

# Citrus information kit

Reprint – information current in 1997



## REPRINT INFORMATION – PLEASE READ!

For updated information please call 13 25 23 or visit the website [www.dpi.qld.gov.au](http://www.dpi.qld.gov.au)

This publication has been reprinted as a digital book without any changes to the content published in 1997. We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research:

- Chemical recommendations—check with an agronomist or Infopest [www.infopest.qld.gov.au](http://www.infopest.qld.gov.au)
- Financial information—costs and returns listed in this publication are out of date. Please contact an adviser or industry body to assist with identifying more current figures.
- Varieties—new varieties are likely to be available and some older varieties may no longer be recommended. Check with an agronomist, call the Business Information Centre on 13 25 23, visit our website [www.dpi.qld.gov.au](http://www.dpi.qld.gov.au) or contact the industry body.
- Contacts—many of the contact details may have changed and there could be several new contacts available. The industry organisation may be able to assist you to find the information or services you require.
- Organisation names—most government agencies referred to in this publication have had name changes. Contact the Business Information Centre on 13 25 23 or the industry organisation to find out the current name and contact details for these agencies.
- Additional information—many other sources of information are now available for each crop. Contact an agronomist, Business Information Centre on 13 25 23 or the industry organisation for other suggested reading.

Even with these limitations we believe this information kit provides important and valuable information for intending and existing growers.

**This publication was last revised in 1997. The information is not current and the accuracy of the information cannot be guaranteed by the State of Queensland.**

This information has been made available to assist users to identify issues involved in the production of citrus. This information is not to be used or relied upon by users for any purpose which may expose the user or any other person to loss or damage. Users should conduct their own inquiries and rely on their own independent professional advice.

While every care has been taken in preparing this publication, the State of Queensland accepts no responsibility for decisions or actions taken as a result of any data, information, statement or advice, expressed or implied, contained in this publication.



Queensland Government



# *Before you* **START**

*If you have never grown citrus before, you will find this section very useful. It is a checklist of the things you need to know before you start. It will help you make the right decision about growing citrus. The information here is brief and to the point. More detail on important areas is provided in other sections of the kit. Symbols on the left of the page will help you make these links.*

## Contents

An overview of the Queensland citrus industry .....	2
Know what you are getting into .....	2
What you can expect to make .....	3
The capital you need .....	7
The farm you need .....	8
The machinery you need .....	9
The labour you need .....	10
Other considerations .....	10

## **An overview of the Queensland citrus industry**

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Queensland grows approximately 3500 hectares of citrus. The main production areas are Mundubbera and Gayndah in the Central Burnett, Emerald, Bundaberg, Maryborough and the Sunshine Coast. Minor producing areas include Gatton, Howard, Byfield, Charters Towers, Cardwell, Kuranda, Mareeba, Tiaro and Koah.

Mandarins and oranges are the main citrus fruit grown with smaller areas of lemons, grapefruit and limes. Most fruit is grown for the fresh fruit market but a percentage of the orange crop is used for juice production. Citrus are grown in orchards from grafted or budded nursery stock.

Fruit are harvested from about January to October with the bulk of the crop from March to July. Most of the fresh fruit production is marketed in the major metropolitan wholesale markets of Brisbane, Sydney and Melbourne but a large and increasing amount of the mandarin and orange crop is being exported.

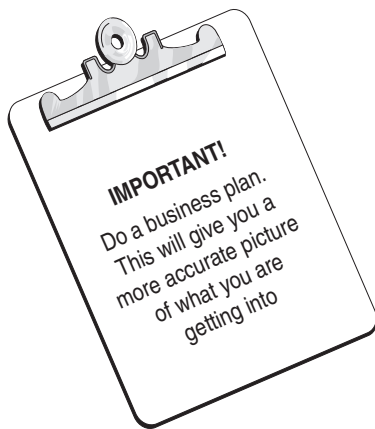
## **Know what you are getting into**

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New growers are being attracted to citrus by the perception of good returns from buoyant prices on the domestic market. This is particularly so for mandarins. The crop is also seen to be a staple, well-known fruit with a stable industry and established infrastructure. Bigger investors also see excellent export potential, particularly in Asia. However, there are a number of problems for new growers. These are:

