AUSTRALIAN INSTITUTE OF VALUERS
AND LAND ECONOMISTS (INC)
Western Australian Division

Tree Plantations
A Valuer's Dilemma

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Friday, 4 August 1995
Manjimup Country Club

TREE PLANTATIONS - A VALUERS DILEMMA

Manjimup 4 August 1995

BACKGROUND TO AUSTRALIAN EUCALYPTS LIMITED

Australian Eucalypts Limited is the manager for the Australian Eucalypt Project which each year since 1992 has registered a prospectus for the establishment of Tasmanian bluegum plantations in Western Australia. $26 million has been subscribed to the project in that period. This has resulted in the purchase of more than 6,000 hectares of land in the south west of Western Australia on which 4,100 hectares of Tasmanian bluegum plantations have been established. The project has also acquired 240 hectares of Pinus radiata.

THE IMPACT OF THE INVESTOR IN THE TIMBER PLANTATION INDUSTRY

My estimate is that private investors have contributed at least $75 million to the Tasmanian Bluegum industry in WA in the last 5 years. A significant proportion of this has been directed to the purchase or lease of land for the establishment of Tasmanian bluegum plantations

This definition of investor does not include the Japanese and Korean corporations with whom CALM have negotiated arrangements.

THE STRUCTURE OF PRIVATE FORESTRY INVESTMENT

There are a number of categories of private forestry investor.

There are individuals who purchase land on which to plant trees These people are often seeking a rural component to their lives and select land accordingly, generally close to major centres. Potential for good capital growth is a consideration. These investors are committed to land anyway and trees represent the best way of achieving a return.

The second category are those who participate in collective investment schemes which are promoted generally by way of prospectus. In this situation the manager of the project secures access to appropriate land which is then divided into lots. Each subscriber to the prospectus (called a grower) enters into a "lease and management agreement" to lease an identifiable area of land and to contract with the manager to establish a plantation on the leased area. The grower then receives the proceeds from the harvest of the plantation.

As long as the project and the grower meet specific criteria, payments made by growers under lease and management agreements constitute allowable deductions under section 51(1) of the Income Tax Assessment Act.

There are a number of variations in the projects offered to the market by way of prospectus.

Most projects lease land from a third party and sublease discrete areas to growers. Security of tenure is obviously critical to the project and the lease and head lease must reflect this requirement. In some projects the growers have ownership of the land on which the plantation is established by subscribing for shares in the company that owns the land.

Another difference between projects is whether there is a once only payment for the establishment or an annual charge for management and lease rental.

A further variation is the treatment of the grower's entitlement to the harvest of the coppice which is a feature of Tasmanian bluegum plantations.

All collective schemes are subject to the provisions of the Corporations Law and subject to the scrutiny of the Australian Securities Commission. The law requires the appointment of a trustee for each project whose obligation is to protect the rights of the growers.

These safeguards mean that forestry investment projects today are bona-fide operations and bear no resemblance to some of the shams promoted as pine plantations 20 years ago. The plantations are established in a professional manner and will produce a reasonable volume of timber for the investors. Market conditions will determine whether or not growers receive the financial returns projected.

WHO ARE THE POTENTIAL BUYERS OF THE TIMBER

Eucalyptus globulus

The only purchaser for Tasmanian bluegum at the present time is Bunnings who process logs at their Diamond Chipmill at Bunbury and rail to a shiploading facility at Bunbury for export.

Because of the significant area of plantations being established in the Albany region it is reasonable to assume that there will be an export facility in Albany in the future. Time will tell the owner and operator of the facility.

Pine

There are a number of outlets for the range of products produced during the various stages in a pine plantation. The market for pine chiplogs in the past has been

restricted but has now improved to the extent where there is actually competition from processors for chiplogs.

ARE THERE ANY GUARANTEES ON FUTURE PRICE ?

Timber is a commodity that is becoming scarcer as the world's forests decline. Precise measurement is not available but FAO statistics would suggest a decline of the order of 20% in the world's forests in the period from 1980 to 1990. At the same time production from those native forests that remain is decreasing because of the political pressure exerted by environmental groups.

As a result there is a greater emphasis on plantation timber.

The ultimate product from Tasmanian bluegum woodchips is printing and writing paper most of which will be consumed in the Asia Pacific region. There is an increasing demand for printing and writing paper as standards of literacy improve in Asia. In particular, China, India and Indonesia because of their large populations need to increase their consumption only modestly to generate a significant increase in the demand for hardwood chips.

The picture then is one of increasing demand and contracting supply - which while difficult to quantify gives some comfort in respect of price stability into the future.

Notwithstanding that situation, the price for woodchips will at any particular time be subject to the influences of international economic and commodity cycles and the control of international cartels.

THE IMPACT OF DISTANCE FROM TIMBER MILLS ON FUTURE RETURNS

The distance that a plantation is located from a mill is critical to the ultimate return. The marginal cost of transport for logs is around 10 to 12 cents per tonne kilometre which will represent approximately 25% of the cost of a chiplog transported 100 kilometres to the mill.

The cost of cartage from a plantation that is 50 kilometres from the mill will be $5 per tonne less than a plantation that is 100 kilometres from the mill. If the harvest volume is 300 cubic metres per hectare that is a difference in harvest proceeds of $1,500 per hectare. If we assume the harvest will be in 10 years time, then discounting the $1,500 per hectare at 10% gives a present value of $580 per hectare that the closer plantation can reasonably be valued more than the distant one. The difficulty in applying this piece of arithmetic at the present is that the locations of future mills are not known. However , the theory is sound.

AUSTRALIAN EUCALYPTS VIEW ON THE VALUATION OF LAND AND PLANTATIONS

There are three circumstances to be considered:

1. Valuation of land purchased for plantation establishment.
2. Valuation of standing timber
3. Valuation of the land on which the timber is standing

The first two I believe are relatively straight forward. The third is more difficult.

1. Valuation of land purchased for plantation establishment.

Land purchased for plantation establishment has a value at the time of purchase of cleared and pastured land. Market forces will determine that price. The market forces competing in certain areas currently is companies competing to purchase land to establish Tasmanian bluegum plantations. If a forestry operator can project a better return from his activities than a farmer pursuing traditional agriculture then the forestry operator will be prepared to pay a higher price for the land.

2. Valuation of standing timber

Valuation of standing timber should be reasonably precise.

For recently established plantations the cost of establishment is a reasonable value.

For more mature forests a discounted cash flow of future harvest proceeds is appropriate.

Harvest volumes can be projected with a reasonable degree of confidence. Pricing, especially for Tasmanian bluegum chiplogs is less certain but a range of reasonable estimates can be made. Pine pricing has an established benchmark and in my view is unlikely to decline in real terms in the future.

However no matter how certain the cash flows, the valuation is influenced significantly by the discount rate and because cash flows for the valuation of a plantation extend well into the future, the valuation is particularly sensitive to the discount rate selected.

I know accountants who would argue that a real discount rate of at least 15% should be adopted when attempting to value a long term plantation cash flow. On the other hand, I know that an eminent consulting forester in Perth will argue that 8% real is entirely appropriate for the same situation.

3. Valuation of the land on which the timber is standing

The valuation of land on which a plantation has been established is more complicated.

If the landowner has leased the land to a plantation owner or developer then it is reasonably straightforward. The land owner will receive an annual lease rental until

harvest which is a defined income stream. Discounting that income stream will give a present value. Similarly if the lease rental is to be taken as a share of harvest proceeds those proceeds have a future value (albeit less certain than the annual rental) and can be discounted to give a present value.

With an established plantation the landowner cannot use the land to generate income and receives no rental from the land. The landowner gains access to the land only when the plantation is clearfelled. And it is therefore not reasonable to value the land as cleared and pastured. When the plantation is clearfelled, after removing stumps and re-establishing pasture, the land can reasonably be given cleared and pastured values. However as clearfall occurs some time into the future this value must be discounted to a present value.

Consider the example of a 15 year old pine plantation which will be clearfelled in 10 years. The land value if cleared and pastured today is $2,000 per hectare. The cost to remove stumps and establish pasture is $650 per hectare. The land in 10 years time is therefore worth $1,350 per hectare, in today's dollars. Discounting that back to a present value, using a discount rate of 10% per annum gives a valuation for the land of less than $600 per hectare. A pure plantation value is then added to the land value to derive a value for the land and trees.

This methodology has been difficult for vendors to accept.

Slightly different circumstances would prevail in the case of a Tasmanian bluegum plantation because the stump has a coppice value rather than attracting the cost necessary to remove it.

This approach means that as soon as a plantation is established the land is devalued and the value of the plantation in the early years may not make up for the devaluation. This could be a problem for companies accounting for the value of land and plantations but is overcome by the accountants approach to the "going concern" which simply means that if the business has no intention of disposing of the asset it can be carried at the cost of the land and plantation establishment.

ID Wildy
28 July 1995

Albany Valuation Services
LICENSED VALUERS & ARBITRATORS

TREE PLANTATIONS - A VALUER'S DILEMMA

BY CHRIS KING - ALBANY VALUATION SERVICES

Ladies and Gentlemen, Mark Bombara and I initiated this Tree Plantation Seminar in an attempt to highlight some of the problems involved in the valuation of tree plantations, particularly bluegum plantations and hopefully, work towards an acceptable valuation methodology which was practical under the current circumstances.

It has become apparent in our practice at Albany Valuation Services that there are going to be problems arising particularly in the future, with the valuation of Profit-A-Prendre agreements between share farmers and tree plantation companies and also in the valuation of privately owned and company owned tree plantations, where the tree plantation may form part or the whole of a particular parcel of land. It would appear than unless a standard approach is adopted towards the valuation of these assets, by both valuers and foresters, in the future, that both investors, capital markets and bankers could well become nervous about the developing tree plantation industry in the South West of Western Australia and be hesitant to invest or lend money in such enterprises, which would result in problems for the industry at all levels, which I don't think any of us would like to see.

Banks, in particular, are always hesitant at lending on emerging rural enterprises and future security valuations carried out on properties with Profit-A-Prendre agreements, share farming arrangements or straight portions of plantations fully owned on the property, could cause problems for lenders if the valuations are carried out by people using outdated methodologies, or with a lack of knowledge of the plantation industry and the dynamics of that industry.

The bluegum plantation industry is already having a dramatic effect on land values in the South West of the State and to illustrate the sort of effect it is having on bare land values, I have analysed various land transactions which have occurred in the Denbarker, Plantagenet and Albany areas, which have shown a huge increase in farming land values over the last 12 to 18 months, much of which has been brought about by the activity of tree plantation companies in the market. This activity has now taken the value of land in these areas basically out of the reach of the normal farmer purchaser, who wishes to operate the land for grazing or normal cropping purposes. Consequently, there appears to be emerging a two market influence in these areas, running through from Rocky Gully right through to Green Range, on the basis that should a property prove to have a reasonably high yield of land suitable for the planting of bluegums, then a premium of around 40.00% or even more may be offered for the land by tree plantation companies, wishing to purchase it over and above what most farmer investors would be prepared to pay for it.

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If you turn to Schedule "A" at the back of this paper, you will see that recent sales in the Perillup, Denbarker and Albany areas to tree plantation companies are showing a considerable premium, over and above that which has been being paid for similar land by farmer purchasers. The problem this poses for the valuer is that when one is attempting to assess the value of any piece of rural land in the 28 inch and upwards rainfall area through the Great Southern or South West Region, one must attempt to determine:

(a) whether or not at the particular time the valuation is being done there may be plantation companies interested in purchasing such a piece of land, in that particular area; and

(b) because the area of plantable land on the property is critical to the purchase price paid by the plantation companies, then how much plantable area is there on the property one is valuing and what is the quality of the land, with regards timber plantation growth rates etc.

Without a detailed soil survey and site survey of the property, this is very difficult to determine from merely visual assessment, or even from aerial photography with a visual assessment and depending on which forester you happen to talk to, the assessment of what land is suitable for planting would seem to vary from only the best brown gravelly loam, to anywhere between rock and beach sand and that all depends on how badly we need a property at the current time.

That is obviously a slight exaggeration of the problems posed to the valuer, however, analysis of various sales in the Rocky Gully area show that some properties purchased have far less than one would have thought would have been an attractive percentage of suitable plantable area available. Obviously, in some of these situations proximity to the company's other plantations for ease of management and availability of land in the particular locality when the company has money from a share float, have become major considerations in the purchasing decision and price paid for the property.

A good example of this is perhaps the purchase by West Star Holdings of Hay Location 904 Papes Road, in Perillup in June 1995. If you refer to your sales sheet, the adjoining property to the south, Hay Location 2075, was purchased for planting in May 1993 showing approximately $1,337 per plantable hectare, by this group. Two years later in June 1995 they have purchased the adjoining property to the north, which has approximately 100 hectares less area plantable on it, for around $128,000 more. The current purchase of Lot 904 shows around $3,000 per plantable hectare, whereas the previous purchase two years before shows only $1,337 per hectare. This is a 224.00% increase in land value over a two year period, which would I think by any person's assessment, appear to be a little excessive.

