

TROPICAL FORESTRY SERVICES

# INDIAN SANDALWOOD

*investment* OPPORTUNITY

*information*

MEMORANDUM







## Contents

Page 1	Introduction
Page 2	1. Executive Summary
Page 3	2. Financial Information
Page 6	3. Overview
Page 9	4. Indian Sandalwood Background and History
Page 11	5. Farming of Indian Sandalwood in the Ord River Irrigation Area ("ORIA")
Page 12	6. About the Manager
Page 15	7. Expert Forester's Report
Page 24	8. Expert Sandalwood Marketing Report
Page 30	9. Directory
Page 31	Australian Taxation Office Product Ruling

### PLEASE TAKE NOTICE THAT

Any invitation or offer made in this Information Memorandum is made to "sophisticated investors" and "professional investors" only and therefore pursuant to section 708 of the Corporations Act does not require disclosure under Chapter 6D of the Corporations Act. The investment opportunities described in this Information Memorandum are not required to be registered as a managed investment scheme, because any issues of interests in these investment opportunities will be excluded offers when they are made (section 601 ED(2)).

This document and the information contained herein is confidential and is supplied to you on the basis that you will preserve that confidentiality and not disclose the information without the prior written consent of Tropical Forestry Services Ltd ("TFS" or the "Manager").

Prospective investors are advised to obtain their own independent professional advice in respect of the taxation, legal and financial matters referred to in this document. Prospective investors and their advisers should read this document in its entirety.

Prospective investors should note that the business of commercial forestry carries risks associated with all medium to long term agricultural projects (see Section 3.5).

Investments described in this Information Memorandum are likely to be illiquid as there is unlikely to be a secondary market for them. Investments should be viewed as being made for a fixed term of 15 years. Investors have no right to require that their investments be repurchased or redeemed by the Manager or any other associate or person.

Investments described in this Information Memorandum are not intended to constitute a "financial investment" for the purposes of the Corporations Act. The Corporations Act definition of a "financial investment" should not apply because any payment to TFS is being made to acquire the provision of services by TFS and is not being used by TFS to generate a return for an investor. An investor is also entitled to exercise control over the activities of TFS and the performance by TFS of the various services. This control is intended to constitute "day to day control" for the purposes of the Corporations Act.

4 June 2003



## Introduction

### INDIAN SANDALWOOD IS A TIMBER THAT IS NATIVE TO INDIA

- its oil is used primarily in cosmetics and perfumes.
- it can be grown successfully in commercial plantations in the Ord River Irrigation Area ("ORIA") in Northern Australia.

### INVESTMENT OPPORTUNITY WITH SOME FLEXIBILITY

- investor can either buy or lease a minimum of 5 hectares of land ("Sandalwood Lot") on which to grow Indian Sandalwood.
- investor engages TFS to plant, cultivate, harvest and market Indian Sandalwood on their Sandalwood Lot.
- investor has an option to prepay TFS in one lump sum or pay TFS annually.
- long term investment of approximately 15 years.

### TROPICAL FORESTRY SERVICES LTD

- proven track record of establishing and managing Indian Sandalwood plantations in the Ord River Irrigation Area of Northern Australia.
- one of the largest owners and managers of commercial Indian Sandalwood plantations in the world.
- board of Directors with diverse experience, qualifications and knowledge.





## 01. Executive Summary

This Information Memorandum invites investors who satisfy either the “sophisticated investor” or “professional investor” definitions in the Corporations Act to participate in the commercial plantation production of Indian Sandalwood. Investors may either buy or lease farming land in the Ord River Irrigation Area (“ORIA”) upon which their Indian Sandalwood plantation will be grown. Investors will either buy land outright or enter into a leasing arrangement with a company in the Tropical Forestry Services Group of companies (“TFS Group”).

Investors can acquire or lease plantation areas of not less than 5 hectares and up to a maximum of 50 hectares (“Sandalwood Lots”). Successful applicants will enter into a Management Agreement with TFS which will govern the establishment and maintenance of the Indian Sandalwood plantation to be grown on their Sandalwood Lots.

The initial expenditure by investors will be the costs of acquiring land and the fees payable to TFS to establish the plantation of Indian Sandalwood. Investors who elect to lease land will be required to pay annual rental fees. All investors will be required to pay annual management fees to TFS in respect of each of their Sandalwood Lots. However an option exists to prepay rent and management fees in one lump sum at a discounted value.

The plantations will be located at either King Location 385 in the ORIA (“Packsaddle”) which is owned by TFS or on other land in the ORIA which is considered by TFS to be suitable for growing Indian Sandalwood. Peter Kimber, a forestry expert with considerable experience in growing Indian Sandalwood in the ORIA, has advised in his report at section 7 that Packsaddle is suitable for commercial Indian Sandalwood plantation forestry.

Investors will receive the net proceeds of sale of Indian Sandalwood produced on their Sandalwood Lots after deducting harvesting, processing and marketing costs. All annual management fees and land rental fees are expected to be 100% tax deductible when incurred. An Australian Taxation Office Product Ruling has been obtained for the project investors and is included in this Information Memorandum.