- Current large plantings, particularly of Imperial and Murcott mandarins, will result in a large increase in production with potentially much lower prices on the domestic market.
- Some believe that export marketing opportunities provide a safe future but this needs to be put in context. Many export markets are still largely untested, making future prices and returns uncertain. There will also be significant competition from other citrus producing countries such as India, South Africa and Argentina. Lack of organised marketing in Australia continues to be a problem in better exploiting export markets. Unless you are prepared to become part of a cooperative marketing venture, you will need to be large enough to effectively develop the required export marketing infrastructure. This requires a major capital investment.
- Citrus is a very demanding crop requiring all year round attention. Mandarins in particular, have intensive management requirements including complex thinning and quality management procedures. As success will depend greatly on your ability to come to grips with these intensive management needs, it has to be said that citrus is a high risk crop. This is exacerbated by the fact that crops are frequently damaged by hail and drought.

- For viable production, citrus demands an exacting soil type and climate as well as an assured water supply. Drier inland areas with well drained soils and adequate water of good quality are preferred, particularly for mandarins. Many coastal areas are unsuitable for the production of export quality fruit. A ready access to labour for harvesting is also required.
- The citrus market is becoming more and more quality conscious and will demand fruit of exacting standards. High prices in the future will almost certainly depend on your ability to meet these standards. You will need to be prepared to embrace the philosophy of quality management and quickly gain the expertise to implement quality systems on your farm.



Before embarking on a citrus investment, take time to research the subject thoroughly. Examine what markets, both domestic and export, will be targeted, and where the competition is likely to come from when your trees are at their peak in ten years or so. Thoroughly check market price and throughput information for the major markets you intend to target. Be cautious about extravagant claims of economic performance and do a thorough business plan.

## What you can expect to make

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### Yields

Yields need to be considered in conjunction with tree density. For an orchard of normal density (7.3 metres between rows and 3½ to 5 metres between trees), average yields range from about 9 kg (half a citrus carton) per tree in the third year to about 150 to 180 kg (8 to 10 citrus cartons) for a mature tree in the tenth year. Using these figures, a mature orchard should be expected to produce approximately 2500 to 3000 citrus cartons per hectare per year.

Higher early per-hectare yields can be obtained with high density planting. This is now a well established practice and is recommended for new plantings. High density orchards are normally based on the same 7.3 metre row spacings (sometimes less for some mandarins) but use double the density of trees within the rows. This effectively doubles the early per tree yields up to about the sixth year and therefore makes much better use of available land. However, close planting requires a higher level of management with more regular pruning and possible tree removal. Mature orchard yields end up at about the same level as that mentioned above.

### Prices

Prices vary according to the varieties grown. In general, Navel oranges range in price from about \$10 to \$30 per citrus carton (18 kg) with the higher prices being received for the limited supplies of early fruit. Seasonal average prices are about \$12 to \$15 per citrus carton.

more info



High density planting  
Section 3 page 8

Valencia oranges range in price from about \$7 to \$12 per citrus carton with a seasonal average of around \$10.

Mandarins generally sell for the main part of the season within the range of \$12 to \$20 per citrus carton but prices may more than double this for early season (Imperial) and late season (Murcott) fruit. All Imperial mandarins are marketed in half citrus cartons with prices ranging from \$10 to \$25.

Lemon prices generally range within \$10 to \$15 per citrus carton for the main part of the season, but again may double for early season fruit.

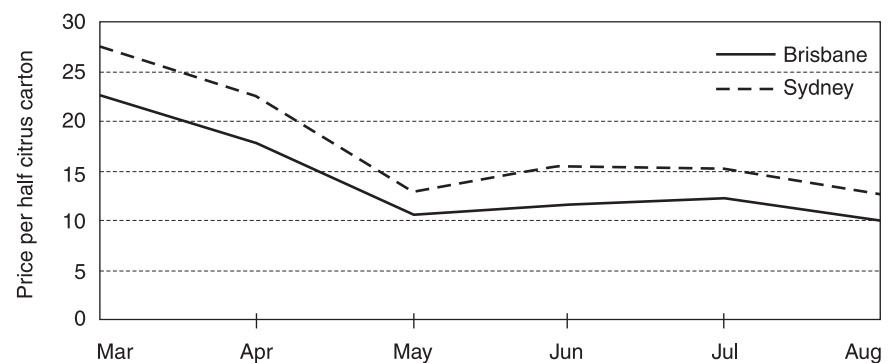
Grapefruit prices generally average \$8 to \$12 per citrus carton with slightly higher prices of up to \$15 for early season fruit.