This is particularly so when one looks at the sale of Hay Location 2268, which was the adjoining property immediately to the north of Hay Location 904 on Papes Road. This property was purchased for $323,770 in December 1994, comprising an area of 268.40 hectares and in addition to the purchase price, there was an extra $30,000 paid to freehold the property by the purchaser. This sale shows approximately $1,650 per plantable hectare on our estimate of the plantable area available and allows for the saline area in the north western corner of the property and bush areas to be taken out.

It is hard to imagine how any company could justify to its shareholders the paying of almost double the price per plantable hectare, when there was one available within 2.00 kilometres of the one they purchased six months earlier, at only $1,650 per plantable hectare, with a larger available area for planting. These three particular sales are probably the best example which I can find of the anomalies being created in the cleared and pastured farmland market in the Southern Region, by the operation of plantation investment companies.

It would appear from our analysis of sales through this region, that at the end of 1993 and the beginning of 1994, the ruling farm land market price was in the region of $1,100 to $1,400 per hectare, depending on the quality of the land and the cleared and pastured area. Over the last 18 months this value has now been pushed up to as high as $3,000 per plantable hectare as is shown by the sale of Lot 904 and we understand, from agents operating in the Rocky Gully, Mount Barker and Albany areas that there is still plenty of enquiry from plantation investment companies and groups, wishing to purchase land at figures of between $2,200 and $2,500 per plantable hectare, depending on quality, size and locality.

At the same time, farmer purchases in the Mount Manypeaks and Albany heavy rainfall areas within 40 km proximity to Albany, are only showing on average between $1,600 and $1,800 per cleared hectare, excluding buildings value, for very well developed land in a very secure high rainfall area, with good soils. A few sales in the Redmond locality, which were suitable for dairying, due to their location and improvements, have shown up to $2,300 per cleared hectare, excluding buildings, but these are mainly properties which had subdivisional potential or some other particular feature giving them a higher than normal value.

Another very good example of the effect on the bare land market is a recent offer made on a property to the north west of Albany, which was purchased by a farmer purchaser approximately 18 months ago. I can't reveal the exact location of the property, or the parties names due to confidentiality, with the sale not yet finalised, however, the property was purchased on the basis of a purchase price of approximately $1,350 per hectare in around February 1994 and an offer has just been placed on the property of around $2,300 per hectare overall, with approximately $2,650 per hectare plantable being paid. This particular property was a high yield property in a secure rainfall locality, with slightly sandier soil types than might otherwise be hoped for and an average fertiliser history. Most of the property was suitable for planting, apart from shade belts.

There are many other examples which I could bring to bear and some of these are listed in the sales sheet attached, however, I believe I have made the point reasonably well as to the effect on the land market in the Southern Region by the operation of tree farming companies. The problems posed for both valuers and finance institutions, who might be lending money to farmers in these locality at the current time, for farm build up or other farm purchases, is that should the plantation companies withdraw from the market for whatever reason, values for land in the heavy rainfall areas would collapse to probably below the current level of farmer activity, due to less buyers being in the market place and cause havoc in farmer's debt to equity ratios through these areas.

On the other hand, if a valuer were to place a value on a property ignoring the potential for the property to be purchased at the moment by tree plantation companies, he would be negligent in his valuation and could be sued by any of the parties commissioning him to do it at the current time. It is therefore imperative for valuers valuing through the Southern Region of the State and the South Western areas, to take into account the influence of tree farming purchasers on the market at the current time and to fully inform the parties requesting the valuation of this two value situation in the market place and the dangers of relying purely on tree farm purchaser sales when estimating the value at the current time. It may be prudent, therefore, for any valuer given such a task, to provide two values for the property, one for sale on the basis of an estimated plantable area and one on the basis for sale in the general farm land market to farmers, based on farmer sale transactions and advise the parties requesting the valuation to determine which figure they need to use for their particular purpose.

It would seem to me to be unfortunate if the activities of small tax incentive given tree planting schemes were to have a detrimental effect on what would otherwise appear to be a viable long term tree farming program and one which might provide other land use systems and long term income sources, for existing farmers through the heavy rainfall areas of the South West Region of Western Australia. It would be sad to see the bluegum plantation industry obtain the same bad reputation as the private pine plantation industry did in the late 1970's, due to the operation of a few unscrupulous company directors.

Previous speakers have already highlighted some of the problems involved with the current methods of valuing established and growing plantations and tree share farming contracts. In my opinion, it is imperative for the health of this growing industry that professional foresters and valuers with an interest in the industry, develop a theoretically correct and practical methodology for valuing these assets, which reflects the real situation in the market, rather than some theoretical model and can have market changes factored into it readily over time, to reflect the changing market situation.

In my opinion, it is also important for the major players in the plantation industry, CALM, foresters and valuers with an interest in this field to keep up a dialogue so that the detrimental effects of any less than reputable, taxation driven plantation investment companies can be minimised in the future.

CHRIS KING
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Licensed Valuer No. 416
WESTERN AUSTRALIA

SCHEDULE "A"

SALES INFORMATION

PERILLUP:-

(1) Hay Location 904 - Sold $548,000, June 1995 (202.30 ha)

$/plantable hectare estimate = $3,000
$/hectare overall = $2,700

Very high sale, purchased by adjoining tree plantation company from farmer. Mainly plantable bar creeks.

(2) Hay Location 2268 - Sold $353,770, December 1994 (268.40 ha)

$/plantable hectare estimate = $1,684
$/hectare overall = $1,318

Adjoins above sale to the north, farmer purchaser, approximately 80.00% plantable.

(3) Hay Location 2075 - Sold $420,000, May 1993 (345.20 ha)

$/plantable hectare estimate = $1,337
$/hectare overall = $1,304 (ex buildings)

Tree farm company purchaser, estimated approximately 293.00 hectares of plantable area and shows approximately $100.00 to $200.00 per hectare premium over farm land sales in this locality at this date. Adjoins Location 904 to the south.

MANYPEAKS:-

(1) Plantagenet Location 2793, 5291 - Sold $732,000, February 1995 (394.50 ha)

$/cleared hectare (ex buildings) = $1,637
$/hectare overall = $1,855

Farmer purchaser of fully cleared and pastured old farming land in safe rainfall, with good super history, Manypeaks area.

(2) Plantagenet Location 6533 - Sold $870,000, April 1995 (491.60 ha)

$/plantable hectare = $2,200
$/hectare overall = $1,770
$/cleared hectare (ex buildings) = $1,825

Purchased by a tree farming company for bluegum development. Heavy ironstone country which is now being ripped for planting.

SALES INFORMATION...Cont'd

NAPIER:-

(1) Plantagenet Location 5797 - Sold $520,000, May 1995 (291.90 ha)

$/plantable hectare = $2,222
$/hectare overall = $1,781

Heavy rainfall property south of the Porongorups, with only average sandy soil types over ironstone. Purchased by private company for tree plantation investment purposes.

(2) Plantagenet Location 5785 - Sold $345,000, October 1994 (234.30 ha)

$/hectare cleared (ex buildings) = $1,200
$/hectare overall = $1,474

Purchased by farmer purchaser in South Porongorup area for farming purposes.

DENBARKER:-

(1) Plantagenet Location 2181 - Sold $515,000, April 1994 (359.70 ha)

$/plantable hectare = $1,650
$/hectare overall = $1,431

(2) Plantagenet Location 2179 - Sold $940,000, June 1995 (496.60 ha)

$/hectare plantable = $2,550 (approx)
$/hectare overall = $1,892

These properties sold by the same vendor to the same purchaser in the Denbarker area, showing an increase of approximately 45.00% or thereabouts on the plantable area figure paid.

(3) Plantagenet Location 2177 - Sold $550,000, July 1994 (409.20 ha)

$/hectare cleared (ex buildings) = $1,355
$/hectare overall = $1,307

Farmer purchaser for good land in the Denbarker area.

TREE PLANTATIONS
A VALUER'S DILEMMA

A Discussion paper covering Sales Evidence of Forestry properties and the DCF approach

For the Australian Institute of Valuers and Land Economists Western Australia seminar at the Manjimup Country Club on Friday 4 August 1995.

Presented by
Mark Bombara, Valuer General's Office, BUNBURY

INTRODUCTION

In January 1993 I presented a paper in Bunbury which discussed sales evidence and its interpretation, and valuation methodology for forestry properties. For some years, there appeared to be a lack of confidence in the "private forestry" industry, which was being reflected in the relatively low level of sales activity for forestry properties and the relatively low prices being achieved. Things have changed.

What I'll discuss today is

- Sales Evidence
- Valuation methodology including the Discounted Cashflow approach

TIMBER

The best and most reliable valuations are those which are based directly on sales evidence. Its not always possible to find directly comparable evidence particularly when, in the past, very little evidence existed. In recent times, this has changed, due in part to the increasing amount of timber farming which has now become an acceptable part of the rural landscape. Presently timber farming is seen to be a credible investment alternative and I believe that the Department of Conservation and Land Management has played an important role in creating and maintaining a stable market for timber product and encouraging farming activities to include timber production.

Before I talk about sales evidence, it is important to have an understanding of the styles of timber investment available.

1. Timber owned by the landowner
2. Shared ownership with CALM or Bunnings
3. Almost total ownership by CALM or Bunnings who pay the landowner an annual rental
4. Managed Unit Trusts or other ownership mechanisms

Sales Evidence (see Appendix 'A')

The approach we use at Valuer General's Office Bunbury to analyse sales evidence of specialist rural properties is to look at the underlying land value on a cleared basis, make allowances for other improvements and determine an added value. In this case, added value reflects the premium paid for the timber over and above the cleared land value. There is no acknowledgment of expenditures which will be necessary at the end of the plantation's life to rehabilitate the land to a fully cleared state. On this basis, the added value of the timber can be slightly less than what the purchaser actually paid for the timber (ie the timber was worth more and the land less). An adjustment which could be used is a discounted rehabilitation cost. The discount should be formulated to take into account taxation implications and the fact that the rehabilitation expenditure will be deferred to the end of the plantation's life. A current rehabilitation cost is around $300 to $400 per hectare.

Since 1990, there have been 23 sales of forestry properties in the southwest and Albany regions, of which all except 4 included the standing timber. Of the 19 including the timber, 16 were for pines. One of the pine sales was for 2 year old trees which disclosed an added value of -$260/ha. Since 1993, 6 pine sales have occurred in the southwest, which disclosed an added value of between $1,500/ha and $2,800/ha. These 6 sales provide us with a solid basis for arriving at some conclusions about plantation properties including the distinct age relationship as indicated in Appendix 'B'.

Thinnings status is also a factor in this equation and there is some evidence that in recent years, a premium is paid for unthinned pines.

Another factor which is also important is the location of the property. Although some account is taken for locational factors in the land value, the value of the timber is also affected due to transportation and rainfall issues. The sale price of timber product from a plantation is affected by CALM's stumpage rates which differ depending on where the plantation is situated. For example, in Bridgetown, stumpages are higher north of the Blackwood river than south.

Discounted Cash Flow

The Discounted Cash Flow approach is used by foresters to demonstrate the growth of the value of the timber asset over time and to provide a financial justification to establish and maintain plantations. It is also used to provide a model for insurance purposes.

The valuation profession uses DCF in a comparative context and irrespective of whether land is included in the analysis, absolute consistency is required in its application.

If an overall land & timber investment DCF was prepared, the discount rate would be lower due to the land investment risk being significantly lower than the timber risk. The benefit of including land is that the investment is looked at as a total package and can be compared with other forms of investment. The disadvantage is that differently located properties can have different land potentials which can distort the overall disclosed discount rate.

The foresters' DCF approach is identical to the valuers' approach with one exception. The discount rate. Its essential for valuers to use a rate which reflects market evidence rather than the real rate. The difference is an allowance for investment risk. Graphically, we can see the affect of using different discount rates (Appendix 'C'). The higher the rate, the longer added value remains negative. The bumps represent thinnings operations.

I have prepared a DCF (Appendix 'D') based on some figures obtained from Geoff McArthur for a pine plantation which is one of the recent sales. To keep things simple, expenditures have been summarised and land has been excluded, however a rehabilitation cost has been added to the end of the DCF so that the Net Present Values can be considered as added values, rather than timber value. Note that all expenses and income are expressed in 1995 dollars.

The age of the subject plantation at Date Of Sale was 19 years. After my analysis of the sale, added value of the pines was disclosed at $2,400/ha. Looking along the 8% row, the added value at a plantation age of 19 years (1994) is $5,504. There is a substantial difference. The only explanation is the discount rate. After some experimenting, a 15.5% discount rate seems to give us the correct answer of $2,400 at year 19. On this basis, it can be said that the sale disclosed a 15.5% discount rate.