TFS is experienced in the management of Indian Sandalwood plantations. It currently owns and manages Indian Sandalwood plantations in the ORIA covering a total area of 350 hectares. Its first plantation was established in 1999. Since 1999, TFS has established a new plantation every year. As far as TFS is aware, it is the largest owner and manager of commercial Indian Sandalwood plantations in the world.

TFS has an exclusive marketing arrangement with Mt Romance Australia Pty Ltd to act as the agent of TFS to market, distribute and sell the products derived from the Sandalwood Lots including the sale of cleaned logs, processed oil or other value added products.

TFS may pay up to 5% of its initial management fees as commission to eligible financial intermediaries. In addition it may pay a marketing allowance to eligible financial intermediaries to reimburse their direct and indirect costs of marketing.



## 02. Financial Information

### 2.1 COSTS

The costs to participate on the Project are as follows:

#### ESTABLISHMENT FEE

The initial establishment cost for one Sandalwood Lot is \$195,000.

#### ANNUAL OR PREPAID MANAGEMENT FEES

To meet ongoing costs and expenses after establishment of the plantation, investors are to pay a management fee to TFS. The total of the management fees for one Sandalwood Lot amount to approximately \$481,233 if paid on an annual basis or \$225,000 if prepaid with the establishment fee.

#### RENT

Investors who lease their Sandalwood Lots pay an annual rental of \$6,000 for each Sandalwood Lot. The rental will increase each year in line with CPI or \$75,000 if prepaid with the establishment fee.

#### HARVEST, PROCESSING AND TRANSPORT COSTS

Each investor will pay the costs of harvesting and processing the timber on their Sandalwood Lot. These costs will be deducted from the gross proceeds received from the sale of their timber.

#### MARKETING AND SALE COSTS

A fee of 5% of the gross proceeds received from the sale of timber will be deducted from those proceeds to cover TFS's costs of marketing and sale of the production derived from the Sandalwood Lots.

#### INCENTIVE FEE

As a performance incentive, TFS is entitled to receive a fee of 25% of the amount by which the "Net Proceeds of Sale" exceed the Target Net Proceeds of Sale (\$4,265,255). Net Proceeds of Sale means the gross proceeds of sales less all costs of harvesting, processing, transport, delivery, marketing and sale.

#### INSURANCE

TFS will take out public liability insurance for an amount of not less than \$5,000,000 on behalf of investors. If the costs of this insurance can be spread across a number of Sandalwood Lots, investors will share the costs in proportion to the area of the Sandalwood Lots. TFS can arrange insurance cover for Sandalwood Lots and will advise investors of premiums upon request.

The following tables illustrate establishment fees, first period fees, annual fees and rent payable depending upon whether those fees are prepaid or paid over the life of the Project. Figures for other fees and costs of participation in the Project are not included.



## 02. Financial Information

**TABLE A**

Grower pays fees and rent over the life of the Project:

Sandalwood Lots	Total Establishment Fees	Total First Period and Annual Fees*	Total Annual Rent*	Total Fees over Project life (GST exclusive)*
1	195,000	481,233	\$107,592	783,825

**TABLE B**

Grower prepays fees and rent in one instalment:

Sandalwood Lots	Total Establishment Fees	Total First Period and Annual Fees*	Total Annual Rent*	Total Fees over Project life (GST exclusive)*
1	195,000	225,000	75,000	495,000

**NOTES:**

- Unless otherwise stated individual fees and rent exclude GST.
- Project life has been assumed to be 15 years. It is possible that the Project will last longer. If this is the case, then the total first period fees, annual fees and rent will be higher than indicated in Table A.
- \* these amounts include an assumed annual “indexed” increase of 2.5% on the basis that this is the minimum increase set out in the Management Agreement. If the average CPI across the life of the Project exceeds 2.5% then total first period fees, annual fees and rent will be higher than indicated.

**2.2 ASSUMPTIONS**

Set out in this section are the relevant assumptions that are considered will impact on your investment return if you participate in the Project. The Directors consider that because of the market fluctuations in relation to various essential components necessary to create forecasts returns combined with the Project’s approximate length of 15 years, that pursuant to ASIC Policy Statement 170 they may not have reasonable grounds for providing forecast returns in this Information Memorandum. Investors should make their own assessment of the likely returns from the Project based on the information set out in this Information Memorandum and based upon advice from their financial advisers.