Prices for limes are variable within a range of \$5 to \$10 per tray or small carton but may reach \$30 to \$40 for limited supplies of fruit in spring and early summer.

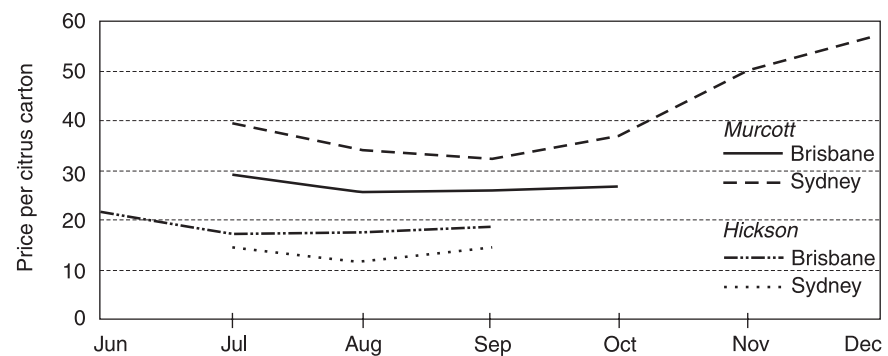
Graphs of average prices and market throughput for some selected lines of citrus for 1994 to 1996 in the Brisbane and Sydney wholesale markets are shown in Figures 1 to 9.



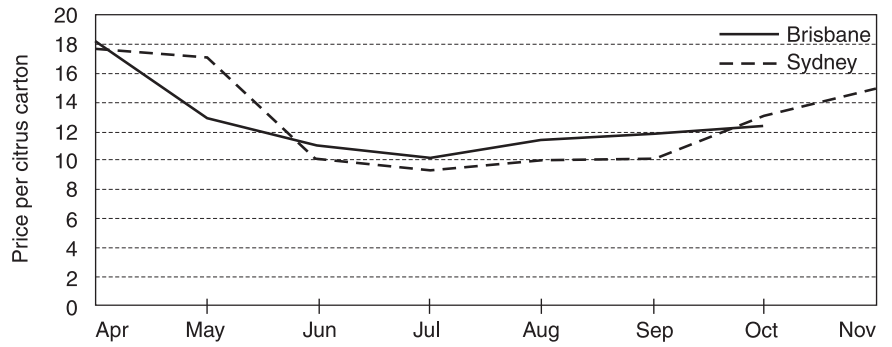
Sources of detailed market price information  
Section 6 page 8



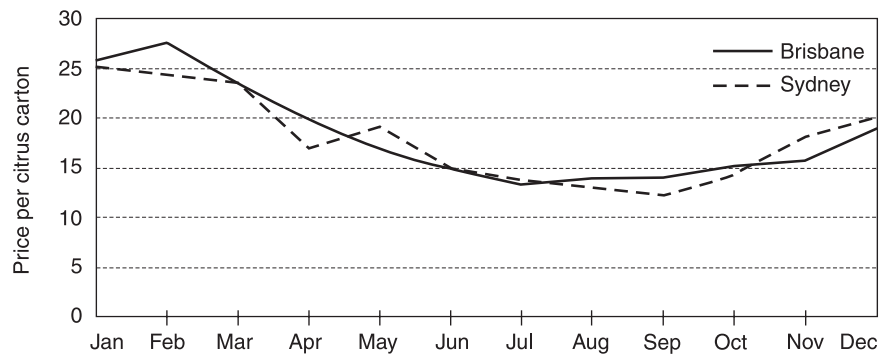
**Figure 1.** Average monthly price for Imperial mandarins in the Brisbane and Sydney markets — 1994 to 1996