Due to variable site conditions and other factors which may be unique to individual plantations, the best approach is to analyse a disclosed discount rate for each sale individually and make a judgement on the appropriate discount rate to apply to the plantation being valued. If you want to look at the DCF approach on a broader basis, we can overlay the sales evidence for the 6 southwest pine plantations onto the DCF. The assumption here is that the DCF is typical.

We can see that, using these 6 sales, the discount rate disclosed by sales evidence for 19 to 22 year old pines in the southwest is 17% (Appendix 'E').

If enough evidence existed to perform this same analysis for pine trees within a different agegroup, I wouldn't be surprised if the disclosed discount rate was higher for younger trees and lower for older trees.

The Traps

Some valuation requests ask for a "land only" value of plantation properties, presumably so the plantation manager can add a forester's timber value to it. This approach will rarely provide a market value of the property, because the forester's timber value will not be a market value unless a market discount rate is used.

The solution

The model DCF provided in this paper relies on information obtained from Geoff McArthur in relation to plantation expenditures and income. Without the forester's specialist knowledge relating to site quality, timber quality and quantity and likely markets for the timber, it would be very difficult to provide accurate expenditure and income figures for a DCF. Once the valuer has obtained the forester's advice in relation to both the subject property and the sales evidence, he is then in the best position to provide a valuation which reflects the marketplace, using normal valuation principles.

SUMMARY

The AIVLE Research Notes contained in The Valuer & Land Economist November 1993 acknowledge the difficulties in arriving at appropriate discount rates when sales evidence is unavailable or inconsistent and states that the appropriate discount rate is the 10 year Government Bond rate (ie the "Risk Free" rate) plus an amount for risk. The role of the valuer is to determine the level of risk disclosed by the marketplace and apply it to the valuation. The evidence which is now available as a result of recent sales gives the valuation profession greater confidence in determining this risk margin for plantations, particularly pine plantations.

DISCLAIMER

This paper is not intended to provide a shortcut to performing a market valuation of a forestry plantation property. In accordance with normal valuation principles, the sales evidence should be verified and the analysis should be performed independently.

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5. Tim Lee-Steere, Lee-Steere & Associates, BUNBURY
6. Gerry Brown, Property Valuation & Consulting Services, HERDSMAN

APPENDIX A

VALUER GENERAL'S OFFICE **WESTERN AUSTRALIA**

	C	D	F	G	I
2	#	Description	Locality	Rainfall	VGO map ref.
3				(mm)	
4					
5	1	Nelson Location 1485	Bridgetown	700	Yerraminnup NW
6					
7	2	Pt Nelson Location 11984 being Lot 15 Plan 10598	Greenbushes	1,000	Balingup SE
8					
9	3	Hay Location 563	Tenterden		Tenterden SW
10		Hay Location 881			
11		Hay Location 1227			
12					
13	4	Hay Location 1675	Denmark	1,100	Mount Frankland SE
14					
15	5	Lot 1 Diagram 10349	Bridgetown	800	Bridgetown SW
16					
17	6	Lot 27 Plan 9901	Chittering	650	Wannamal SW
18					
19	7	Wellington Location 4711	Cookernup	1,000	Hamel SE
20					
21	8	Tweed AA 892	Bridgetown	750	Boyup Brook SW
22		Tweed AA 893	Bridgetown	750	Boyup Brook SW
23		Tweed AA 894	Bridgetown	750	Boyup Brook SW
24					
25	9	Nelson Location 11059	Nannup	1,150	Carlotta Brook NW
26		Nelson Location 11060	Nannup	1,150	Carlotta Brook NW
27					
28	10	Tweed AA Lot pt654	Bridgetown	750	Bridgetown SE
29					
30	11	Pt Plantagenet Location 6447 being lot 2 Diagram 82171	Albany		Two Peoples Bay SW
31					
32	12	Hay Location pt1190			
33					
34	13	Nelson Location 1737	Greenbushes	1,000	Bridgetown SW
35					
36	14	Pt Sussex Location 550 being Lot 3 Diagram 35030	Busselton	1,000	Yallingup SE
37					
38					
39	15	Hay Location 321			
40		Hay Location 395			
41		Hay Location 396			
42		Hay Location 397			
43		Hay Location 667			
44		Hay Location 807			
45		Hay Location 815			
46		Hay Location 879			
47		Hay Location 880			
48					
49	16	Tweed AA 892	Bridgetown	750	Boyup Brook SW
50		Tweed AA 893	Bridgetown	750	Boyup Brook SW
51		Tweed AA 894	Bridgetown	750	Boyup Brook SW
52					
53	17	Nelson Location 2897	Benjimup	800	Boyup Brook NW
54					
55	18	Nelson Location 1099	Bridgetown	800	Bridgetown SE
56		Nelson Location 1992	Bridgetown	800	Bridgetown SE
57					
58	19	Tweed AA Lot pt654	Bridgetown	750	Bridgetown SE
59					
60	20	Nelson Location pt1459 (3d70941)	Yornup	800	Wilgarup NE
61					
62	21	Nelson Location pt117	Bridgetown	800	Bridgetown SE
63					
64	22	Nelson Location 1548	Bridgetown	800	Wilgarup NW
65					
66	23	Nelson Location 821	Balingup	1,000	Balingup NE

VALUER GENERAL'S OFFICE — WESTERN AUSTRALIA

	O	P	Q
2	Vendor	Purchaser	D.O.S.
3			
4			
5	WA Pines Pty Ltd	Australian Forest Holdings Ltd	6/95
6			
7	WA Pines Pty Ltd	Officer	5/95
8			
9	Higgins BG & MJ	Norton Ridge Holdings Pty Ltd	1/95
10		Eucalypt Forestry Management Ltd	
11		Norton Ridge Holdings Pty Ltd	
12			
13	Elphick G & W	Campbell-Clause JI & PMS	12/94
14			
15	Pinewood Holdings Pty Ltd	Bilbil Pty Ltd, Greenwest Pty Ltd, Trenna TURNER & Claypot Pty Ltd	11/94
16			
17	Pinewood Holdings Pty Ltd	Brofam Nominees Pty Ltd	10/94
18			
19	Jones GR & CG, Crombie MJ	Quintin Holdings Pty Ltd	8/94
20			
21	TC Scott Pty Ltd	Holroyd SJ & IS	5/94
22			
23			
24			
25	Trahar: IN, Wheatley: AV	West State Pty Ltd	12/93
26			
27			
28	Bombara: A, RM, HJ, M	Holroyd SJ & IS	5/93
29			
30	Cantwell EJ & MO	Van Dongen H & A	11/92
31			
32	Parker RK	Ditchburn AD & RM	10/92
33			
34	Hynes JM PF	Australian Forest Holdings Ltd	7/92
35			
36	Butler FR, AF, MR & SA	Fry AV & BA	6/92
37			
38			
39	Heytesbury Properties Pty Ltd	Australian Forest Holdings Ltd	6/92
40			
41			
42			
43			
44			
45			
46			
47			
48			
49	Australasian Forestry Nominees Pty Ltd	TC Scott Pty Ltd	1/92
50			
51			
52			
53	Moore PM	Queron Nominees Pty Ltd	9/91
54			
55	Terana Holdings Pty Ltd	MacNish: GI, Cocks: TE, Nichols: AH	6/91
56			
57			
58	Yaralla Holdings Pty Ltd	Bombara: A, RM, HJ, M	11/90
59			
60	National Australia Bank Ltd	Armstrong: MF	10/90
61			
62	Ard Greine Pty Ltd	Parks: RJ, AS	9/90
63			
64	Tranquil Nominees Pty Ltd, Murphy: RJ, Shepherd: AK, Brindal: CF	National Forest Holdings Pty Ltd	6/90
65			
66	Australasian Forestry Nominees Pty Ltd	South West Forest Holdings Pty Ltd	1/90

VALUER GENERAL'S OFFICE — WESTERN AUSTRALIA

	R	S	W	Z	AA	AB	AC
2	Sale price	Timber ownership	Land area	Plantation	Tree species	Site quality	Tree management
3			(ha)	area (ha)		(poor/fair/good)	(poor/fair/good)
4							
5	$450,000	Landowner	141.6	128.0	Pinus Radiata	fair	fair / good
6							
7	$155,000	Landowner	40.3	20.0	Pinus Radiata	fair	fair
8							
9	$420,000	37.58% landowner, balance CALM	317.2	96.3	Euc. Globulus		
10		37.58% landowner, balance CALM					
11		37.58% landowner, balance CALM					
12							
13	$207,000	WACAP	118.2	112.0	Euc. Globulus		
14							
15	$505,000	Landowner	81.1	65.0	Pinus Radiata	fair / good	fair / poor
16							
17	$100,000	Landowner	40.9	35.0	Pinus Radiata	poor	poor
18							
19	$120,000	Landowner	33.6	11.5	Euc. Globulus	poor	fair
20							
21	$600,000	Landowner	40.4	38.0	Pinus Radiata	fair	fair
22		Landowner	46.9	44.0	Pinus Radiata	fair	fair
23		Landowner	29.1	28.0	Pinus Radiata	fair	fair
24							
25	$520,000	Landowner	85.3	20.0	Pines	fair	fair
26		Landowner	64.0	24.0	Pines	fair	fair
27							
28	$150,000	Landowner	39.5	33.6	Pinus Radiata	fair	poor
29							
30	$120,000	CALM	146.0	135.0	Euc. Globulus		
31							
32	$295,000	CALM Profit a' prendre F55294 30 y	691.9	120.0	Pines		
33							
34	$280,000	Landowner	117.4	36.0	Pinus Radiata	good	good
35							
36	$366,000	CALM Profit a' Prendre E77067 30	121.5	54.9	Euc. Globulus	fair	fair
37		Bunnings Sharefarming (annuity)			Pines		
38							
39	$2,300,000	Landowner	64.7		Euc. Globulus		
40		Landowner	64.7		Euc. Globulus		
41		Landowner	40.5		Euc. Globulus		
42		Landowner	202.3		Euc. Globulus		
43		Landowner	63.2		Euc. Globulus		
44		Landowner	144.1		Euc. Globulus		
45		Landowner	59.4		Euc. Globulus		
46		Landowner	115.1		Euc. Globulus		
47		Landowner	191.3		Euc. Globulus		
48							
49	$182,500	Landowner	40.4	38.0	Pinus Radiata	fair	fair
50		Landowner	46.9	44.0	Pinus Radiata	fair	fair
51		Landowner	29.1	28.0	Pinus Radiata	fair	fair
52							
53	$190,000						
54							
55	$205,000	Landowner	74.2	63.0	Pinus Radiata	poor	poor
56		Landowner	40.5	32.5	Pines	poor	poor
57							
58	$57,000	Landowner	39.5	33.6	Pinus Radiata	fair	poor
59							
60	$114,000	Landowner	64.8	60.0	Pines	fair	good
61							
62	$85,000	Landowner	16.2	14.0	Pines	fair	poor
63							
64	$440,000	Landowner	106.0	100.0	Pines	very good	excellent
65							
66	$1,265,000	Landowner	64.7		Pines		

VALUER GENERAL'S OFFICE

WESTERN AUSTRALIA

	AD	AE	AF	AH	AI
2	Thinnings	Year Planted	Age @	Developed	Added value of timber
3			D.O.S	value ($/chxb)	($/timbered ha above $/chxb)
4					
5	Thinned 1988	1976	19	$1,620	$1,800
6					
7	thinned earlier, next due 1998/99	1975	20	$2,660	$2,500
8					
9		1993	18 months	$900	$4,500
10					
11					
12					
13	Average:	1988	6	$1,750	$0
14					
15	Unthinned, due soon	1975	19	$4,400	$2,400
16					
17	Unthinned	1973	21	$1,830	$720
18					
19	Unthinned		3	$3,040	$2,000
20					
21	Recently thinned	1972	22	$2,540	$2,800
22	Recently thinned	1972	22	$2,540	
23	Recently thinned	1972	22	$2,540	
24					
25	Some thinnings	Average	22	$3,000	$2,100
26	Some thinnings	Average	22		
27					
28	Thinned	1974	19	$2,500	$1,500
29					
30		1987	5	$1,000	-$193
31					
32			1	$800	-$800
33					
34	Unthinned		13	$1,260	$640
35					
36	Unthinned		2	$2,940	-$1,000
37			2		-$500
38					
39			3		$515
40			3		
41			3		
42			3		
43			3		
44			3		
45			3		
46			3		
47			3		
48					
49	Recently thinned		20	$1,750	-$150
50	Recently thinned		20	$1,750	
51	Recently thinned		20	$1,750	
52					
53				$1,110	
54					
55			15	$1,800	$87
56			15	$1,800	
57					
58			17	$1,800	-$370
59					
60			2	$2,000	-$260
61					
62	Require thinning		15	$4,250	$1,000
63					
64			16	$2,100	$2,500
65					
66				$2,200	

