. 1998, 'Water trading in the Murray Darling Basin – some preliminary obsrvations', in *Outlook 98*, Proceedings of the National Agricultural and Resources Outlook Conference,

Canberra, 3–5 February, vol. 1, *Commodity Markets and Resource Management*, ABARE, Canberra, pp. 157–66.

Shepherd, A. 1999, *Wine Grapes: Projections of Wine Grape Production and Winery Intake to 2001-02*, ABARE, Canberra.

Skewes, M. and Meissner, T. 1997, *Irrigation Benchmarks and Best Management Practices for Winegrapes*, Technical Report no. 259, Primary Industries and Resources, South Australia, Adelaide.

Small, G. and DeGaris, K. 1999, 'Benchmarking in the Riverina: moving toward best practice', *Australian Grapegrower and Winemaker*, November, pp. 33.

Thompson, C. and Hill, M. 1999a, The economics of growing winegrapes in Victoria, *Australian Grapegrower and Winemaker*, April, pp. 15–18.

—— and —— 1999b, 'Benchmarking to make better business decisions', *Australian Grapegrower and Winemaker, Annual Technical Edition*, pp. 102–7.

Topp, V. and Danzi, E. 1998, 'Irrigated horticulture in the southern Murray Darling Basin', *Australian Commodities*, vol. 5, no. 2, pp. 221–30.

Vast, M., Langley, T. and Hurford, P. 1997, 'The benchmarking process and best practice', in *Viticultural Best Practice*, Mildura.

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