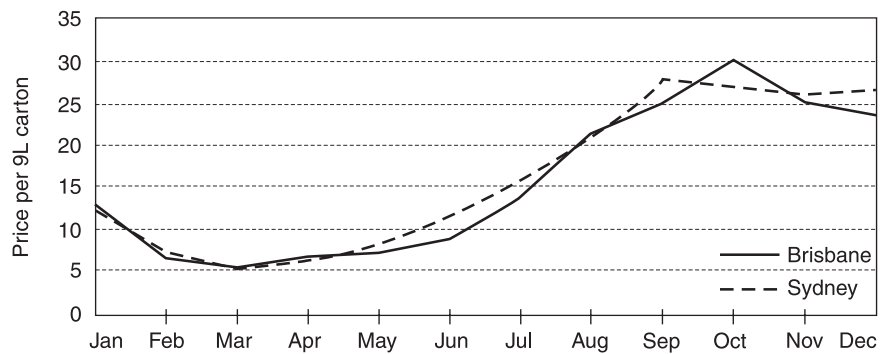
**Figure 2.** Average monthly price for Murcott and Hickson mandarins in the Brisbane and Sydney markets — 1994 to 1996



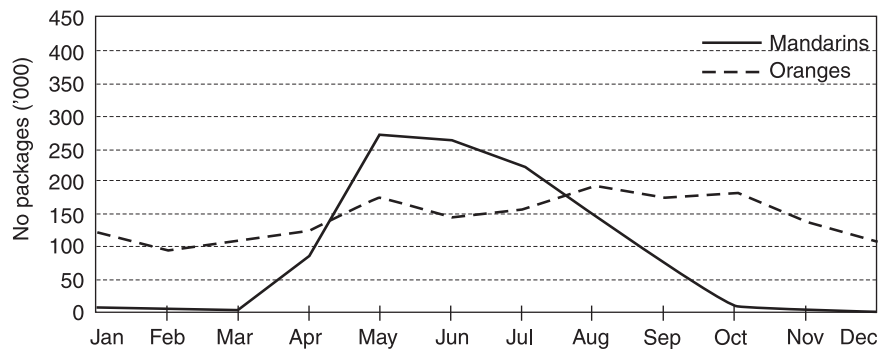
**Figure 3.** Average monthly price for Washington Navel oranges in the Brisbane and Sydney markets — 1994 to 1996



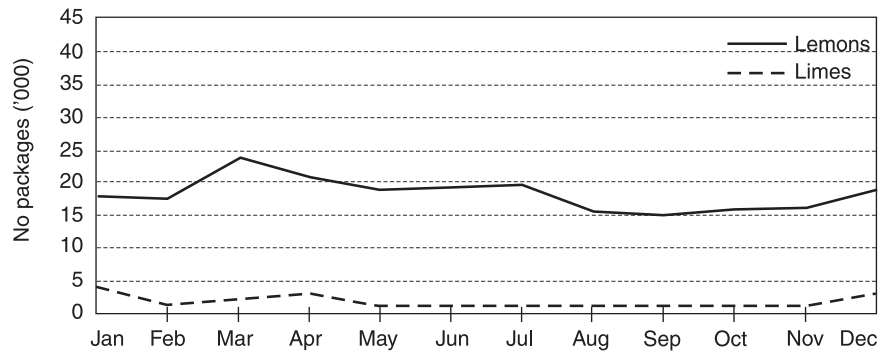
**Figure 4.** Average monthly price for lemons in the Brisbane and Sydney markets — 1994 to 1996



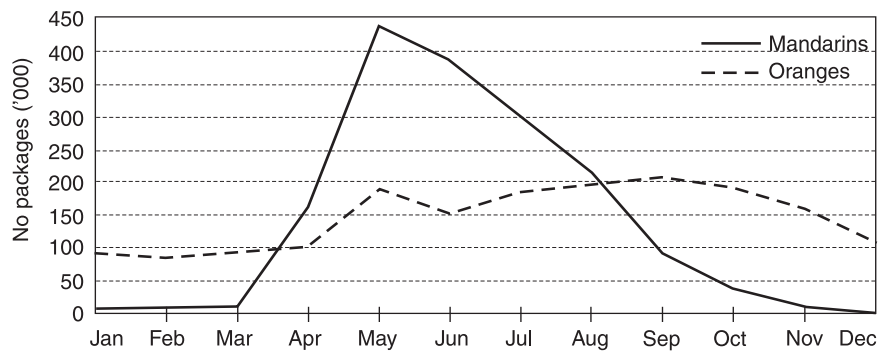
**Figure 5.** Average monthly price for limes in the Brisbane and Sydney markets — 1994 to 1996