VALUER GENERAL'S OFFICE — WESTERN AUSTRALIA

	C	D	F	G	I
2	#	Description	Locality	Rainfall	VGO map ref.
3				(mm)	
67		Nelson Location 927	Balingup	1,000	Balingup NE
68		Nelson Location pt950	Balingup	1,000	Balingup NE
69		Nelson Location pt1055	Balingup	1,000	Balingup NE
70		Nelson Location 11039	Greenbushes	900	Bridgetown NW
71		Nelson Location 11073	Nannup	1,100	Carlotta Brook NW
72		Nelson Location 11202	Nannup	1,100	Carlotta Brook NW
73		Nelson Location 11517	Greenbushes	900	Bridgetown NW
74					
75	24	Nelson Location 11059	Nannup	1,150	Carlotta Brook NW
76		Nelson Location 11060	Nannup	1,150	Carlotta Brook NW
77					
78	25	Murray Location 169	Waroona	1,200	Hamel NE
79					
80	26	Murray Location 242	Waroona	1,200	Hamel NE
81					
82	27	Wellington Locations 3020, pt3222 & pt3657 (2d29974)	Waroona	1,000	Hamel SW
83		Nelson Location 10453	East Nannup	1,150	Carlotta Brook NW
84		Swan Location pt7576 (1d62850)	Moore River	700	Bidaminna SW
85		Plantagenet Location pt3835	Cordinup		Haul Off Rock
86		Plantagenet Location 3836	Cordinup		Haul Off Rock
87		Nelson Location 1099	Bridgetown	800	Bridgetown SE
88		Nelson Location 1992	Bridgetown	800	Bridgetown SE
89		Swan Location 516	Moore River	700	Bidaminna SW
90		Swan Location 517	Moore River	700	Bidaminna SW
91		Swan Location 518	Moore River	700	Bidaminna SW
92		Swan Location 531	Moore River	700	Bidaminna NW
93		Swan Location 872	Moore River	700	Bidaminna NW
94		Swan Location 943	Moore River	700	Bidaminna SW
95		Swan Location pt873	Moore River	700	Bidaminna NW
96		Swan Location 491	Moore River	700	Bidaminna NW
97		Swan Location 492	Moore River	700	Bidaminna NW
98		Swan Location 800	Moore River	700	Bidaminna NW
99		Swan Location 1567	Moore River	700	Bidaminna SW
100		Swan Location pt4434 (30p13707)	Moore River	700	Bidaminna NW
101		Swan Location pt2847 & pt6824 (23p13707)	Moore River	700	Bidaminna SW
102		Swan Location pt6824 (28p13707)	Moore River	700	Bidaminna NW
103		Swan Location pt2847	Moore River	700	Bidaminna SW
104		Swan location pt6824	Moore River	700	Bidaminna NW
105		Swan Location pt2258	Moore River	700	Bidaminna SW
106		Swan Location 5242	Moore River	700	Bidaminna SW
107		Swan Location 5498	Moore River	700	Bidaminna SW
108					
109	28	Nelson Location pt629	Hester	850	Bridgetown SW
110		Nelson Location 7907	Hester	850	Bridgetown SW
111					
112	29	Tweed AA 663	Bridgetown	750	Boyup Brook SW
113					
114	30	Nelson Location 9703	Bridgetown	700	Yerraminnup NW
115					
116	31	Nelson Location 138	Bridgetown	900	Wilgarup NW
117					
118	32	Nelson Location pt8468	Hester	850	Bridgetown SW
119					
120	33	Nelson Location 1948	Bridgetown	700	Yerraminnup NW
121					
122	34	Nelson Location 767	Bridgetown	700	Yerraminnup NW
123		Nelson Location 768	Bridgetown	700	Yerraminnup NW
124		Nelson Location 1581	Bridgetown	700	Yerraminnup NW
125		Nelson Location 2178	Bridgetown	700	Yerraminnup NW
126		Nelson Location 2656	Bridgetown	700	Yerraminnup NW
127		Nelson Location 7478	Bridgetown	700	Yerraminnup NW

VALUER GENERAL'S OFFICE

WESTERN AUSTRALIA

	O	P	Q
2	Vendor	Purchaser	D.O.S.
3			
67			
68			
69			
70			
71			
72			
73			
74			
75	McKenna: DG, Don McKenna Pty Ltd	Trahar: IN, Wheatley: AV	8/89
76			
77			
78	Watson: LA	Meretone Pty Ltd	7/89
79			
80	Watson: LA	Olsen: G, Vickery: EA	5/89
81			
82	TPS Properties Pty Ltd	Terana Holdings Pty Ltd	4/89
83			
84			
85			
86			
87			
88			
89			
90			
91			
92			
93			
94			
95			
96			
97			
98			
99			
100			
101			
102			
103			
104			
105			
106			
107			
108			
109	Long: RW, LJ	Egerton-Warburton: VG	5/89
110	Long: RW, LJ	Mecca Holdings Pty Ltd, Reuben Holdings Pty Ltd	
111			
112	Saunders B, Newell: RJ, Pennington: WT	TC Scott Pty Ltd	4/89
113			
114	Newry Nominees Pty Ltd, Karpin: LR	Silvagold Corporation Pty Ltd	10/88
115			
116	Fisher: DF, SA	National Forest Holdings Pty Ltd	4/88
117			
118	Sutherland: JEN	Egerton-Warburton: VG	6/87
119			
120	Uambine Pty Ltd, Seward: JM, PM	Silvagold Corporation Pty Ltd	2/87
121			
122	Winnejup Pine Pty Ltd	Australian Stock Developments Ltd	5/86
123			
124			
125			
126			
127			

VALUER GENERAL'S OFFICE — WESTERN AUSTRALIA

	R	S	W	Z	AA	AB	AC
2	Sale price	Timber ownership	Land area	Plantation	Tree species	Site quality	Tree management
3			(ha)	area (ha)		(poor/fair/good)	(poor/fair/good)
67		Landowner	64.7		Pines		
68		Landowner	63.8		Pines		
69		Landowner	22.0		Pines		
70		Landowner	64.7		Pines		
71		Landowner	63.6		Pines		
72		Landowner	78.0		Pines		
73		Landowner	29.9		Pines		
74							
75	$330,000	Landowner	85.3	18.0	Pines	fair	fair
76		Landowner	64.0	18.0	Pines		
77							
78	$130,000	Landowner	40.5	39.8	Pines	poor	poor
79							
80	$120,000	Landowner	40.5	27.1	Pines	poor	poor
81							
82	$1,300,000	Landowner	292.5		Pines	good	poor
83		Landowner	55.8		Pines		
84		Landowner	127.1		Pines		poor
85		Landowner	798.8		Euc. Globulus		
86		Landowner	1027.5		Euc. Globulus		
87		Landowner	74.2		Pines		
88		Landowner	40.5		Pines		
89		Landowner	16.2		Pines		poor
90		Landowner	16.2		Pines		poor
91		Landowner	16.2		Pines		poor
92		Landowner	16.2		Pines		poor
93		Landowner	40.5		Pines		poor
94		Landowner	16.2		Pines		poor
95		Landowner	31.6		Pines		poor
96		Landowner	16.2		Pines		poor
97		Landowner	16.2		Pines		poor
98		Landowner	20.2		Pines		poor
99		Landowner	40.5		Pines		poor
100		Landowner	51.5		Pines		poor
101		Landowner	60.2		Pines		poor
102		Landowner	187.4		Pines		poor
103		Landowner	41.9		Pines		poor
104		Landowner	319.5		Pines		poor
105		Landowner	80.4		Pines		poor
106		Landowner	131.3		Pines		poor
107		Landowner	105.0		Pines		poor
108							
109	$300,000	Landowner	70.9	28.3	Pines	fair	good
110		Landowner	66.3	0.0			
111							
112	$100,000	Landowner	39.6	11.0	Pines	fair	poor
113							
114	$220,000	Landowner	56.2	52.0	Pines	good	good
115							
116	$144,000	Landowner	39.8	38.0	Pines	poor	
117							
118	$190,000	Landowner	60.3	60.0	Pines		good
119							
120	$180,000	Landowner	64.7	58.0	Pines		
121							
122	$1,300,000	Landowner	40.5	350.0	Pines		
123		Landowner	65.4		Pines		
124		Landowner	32.6		Pines		
125		Landowner	64.8		Pines		
126		Landowner	64.8		Pines		
127		Landowner	145.7		Pines		

VALUER GENERAL'S OFFICE

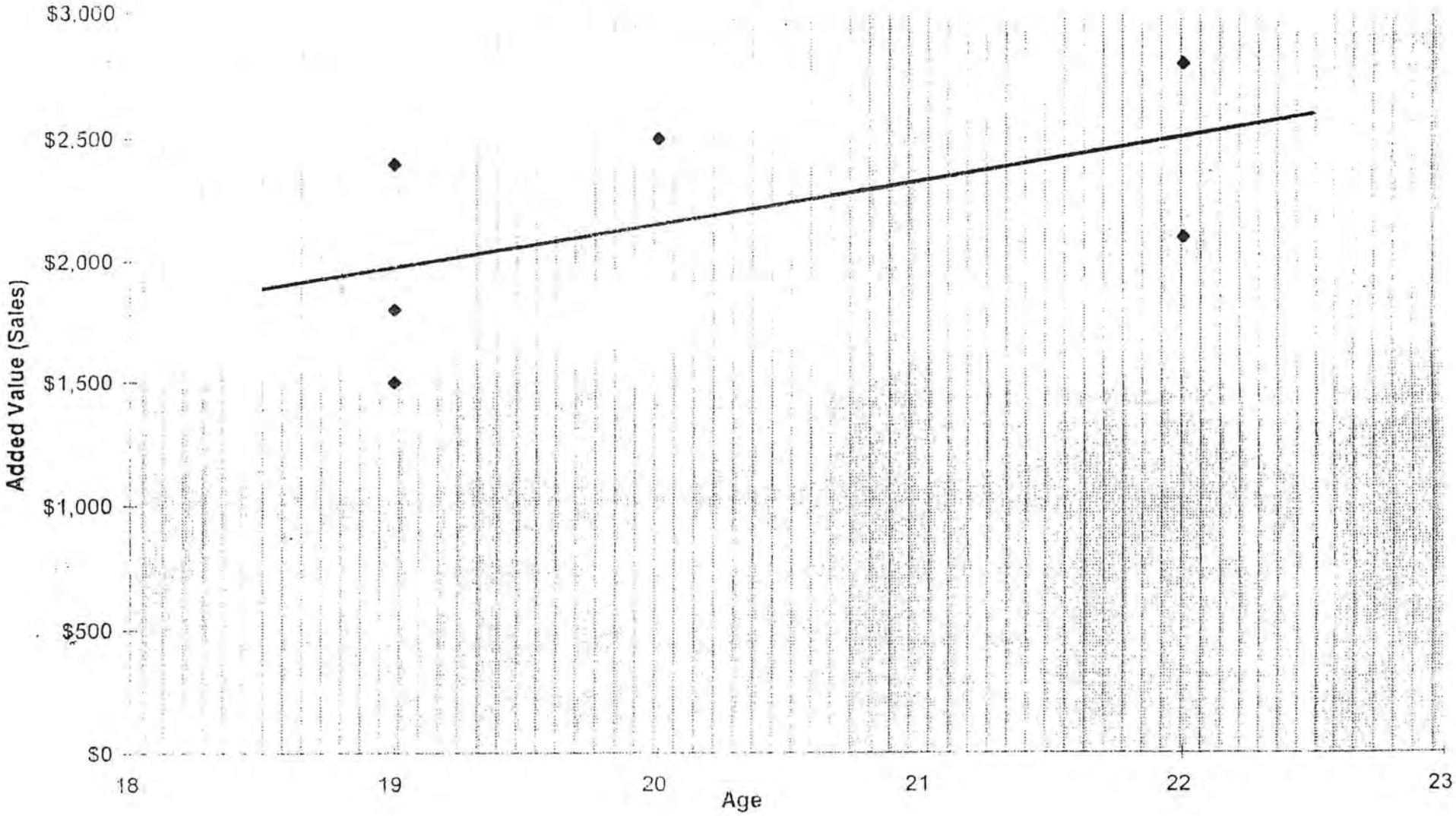
WESTERN AUSTRALIA

	AD	AE	AF	AH	AI
2	Thinnings	Year Planted	Age @	Developed	Added value of timber
3			D.O.S	value ($/chxb)	($/timbered ha above $/chxb)
67				$2,200	
68				$2,200	
69				$2,200	
70				$1,850	
71				$1,600	
72				$1,600	
73				$1,850	
74					
75			18	$1,700	$3,000
76			18	$1,700	
77					
78			18	$3,400	-$170
79					
80			18	$3,450	-$300
81					
82				$1,250	
83				$1,700	
84				$750	
85				$350	
86				$350	
87			13	$1,700	
88			13	$1,700	
89				$750	
90				$750	
91				$750	
92				$750	
93				$750	
94				$750	
95				$750	
96				$750	
97				$750	
98				$750	
99				$750	
100				$750	
101				$750	
102				$750	
103				$750	
104				$750	
105				$750	
106				$750	
107				$750	
108					
109			14	$1,800	$500
110				$1,800	
111					
112			10	$1,800	$2,700
113					
114			14	$1,250	$2,900
115					
116			15	$1,400	$2,300
117					
118			10	$1,400	$1,800
119					
120			13	$1,200	
121					
122			14	$1,150	
123				$1,150	
124				$1,150	
125				$1,150	
126				$1,150	
127				$1,150	

APPENDIX 15

13

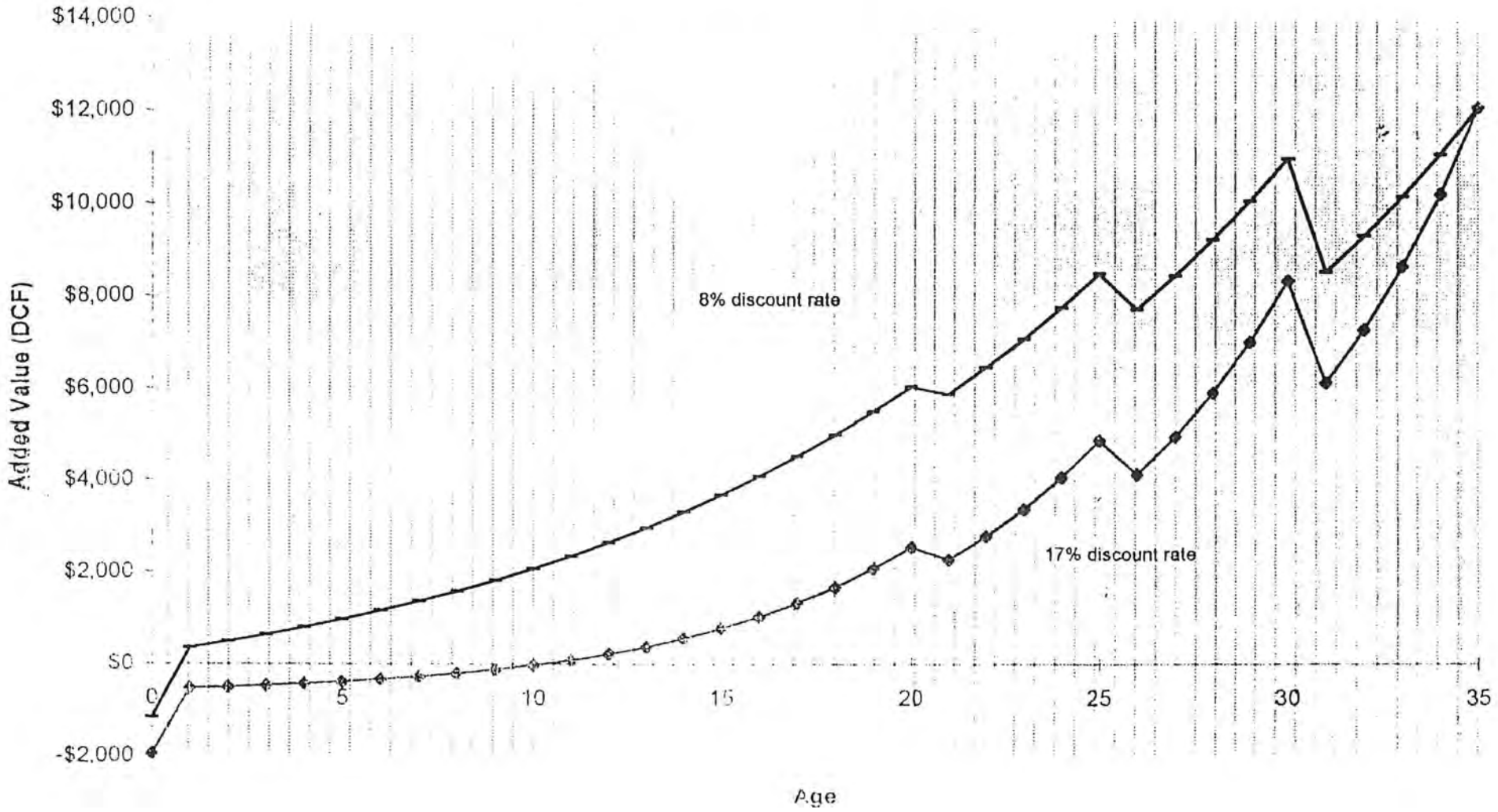
Age - v - Added Value (Sales Evidence)



6 SW pine sales since 1993 Chart 1

2/8/95

Age - v - added value (DCF approach)



Simple DCF excluding land Chart 1

2/8/95

Plantation Area	65	ha									
1st thinning	1995										
2nd thinning	2000										
3rd thinning	2005										
clearfelling	2010										
			t=	0	1	2	3	4	5	6	7
		discount rate	year	1975	1976	1977	1978	1979	1980	1981	1982
			establishment	$1,500							
			rehabilitation								
			Expenses ($/ha)	$1,500	$100	$100	$100	$100	$100	$100	$100
			yield (m3/ha)								
			stumpage ($/m3)								
			Revenue ($/ha)								
			Profit	-$1,500	-$100	-$100	-$100	-$100	-$100	-$100	-$100
		8.00%	NPV @ t="year"	-$1,162	$365	$502	$651	$811	$984	$1,170	$1,372
		12.00%	NPV @ t="year"	-$1,822	-$361	-$292	-$216	-$129	-$33	$75	$196
		15.50%	NPV @ t="year"	-$1,941	-$510	-$473	-$431	-$383	-$326	-$261	-$186
		17.00%	NPV @ t="year"	-$1,948	-$524	-$497	-$464	-$426	-$381	-$329	-$268

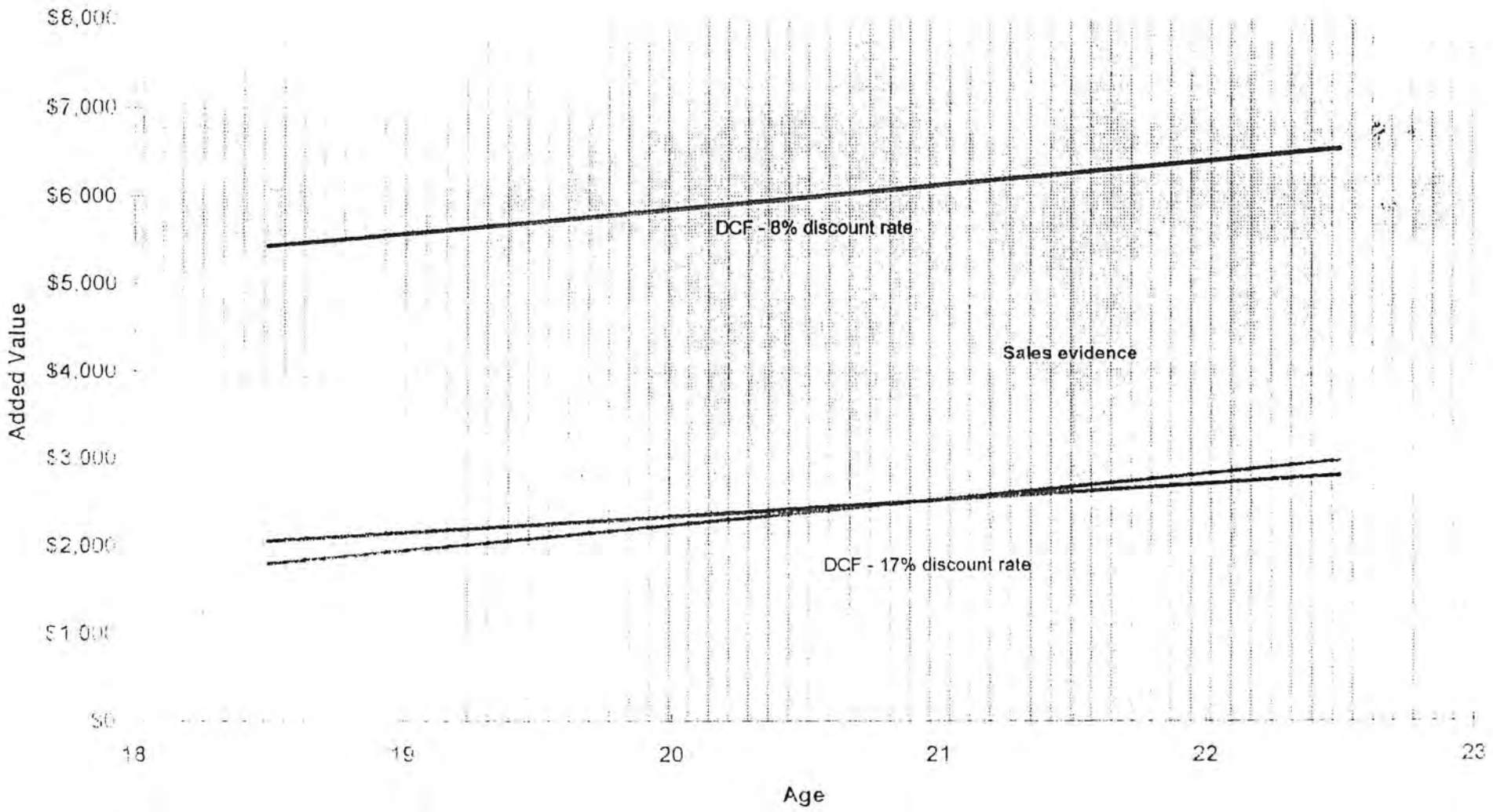
8	9	10	11	12	13	14	15	16	17	18	19	20	21
1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
												100	
												$7	
												$700	
-$100	-$100	-$100	-$100	-$100	-$100	-$100	-$100	-$100	-$100	-$100	-$100	$600	-$100
$1,590	$1,825	$2,079	$2,353	$2,649	$2,969	$3,315	$3,688	$4,091	$4,526	$4,996	$5,504	$6,052	$5,888
$332	$484	$654	$844	$1,057	$1,296	$1,564	$1,863	$2,199	$2,575	$2,996	$3,467	$3,995	$3,803
-$100	$0	$116	$249	$403	$581	$787	$1,024	$1,299	$1,615	$1,981	$2,404	$2,892	$2,647
-$196	-$113	-$15	$99	$233	$390	$573	$788	$1,039	$1,332	$1,676	$2,078	$2,548	$2,279

22	23	24	25	26	27	28	29	30	31	32	33	34	35
1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
													$400
$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$400
			80					100					250
			$18					$32					$50
			$1,440					$3,200					$12,500
-$100	-$100	-$100	$1,340	-$100	-$100	-$100	-$100	$3,100	-$100	-$100	-$100	-$100	$12,100
$6,468	$7,093	$7,768	$8,498	$7,730	$8,457	$9,241	$10,089	$11,004	$8,536	$9,327	$10,181	$11,104	$12,100
$4,371	$5,007	$5,720	$6,519	$5,800	$6,608	$7,513	$8,527	$9,662	$7,350	$8,344	$9,457	$10,704	$12,100
$3,173	$3,780	$4,482	$5,292	$4,565	$5,388	$6,338	$7,436	$8,704	$6,473	$7,592	$8,884	$10,376	$12,100
$2,783	$3,373	$4,064	$4,872	$4,132	$4,952	$5,910	$7,032	$8,345	$6,136	$7,296	$8,654	$10,242	$12,100

APPENDIX E

18

Age - v - added value



Simple DCF excluding land Chart 3

2/8/95

PLANTATION VALUATION
SHAREFARMING AGREEMENTS

SOFTWOOD PLANTATIONS

Broadscale Plantations - P. radiata

Annuity payment of $80 - $230/ha/yr plus residual share of final harvest revenue of 2% - 4% (exceptions to 17%). Final harvest revenue average of $15000/ha.

Integrated Plantations - P. pinaster

30% share in all revenue (thinning @ age 12 - 14, 20 - 22, 30 and final harvest @ age 35 - 40). Final harvest revenue average of $12000/ha.

HARDWOOD PLANTATIONS

CALM Sharefarms

Broadscale Plantations - E. globulus

Annuity payment of $90 - $210/ha/yr (exceptions to $270/ha/yr) plus residual share of final harvest revenue of 4 - 11%. Final harvest revenue average of $6000/ha.