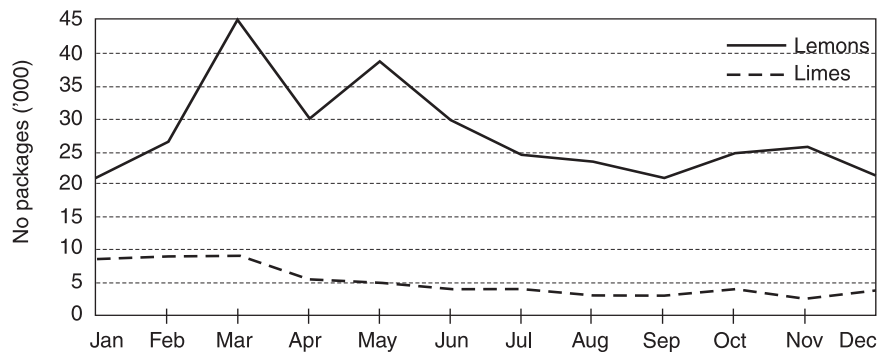
**Figure 6.** Average monthly throughput for mandarins and oranges in the Brisbane market — 1994 to 1996



**Figure 7.** Average monthly throughput for lemons and limes in the Brisbane market — 1994 to 1996



**Figure 8.** Average monthly throughput for mandarins and oranges in the Sydney market — 1994 to 1996



**Figure 9.** Average monthly throughput for lemons and limes in the Sydney market — 1994 to 1996

Prices for export fruit are generally higher than those for domestic fruit but the extent of this depends on variety, quality, market destination and competition from other citrus exporting countries.

### Production costs

Production costs range from about \$1200 per hectare per year in the first year to about \$18 000 to \$20 000 per hectare per year at maturity in the tenth year. These include all growing costs including watering, fertilising, pest control, weed control and pruning, and marketing costs such as harvesting, packing and transport. Costs for high density orchards can be higher because of the need for extra pruning and fruit thinning.





Economics of  
growing citrus  
Section 4 page 6

## Gross margin and cash flow

No significant income is received until the third year. Annual income from sale of fruit then quickly exceeds annual production costs to reach a gross margin (proceeds from sale of fruit less production costs) in a mature orchard after the tenth year of approximately \$17 000 to \$20 000 per hectare. These figures are based on an orchard of about 20 hectares with average yields and prices, operating in a good season.

When capital costs and fixed or overhead costs such as permanent labour, rates, insurance, repairs and depreciation are also considered, total expenses are greater than income each year until about the sixth to seventh year. Accumulated expenses can be expected to exceed accumulated income until about the twelfth to fifteenth year.

## The capital you need

If you want to be viable as an individual exporter, you will need a minimum of 50 hectares of mature bearing trees. This will ensure sufficiently large lines of uniform quality fruit to interest exporters in the long term. To allow for expansion and the planting of replacement blocks throughout the life of the orchard, more than 50 hectares in total should be purchased. Allow for the fact that not all the soil on a farm will be suitable for citrus. Also allow for a buffer zone between the orchard and neighbouring properties. This zone is necessary to minimise the risk of complaints from neighbours about essential horticultural activities.

Good citrus land with adequate water may cost up to \$6000 per hectare. Buffer areas around it could be of lower quality land and may be as little as \$400 per hectare. Based on the 50 hectare orchard size, a minimum amount of \$400 000 should be allowed for the purchase of land.

Smaller farms may be viable but are more suitable for producing fruit for the domestic market unless you can become involved in a marketing cooperative. A farm of 18 to 20 hectares is considered the minimum size for a viable family operation where citrus is the sole source of income.

Excluding the cost of the land and housing, it would cost at least another \$400 000 to set up the small family operation of about 18 to 20 hectares of trees. This covers the cost of machinery and equipment, fencing, an irrigation system and tree establishment. The 18 to 20 hectares should be made up of a number of different varieties to spread harvesting and cash flow over six months of the year.

A further \$500 000 would be needed by year four to have equipment and buildings in place for the start of harvesting and postharvest operations. This covers the costs of harvesting equipment, a packing shed, trailers and bins, a cool room/degreening room, workers' accommodation and a large orchard sprayer.



Capital costs  
Section 4 page 8



Capital costs may be reduced by buying second-hand equipment or by joining a cooperative which has its own packing shed.

## **The farm you need**

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### **Soil**

Citrus trees require a minimum of 60 centimetres of well-drained topsoil. A depth of one metre is preferable. Use an auger to check that there is no barrier to drainage within 1½ m of the surface.