Integrated Plantations - E. globulus

28 - 36% share in all harvest revenue from either the first or from (more generally) the first and second harvests.

Agency Agreements

Full Crop Share

28 - 36% share in the first and second harvests. Share adjustable due to additional costs.

Partial Annuity

Similar to above yet prepayment of harvest revenue of up to $90/ha/yr compounded at 7% + inflation and deducted from share of harvest revenue.

Increased Investment for Increased Share

Similar to above two cases, yet with increased investment by landowner to increase share. $1000/ha investment at establishment will increase share to 60 - 70%

Full Annuity with no harvest share

Annuity Payment of $150 - $200/ha/yr with no share in harvest revenue. Tree Crop Area adjustable according to successful growth and damage/destruction of crop.

PLANTATION VALUATION ACTIVITIES

Purchase of private plantations

Plantation assessment - soil and site characteristics, plantation area, age, stocking density, growth and health.

Establishment/replacement costs.

Net present value - predicted productivity.

Land purchase inclusive of private plantations

Net area plantable and net area already planted, plus

As above, yet relatively unimportant.

Compensation payable when destroyed

Capitalised costs of establishment and management

NPV to calculate opportunity costs

Resumption of Tree Crop Area

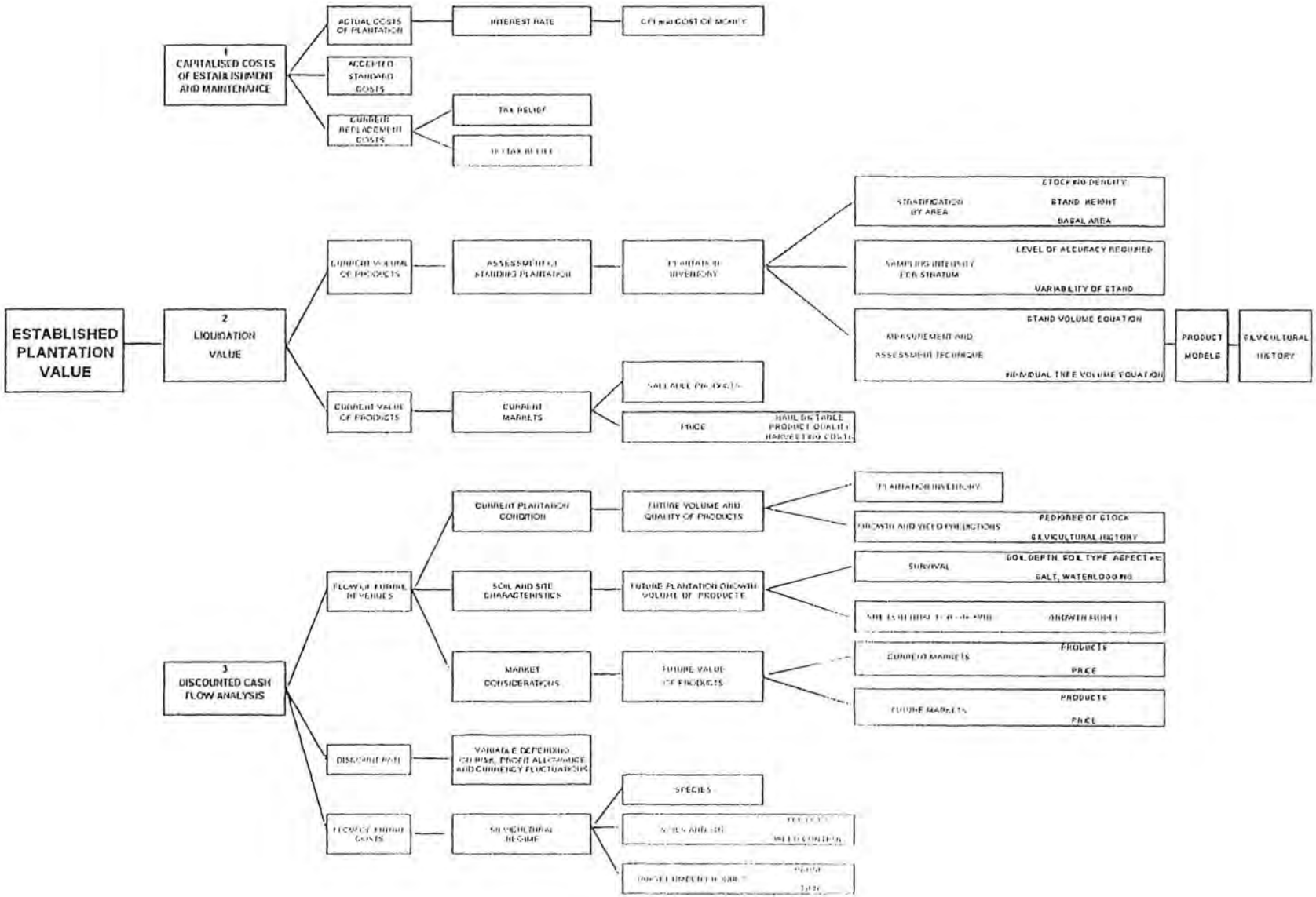
Annuity costs paid

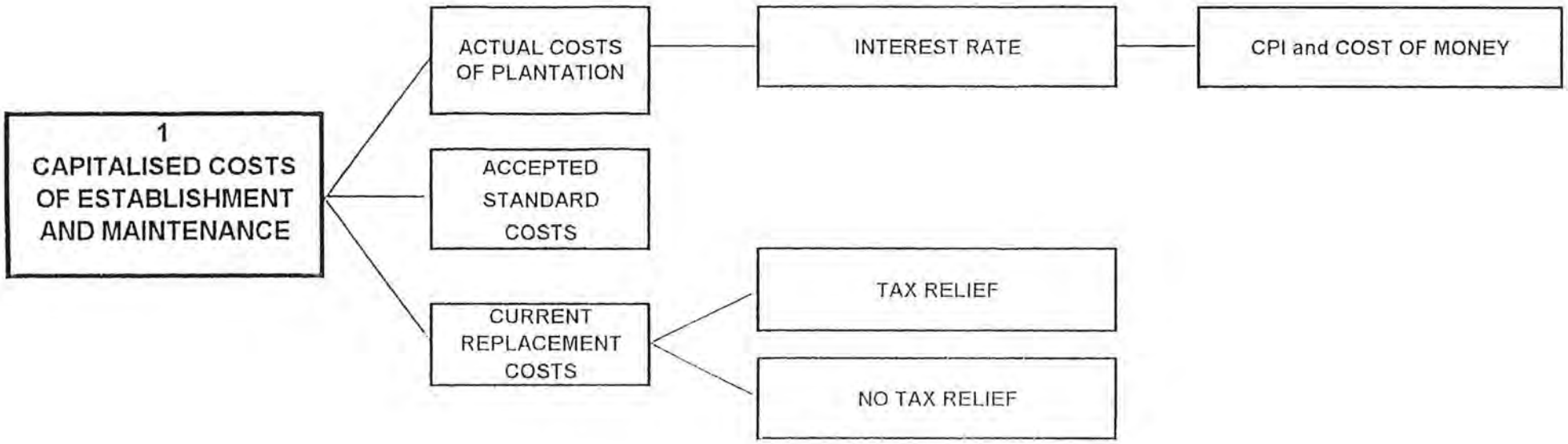
Opportunity costs

Asset Valuation for entire CALM Plantation Estate

Plantation growth rates

Stumpage


ESTABLISHED PLANTATION VALUE
1 CAPITALISED COSTS OF ESTABLISHMENT AND MAINTENANCE
ACTUAL COSTS OF PLANTATION
INTEREST RATE
ACCEPTED STANDARD COSTS
CURRENT REPLACEMENT COSTS
TAX RELIEF
2 LIQUIDATION VALUE
CURRENT VALUE OF PRODUCTS
ASSESSMENT OF STANDING PLANTATION
ESTIMATE OF INVENTORY
STRATIFICATION BY AREA
STOCKING DENSITY
STAND HEIGHT
BASAL AREA
SAMPLING INTENSITY FOR STRATUM
LEVEL OF ACCURACY REQUIRED
VARIABILITY OF STAND
MEASUREMENT AND ASSESSMENT TECHNIQUE
STAND VOLUME EQUATION
INDIVIDUAL TREE VOLUME EQUATION
PRODUCT MODELS
SILVICULTURAL HISTORY
CURRENT VALUE OF PRODUCTS
CURRENT MARKETS
SALEABLE PRODUCTS
PRICE
HAUL DISTANCE
PRODUCT QUALITY
HARVESTING COSTS
3 DISCOUNTED CASH FLOW ANALYSIS
FORECAST FUTURE REVENUES
CURRENT PLANTATION CONDITION
FUTURE VOLUME AND QUALITY OF PRODUCTS
ESTIMATE OF INVENTORY
GROWTH AND YIELD PREDICTIONS
PEDIGREE OF STOCK
SILVICULTURAL HISTORY
SOIL AND SITE CHARACTERISTICS
FUTURE PLANTATION GROWTH VOLUME OF PRODUCTS
SURVIVAL
SOIL DEPTH FOR TYPE ASPECT ETC
SALT, WATERLOGGING
SITE EVALUATION FACTORS AND GROWTH MODELS
MARKET CONSIDERATIONS
FUTURE VALUE OF PRODUCTS
CURRENT MARKETS
PRODUCTS
PRICE
FUTURE MARKETS
PRODUCTS
PRICE
DISCOUNT RATE
VARIABLE DEPENDING ON RISK, PROFIT ALLOWANCE AND CURRENCY FLUCTUATIONS
FORECAST FUTURE COSTS
SILVICULTURAL REGIME
SPECIES
SITES AND SOIL
FERTILITY
WEED CONTROL
PRUNE
THIN


1
CAPITALISED COSTS OF ESTABLISHMENT AND MAINTENANCE
ACTUAL COSTS OF PLANTATION
INTEREST RATE
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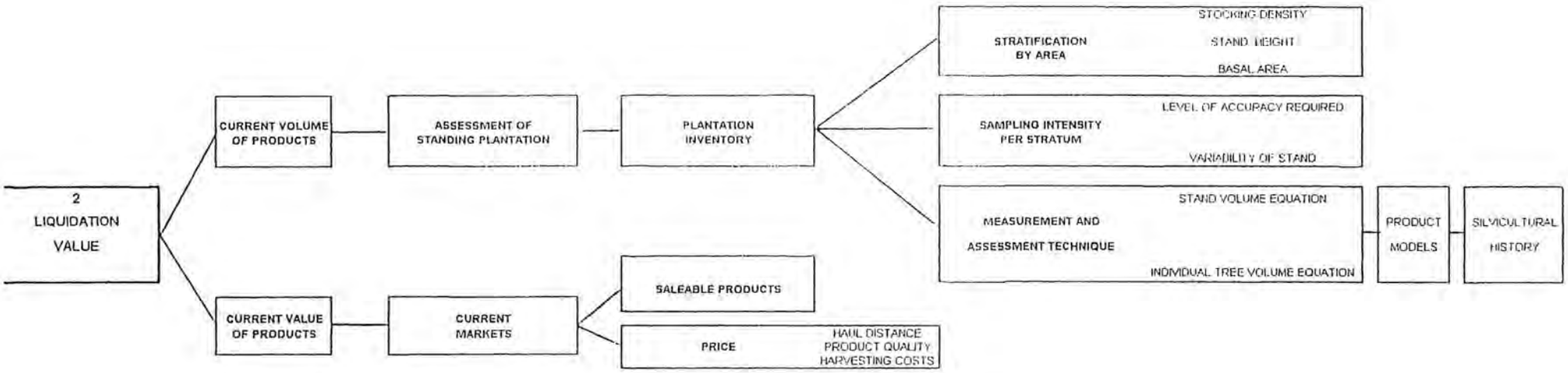
ACCEPTED STANDARD COSTS
CURRENT REPLACEMENT COSTS
TAX RELIEF
NO TAX RELIEF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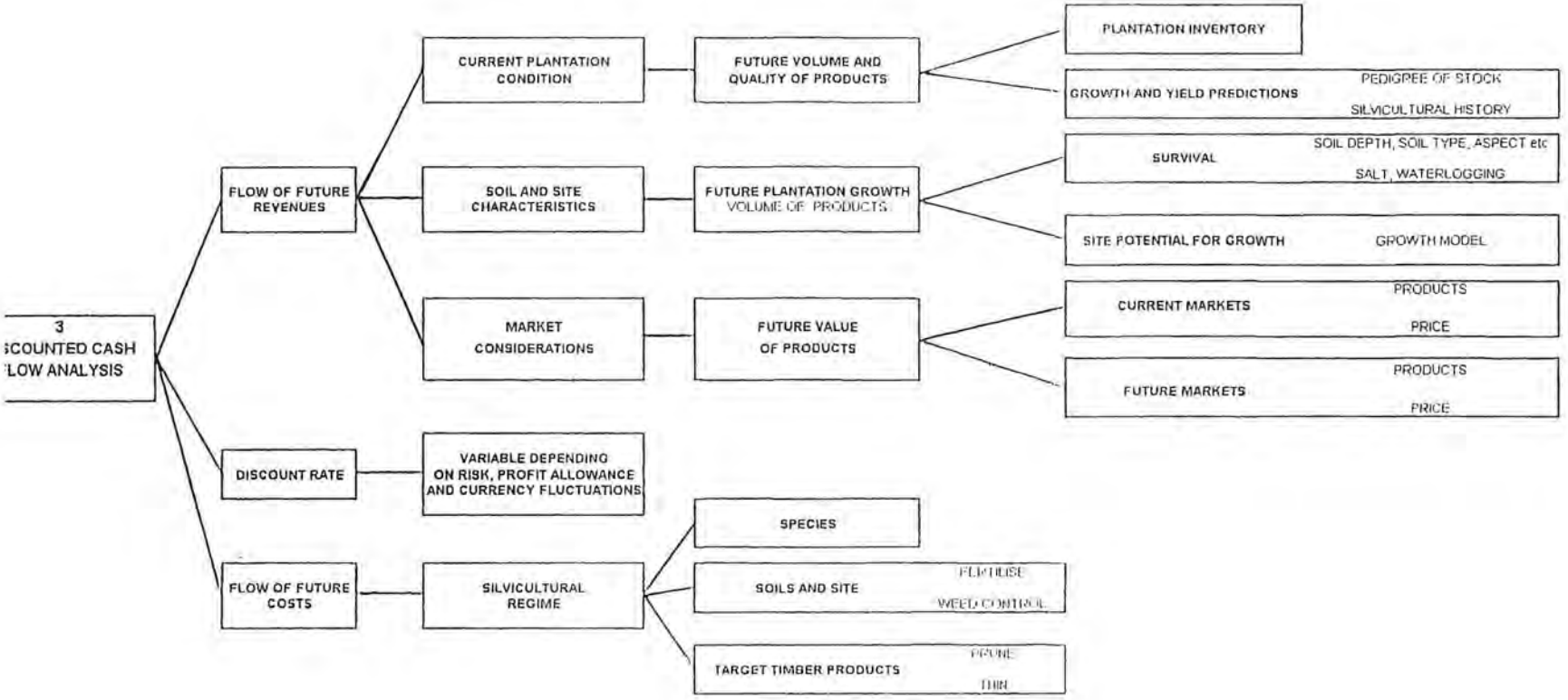
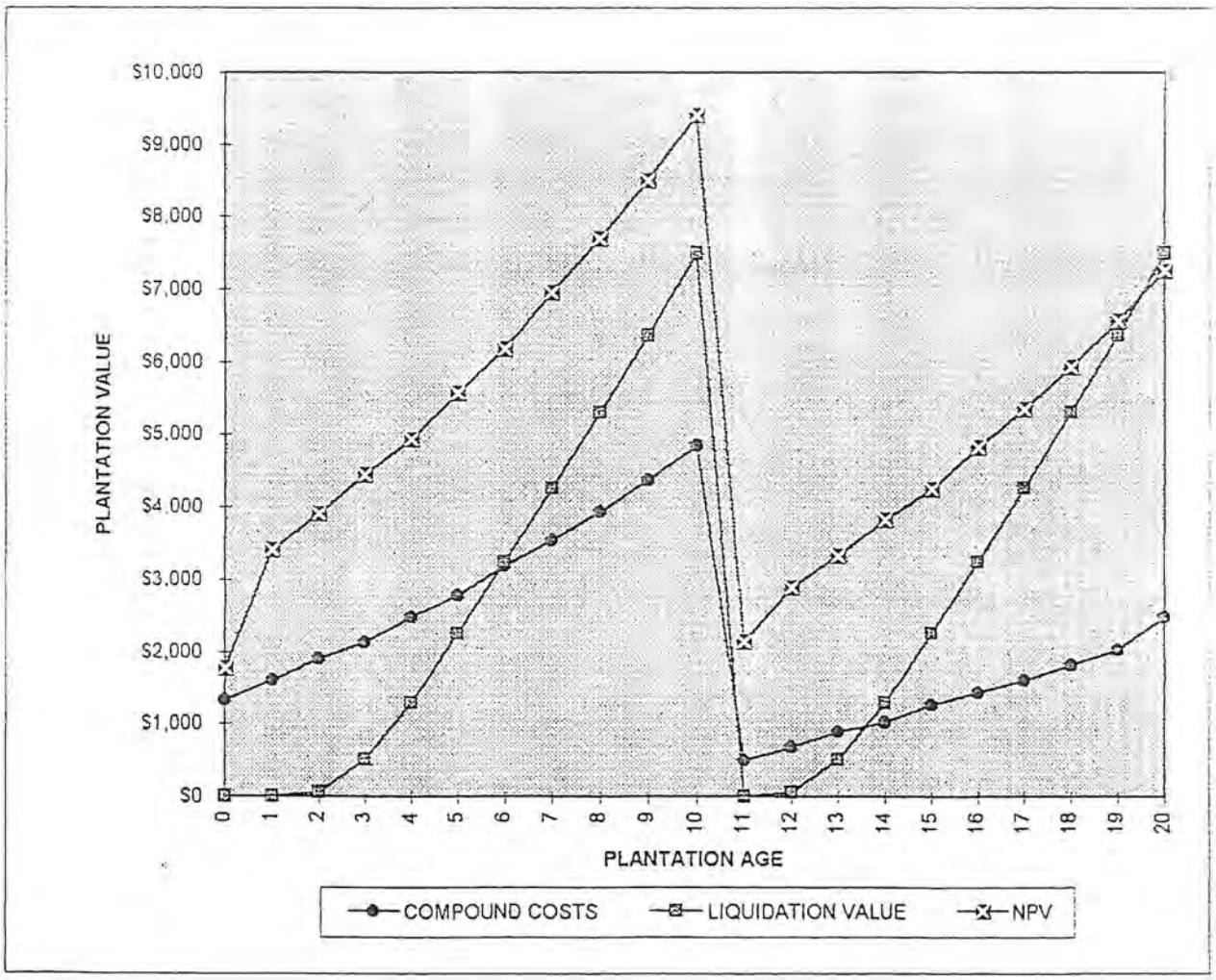
LIQUIDATION
VALUE
CURRENT VOLUME
OF PRODUCTS
CURRENT VALUE
OF PRODUCTS
ASSESSMENT OF
STANDING PLANTATION
CURRENT
MARKETS
PLANTATION
INVENTORY
SALEABLE PRODUCTS
PRICE
HAUL DISTANCE
PRODUCT QUALITY
HARVESTING COSTS
STRATIFICATION
BY AREA
STOCKING DENSITY
STAND HEIGHT
BASAL AREA
SAMPLING INTENSITY
PER STRATUM
LEVEL OF ACCURACY REQUIRED
VARIABILITY OF STAND
MEASUREMENT AND
ASSESSMENT TECHNIQUE
STAND VOLUME EQUATION
INDIVIDUAL TREE VOLUME EQUATION
PRODUCT
MODELS
SILVICULTURAL
HISTORY

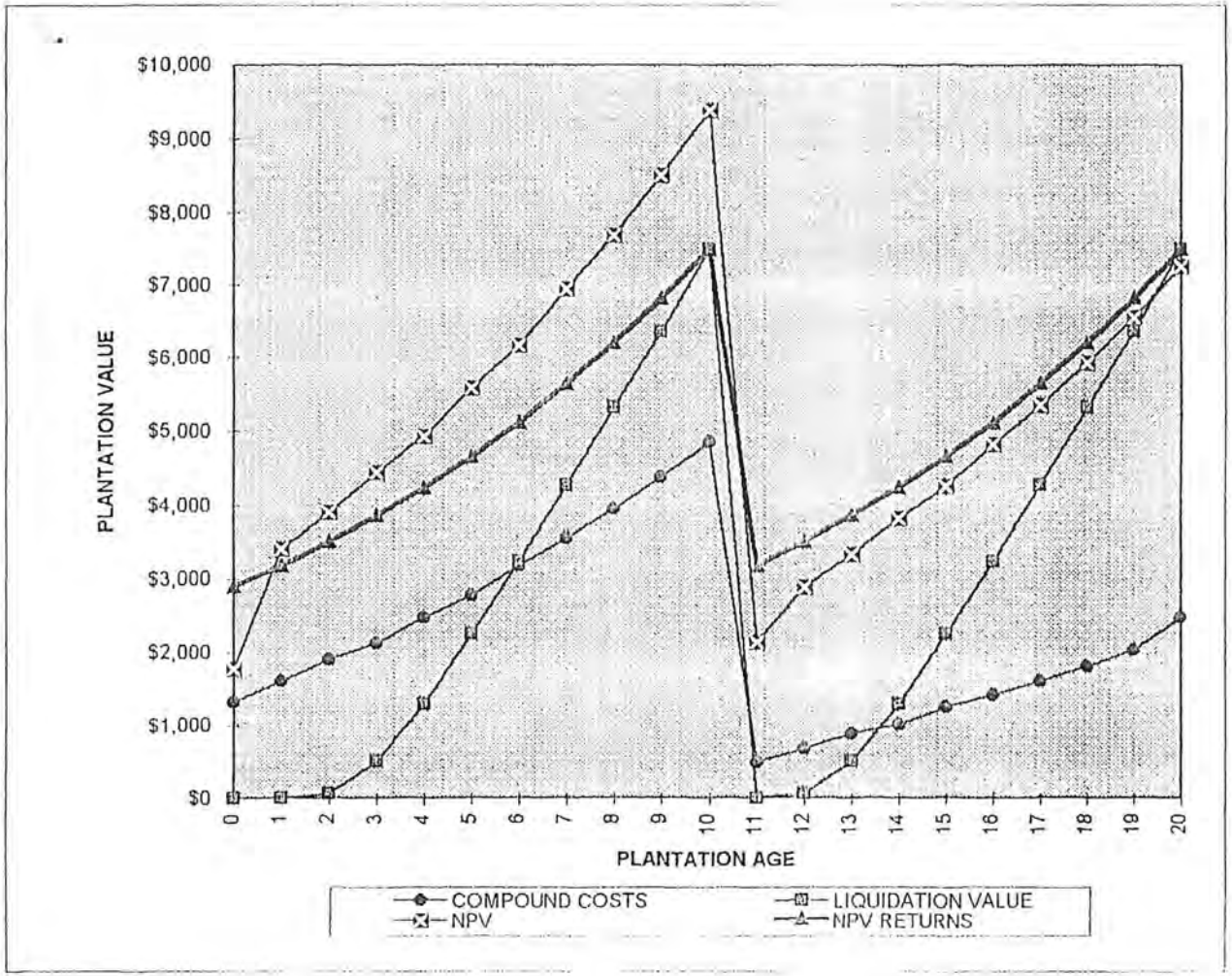

3
SCOUNTED CASH
LOW ANALYSIS
FLOW OF FUTURE REVENUES
DISCOUNT RATE
FLOW OF FUTURE COSTS
CURRENT PLANTATION CONDITION
SOIL AND SITE CHARACTERISTICS
MARKET CONSIDERATIONS
VARIABLE DEPENDING ON RISK, PROFIT ALLOWANCE AND CURRENCY FLUCTUATIONS
SILVICULTURAL REGIME
FUTURE VOLUME AND QUALITY OF PRODUCTS
FUTURE PLANTATION GROWTH VOLUME OF PRODUCTS
FUTURE VALUE OF PRODUCTS
SPECIES
SOILS AND SITE
TARGET TIMBER PRODUCTS
PLANTATION INVENTORY
GROWTH AND YIELD PREDICTIONS
PEDIGREE OF STOCK
SILVICULTURAL HISTORY
SURVIVAL
SOIL DEPTH, SOIL TYPE, ASPECT etc
SALT, WATERLOGGING
SITE POTENTIAL FOR GROWTH
GROWTH MODEL
CURRENT MARKETS
PRODUCTS
PRICE
FUTURE MARKETS
PRODUCTS
PRICE
FERTILISE
WEED CONTROL
PRUNE
THIN

TASMANIAN BLUEGUM PLANTATION VALUATION

AGE	COMPOUND COSTS	LIQUIDATION VALUE	NPV
0	$1,325	$0	$1,770
1	$1,598	$0	$3,405
2	$1,897	$60	$3,899
3	$2,127	$510	$4,443
4	$2,480	$1,290	$4,932
5	$2,768	$2,250	$5,579
6	$3,184	$3,240	$6,181
7	$3,543	$4,260	$6,953
8	$3,937	$5,310	$7,692
9	$4,371	$6,360	$8,505
10	$4,848	$7,500	$9,400
11	$490	$0	$2,134
12	$679	$60	$2,886
13	$887	$510	$3,329
14	$1,016	$1,290	$3,816
15	$1,257	$2,250	$4,241
16	$1,423	$3,240	$4,819
17	$1,605	$4,260	$5,345
18	$1,806	$5,310	$5,924
19	$2,026	$6,360	$6,560
20	$2,469	$7,500	$7,260



Example based on two ten year rotations, harvest volume of 250 m3/ha, stumpage of $30/m3, costs based on E. globulus production costs (Shea and Hewett 1990) - all values are $/ha.