Loams and sandy loams are preferred. Very sandy soils require expert management as they have a low water holding capacity and nutrients are readily leached. Wetter clay soils have the risk of tree death due to collar and root rot. A soil pH between 6.0 and 6.5 is required. Avoid soils with a natural pH above 8.

### **Slope**

Slopes of up to 15% are suitable provided the farm is designed to minimise soil erosion. Steeper slopes present a major erosion risk and make it difficult to operate machinery safely. Avoid these wherever possible.

### **Climate**

Citrus will tolerate high temperatures provided the trees are well supplied with soil moisture. Trees are sensitive to frost, but this varies with variety, tree age and health. A young tree, or a tree with a recent growth flush, will be damaged by even very light frosts. A mature tree which has hardened off may tolerate temperatures down to -5°C for a short time without being seriously affected. Leaf, branch and fruit damage can occur. Trees under any stress, such as trees with a crop, will suffer greater damage. When frost causes fruit drop before harvest, some fruit left on the tree may be damaged internally, but show no external symptoms.

Lemons (except the Meyer) are more sensitive to frost than oranges. Mandarins vary widely in their frost tolerance. In general, planting citrus is not recommended in areas where heavy frosts occur regularly.

Some orchardists in frost prone areas use wind machines for the prevention of frost damage. Because of their expense, these machines are reserved for high value mandarins or export oranges which carry crops through the winter. This includes the Murcott mandarin and Late Valencia orange.

Exposed, windy sites should be avoided because of the risk of wind scarring of the fruit rind which causes the fruit to be downgraded. Properly designed windbreaks are essential.

Drier coastal or inland areas are preferred for citrus to reduce the risk of pest and disease problems.

## Water

Irrigation is essential for regular cropping. In areas where the rainfall is below 700 mm per year, one hectare of mature trees will need 8 to 9 megalitres of irrigation (1 megalitre = 1 million litres). Citrus trees are very sensitive to salt. Avoid waters with an electrical conductivity above 1800 microSiemens per centimetre or a chloride level above 450 parts per million.

## The machinery you need

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Here is a list of the major items required in the first year:

- machinery shed
- tractor
- fencing
- irrigation system (undertree sprinkler or trickle)
- airblast sprayer
- weed control sprayer
- trailer
- slasher
- pruning equipment
- workshop and tools
- truck with water tank and pump
- cultivation equipment
- fertiliser spreader
- utility
- motor bike
- chemical storage shed.

By the fourth year, additional spraying, pruning, harvesting, and packing equipment will be required. Here is a list of the major items:

- packing shed (42 m x 15 m x 5 m)
- degreening room/cool room
- grading and packing equipment
- bulk bins and bin trailers
- second-hand tractors to haul the trailers
- oscillating boom sprayer
- fork-lift
- cherry pickers or ladders

- picking bags and clippers
- generator for emergency power
- workers accommodation.

High density orchards will also require specialised pruning and trimming machinery and a mulcher to mulch prunings. Use of contract pruning services is an alternative.

Small orchards can reduce capital costs by becoming part of a packing cooperative and by the use of second-hand machinery.

## **The labour you need**

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Major operations up to the fourth year include irrigating, fertilising, pest and disease control and weed control. For an 18 to 20 hectare orchard, this can be handled by two permanent workers. From the fifth year onwards, extra staff will be needed from March to September. Ten workers will be needed for pruning, fruit thinning and harvesting and eight for packing shed operations.

## **Other considerations**

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As production and marketing technology is changing rapidly, it will help if you are prepared to experiment with new ideas. An integrated crop management approach is recommended. This requires a willingness to employ specialised consultants for pest monitoring and water management. Mandarins, particularly under high density plantings, require exceptionally high levels of management.

As the crop is very labour-intensive, you will need skills in labour management and the ability to train staff.

A knowledge of marketing and a commitment to quality throughout your entire production and marketing system are becoming essential if you wish to maximise your returns. Regular communication with people in the market chain, as well as other growers, is an integral part of this process.

To be successful, the orchard must be run as a business. This is a complex operation requiring many skills such as the ability to:

- interpret information supplied by pest management and irrigation consultants
- interpret results of leaf tissue and soil analyses and correctly apply the recommended fertilisers
- promote and develop markets for your own product
- seek out and arrange export markets, shipping and insurance contracts.