Example based on two ten year rotations, harvest volume of 250 m3/ha, stumpage of $30/m3, 10% disc rate, costs based on E. globulus production costs (Shea and Hewett 1990) - all values are $/ha.

Marketing immature forests

Bruce Koller
New Zealand Forestry Exchange
MREINZ

Over the last 12 months experiences are that when selling farms with significant areas of immature forest, the forest has often complicated the sale of the farm.

Forests on farms are now recognised as valuable assets and their value is likely to further increase. These forests create very real taxation and legal issues, and it is becoming very difficult to "fudge" the value of the trees in any farm transaction, without prejudicing either the vendor or the purchaser.

Purchasers of any rural property normally have a fixed amount of money allocated for the land and buildings and they make provision for the purchase of livestock and plant.

Working capital is a key requirement. Normally there are constraints on cashflow in the first couple of years.

Having made the decision to purchase the land and buildings, the last thing the new farmer wants is to be faced with purchasing another asset (an immature forest) on his or her farm that's not going to deliver any cashflow for several years.

The conclusion from this is that with the sale and purchase of land, and the sale and purchase of immature forest, we are talking about two different transactions. Therefore we need to target two quite different sets of buyers.

This is important because when it comes to marketing the two assets (the farm and the immature forest) the methods used to target the two different groups of buyers need to be different.

There is growing interest through the farming community at the prospect of being able to use a Registered Forestry Right to legally separate part or all of their forest from the land and create a new asset that can be freely traded. Farming is never easy and the idea of having greater liquidity and being able to free up a significant lump of money from the forest seems to have struck a chord. We initially talked about improved liquidity as being important for the investors, but it seems that it's equally important for the forest owners as well.

Our experience to date supports the comments that we made in the first article back in August 1994.

- We are talking about a specialist market requiring a specialist knowledge to understand the needs of both the buyers and the sellers.
- The Standard Forestry Description is an essential prerequisite if we are going to interest an investor and obtain for forest owners a realistic and fair market value.
- To ensure that investor confidence, we will not list any forest on the Exchange without an adequate forestry description done by a forestry consultancy group in whom we have confidence. In developing this secondary market neither we nor you can afford to make mistakes.
- Where an accurate forestry description is not in existence, it seems to be taking months to get things adequately in place.
- The Net Stocked Area is a key quality measurement, and in discussion with a wide range of forestry consultants it would seem that our estimate of 90 per cent of cases not having accurately assessed net stocked areas is conservative. Many would put it as high as 98 per cent.
- At present there is a very thin market for these immature forests on farms and we are working to convince investors to include forestry within their investment portfolio.
- Investors have quite clear investment criteria, and we have to match the forestry investment with those requirements, before a satisfactory deal will take place.

Key Advantage

Many investors are taking a portfolio approach to forestry investment and looking for sustainability, or failing that, a range of age classes, and there are very few small forests like this. This is one of the key advantages of the New Zealand Forestry Exchange. It is the ability to mix and match.

As long as we package things correctly, the potential purchaser seems to be quite relaxed about the fact that he or she may be purchasing 10 hectares of 20-year-old forest at Kerikeri, 15 hectares of 16-year-old at Raglan, 10 hectares in the Wairarapa and 10 hectares in Marlborough.

In fact, the geographic spread is seen as a method of spreading the risk, in the case of a wind blow like cyclone Bola.

As time goes on we will improve our understanding even further of what's required to develop an active market for immature forests, and will keep you informed.

FROM THE EXECUTIVE OFFICER

Since beginning as Executive Officer in mid November 1994, I have spoken with many people both inside and outside the NZ Farm Forestry Association. I have concentrated on understanding how the Association works, including combining the business and annual plan. Outside issues have included the Resource Management Act and the New Zealand Forest Accord.

My contact with both Federated Farmers and the New Zealand Forest Owners' Association leads me to conclude that, while we should work closely with these groups, we have different needs and a separate identity. The 80:20 rule describes farm forestry's position in New Zealand's forest-growing sector. The larger forest owners, often referred to as the corporates, are the 20% who own 80% of the resource. Small growers are the 80% who own 20% of the resource. This makes us much less accessible, whether it is forest health or implementation of the Resource Management Act.

The large forest owners are much more accessible to local and national government officials and conservation/environment groups than the small forest growers. These groups are requiring higher environmental standards for the forestry sector than those required of the agricultural industry at this time. I am convinced that the agricultural industry will have to follow the lead taken by the forestry industry. Codes of practice for the dairying industry are being prepared.

Whether we concur or not, the corporates are agreeing to and setting environmental standards under the Resource Management Act which we will have to (and hopefully want to) comply with. A number of Branches are active in regional working groups which are addressing these environmental standards. We need to be part of these groups; otherwise we lose the opportunity to have an input.

In many cases we will incur additional costs to meet these new standards. Roading for harvesting is a good example where the cost to the small forest grower will be greater. As roading construction and poor maintenance can have the greatest impact on water quality, from sediment entering waterways, any methods to reduce this sediment will be beneficial. These methods include constructing the road ahead of harvesting to compact the road surface and provide adequate water drainage (water tables, culverts and cut-offs). For many small forest growers this will mean borrowing money for up to 18 months before harvesting. Another way would be to put any access tracks on a grade suitable for logging trucks and upgrade it over a number of years as part of repairs and maintenance (which is tax deductible).

Issues I expect to come up in the next three months are advertising/publicity for the Association, the Hazardous Substances and New Organisms (HSNO) Bill, the Electricity Regulations and associated Codes of Practice, and discussion at Conference about agreeing to a set of Principles for Plantation Management with the New Zealand Forest Accord signatories.

See you at Conference

Ket Bradshaw
Executive Officer

AUSTRALIAN INSTITUTE OF VALUER'S AND LAND ECONOMISTS

TREE PLANTATIONS - A VALUER'S DILEMMA

Friday 4 August 1995
Manjimup

Notes taken by Peter Eckersley

Dr Gary Inions - Manager, Plantations Groups, Department of Conservation & Land Management.

Eucalyptus plantations first established near Dryandra in 1930.

	TOTAL	SPECIES	P.1995	ROTATION
CALM is managing	44,408 ha	P.radiata	1,500 ha	25 year 2T +C
	27,682	P.pinaster	1,000	30-40 2T+C
	8,171	E.astringens		
	16,325	E.globulus	4,000	10 C
	3,200	mallee	2,600	2 year harvests
	99,786		**9,100**	

Plantation value related to:

1. species
2. viticultural regime
3. age (volume curve sigmoidal)
4. product differentiation (foresters use yield tables - by site quality, piece sizes, etc.) and method of sale (e.g. stump, stacked at roadside, millgate, in ship's hold).
5. Method of valuation
   - Harvest return discounted back to present
   - Cost method
   - Faustmann method

Fire risk?

Professional forestry advice essential

Ian Wildy - Managing Director, Australian Eucalyptus Ltd
UWA Civil Engineering and Economics degrees, Associate member IFA.

(i) The Investor in the Plantation Industry

AEL $26m subscribed ~ 4000 ha Eglob
~ 2000 ha P.pinaster

~ $75m total via prospectuses over last 4-5 years (excluding CALM managed) includes substantial land component.

(ii) The Structure of Private Forestry Investment

Individuals - purchase to plant trees:

Collective schemes:

- lease and management agreement
- tax deductibility
- sublease discrete lots (AEL buys and subleases to growers)
- harvest proceeds to grower
- role of Trustee and ASC. All schemes promoted today are well supervised profitability will depend on method sale (most will sell to BTF).

(iii) The Market

Some market risk in international commodity trade (cartels etc).

Current annual consumption of writing quality paper:

Australia	-	50kg/head
India	-	1
Indo	-	7
China	-	16
HK	-	75

Current -

20m kg for region
38m kg for region if 10kg/head/yr
76m kg for region if 20kg/head/yr

Example showing importance of location relative to market - freight differential for a difference of 50km is, @ 10c/t/km @ 300t/ha = $1500/ha at harvest, which = $580/ha when discounted back 10yrs @ 10%
∴ market location critical to valuation.

Discount rate

Some accountants use 15% discount rate.
Some foresters use 8% discount rate.

Gavin Ellis - Manager, Hardwood Plantations, CALM

CALM's hardwood business unit includes Wellington share farms 30,000ha (Hansol + Nippon/Mitsui).

Plantation value

- timber value(1) + aesthetic(2) + farm sustainability(3) + improved productivity(4)

(3) surrogate is cost of farm planning e.g. $5/ha and implementation e.g. $50/ha
(2) intangible, but establishment cost may be a guide
(1) as per model
(4) negative value of grazing lost may be offset by protection of adjoining land

Geoff McArthur Consultant Forester, National Pres AFG

Capital asset pricing model

	risk free Rate of Return	+	[Beta (stockmarket rate - risk free ROR)]	=	Discount rate
range	2.5%		0.2→0.5% 15% 2.5%		8.75%
			good-poor		

Cumulative risks

Risk free ROR 2.5%	+	risk margins for country	+	region	property of + company	=	Discount rate
Range:		5→10%		0→1%	0→1%		7.5→14.5%
NZ							8.6%
WA		8%		0.75%	0.9%	=	12.15% (9% at best)

Risks:

Location
- distance to markets
- climate stability

Size
- property or company

Markets
- diversity
- scale
- domestic or international

Condition
- log quality
- stems/ha
- growth rate
- years before clearfall
- any delayed operation
- age

Protection
- fire
- disease

Contractual/position
- contracts in place
- free or spot market

Recommendations

Six (6) monthly summary of sales (VGO collate, AFG publish)
Larger plantations under contract. Discount rate 8 to 9%
Small plantation (e.g. 20ha) with no marketing arrangement > 10%
(e.g. in NZ when State plantations were sold off, for 200 ha lots was 12%).
Range 7.5→20% - most under 12%
ACFA working on a manual, waiting to confirm consistency with NZ etc.
Should not try to guess inflation - ignore it.
Land factor will become more important.
Forest Rights legislation coming in future and will complicate valuations.
Code of practice coming in.
Pruned stand certification scheme.
Full stand certification.

Mark Bombara - VGO, Bunbury, owns plantation at Waroona.

- register of scales documented in spreadsheet - electronic copy available
- suggests discount rate varies during rotation, as risk varies

Chris King - farmed in Bridgetown area, contract pine planting and pruning and thinning, before joining VGO, then private valuer in Albany since 1983.

Profession wants to resolve valuation method with foresters, partly because finance industry (banks and share market) require securities valuations for properties with a range of assets including trees under joint ventures.

Investors having an effect on the land market e.g. bare land values.

Serious concern about potential impact of tax law changes on the rural industry if values dropped suddenly and greatly, leading to mortgagee sales; also potential for valuers to be sued.

Group reports

1. Use evidence of forced sales.

2. Comparable sales + employ forester, standard report, keep working papers.

3. Do two valuations - 1 for farmland, 1 for forestry.
   Should include industry appraisal.
   Add forest value + farmland value discounted from end of rotation (net of rehabilitation cost).
   AFG could publish a set of indicative tables on regional yields.

4. Different valuation methods should be used to confirm/back-up each other.
   Instructions need to be explicit and agreed with client
   Should present justification for discount rate

5. Cost compounding method for early stage of rotation.
   Liquidation for sell-up situation.
   DCF method for most situations.
   All these should be compared to sales, and calculate discount rate from sales analysis.
   Clients should be informed of reason for methods chosen.

6. - One value for all purposes (highest and best use)
   - Obligation to provide advice to banker client about prospective costs and returns and risks for the long term (at least as long as the term of any proposed loan).

Questions to panel

1. What's the cost of hiring a consultant forester?
   - \- $500-$600/day for field work on 200-300ha property
   - \+ $80 to $90/hr for follow up work
   - \+ extra for detailed stand appraisal

2. Native forest valuation?
   - Current sales evidence small but shows that these blocks are sold for little less than cleared land.

Contact:
The Executive Officer, AIVLE, PO Box 502, South Perth 6151; ph 4742784, fax 4741157