The assumptions set out below are subject to significant uncertainties, many of which are outside the control of TFS and its Directors. The assumptions include best estimate assumptions relating to future events that the Directors expect to occur and actions that management expects to take and management actions that may not necessarily occur as anticipated. The summary of key assumptions included below should be read in conjunction with the risk factors described in Section 3.5:

- there will be an average of approximately 2000 Indian Sandalwood trees per Sandalwood Lot at harvest. This assumption has been verified by Peter Kimber in his report at Section 7;
- the total production of heartwood per tree to be harvested should be 30 kg. This assumption has been verified by Peter Kimber in his report at Section 7;
- total average heartwood production per Sandalwood Lot of 60 tonnes ( 60,000 kg). This assumption has been verified by Peter Kimber in his report at Section 7;



## 02. Financial Information

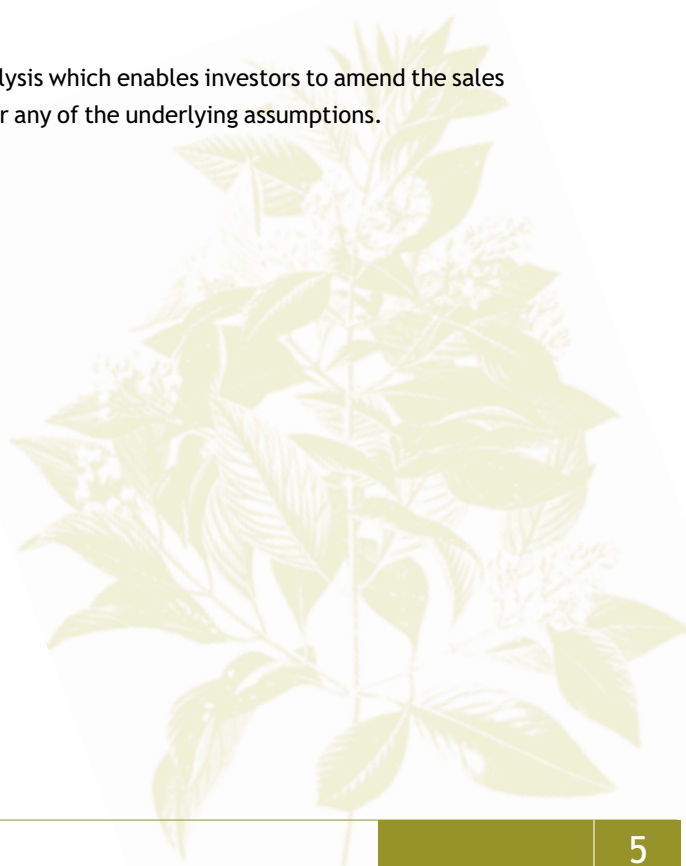
- the trees will be harvested progressively in accordance with the following ratios:

year 13 after initial planting on the Plantation	:	15%
year 14 after initial planting on the Plantation	:	30%
year 15 after initial planting on the Plantation	:	55%

This assumption has been verified by Peter Kimber in his report at Section 7;
- the international market price as cleaned logs is US\$35,191 per tonne (US\$35.19 per kg) for heartwood based on the January 2003 Indian auction prices. This assumption has been verified by Anantha Padmanabha in his report at Section 8. Forward looking assumptions about the price at the estimate times of harvest have not been included because of uncertainties associated with accurately forecasting the price across those times;
- the AUD\$:US\$ exchange rate on 27 May 2003 was A\$1.00 = US\$0.6625. It is not reasonable to forecast the A\$:US\$ exchange rate in the future as it is subject to fluctuations;
- the selling and marketing fee paid to TFS is 5% of gross proceeds of sale;
- if you elect to make annual payments for rent and fees that are “indexed”, those fees will be indexed annually to the higher of 2.5% or the increase in any consumer price index. It is not reasonable to forecast the increase in the consumer price index on an annual basis or over the term of the Project as it is subject to fluctuations;
- the present day costs of harvesting, processing and transport costs are estimated by Peter Kimber in his report at Section 7 to be \$35,000 per Sandalwood Lot (the reference to processing is confined to cutting the timber into cleaned logs and transporting them to market); and
- investors register as a business for the purposes of GST and that any GST paid is recouped within the year it is paid.

### 2.3 SENSITIVITY ANALYSIS

TFS website [www.tfsltd.com.au](http://www.tfsltd.com.au) contains a sensitivity analysis which enables investors to amend the sales and cash flows by making their own predictions regarding all or any of the underlying assumptions.







## 03. Investment Overview

### 3.1 WHERE WILL THE PLANTATION BE LOCATED?

Each Sandalwood Lot will be located at either Packsaddle or on other land located in the ORIA that is suitable for Indian Sandalwood plantation forestry.

The Packsaddle property has:

- soils of the black cracking clay type which are most suited to the growing of Indian Sandalwood;
- access to unlimited irrigation scheme water;
- been laser-levelled and specifically prepared for the planting of Indian Sandalwood.

The other properties that TFS is considering acquiring for plantation purposes have similar qualities to the Packsaddle property.

### 3.2 WHY THE ORD RIVER IRRIGATION AREA?

Indian Sandalwood has been grown in the ORIA since the mid 1980's when trial plots were established by the then Forests Department (now incorporated into the Department of Conservation and Land Management, or CALM). Early trials showed considerable promise and a more intensive research programme was instituted. This research focused on nursery techniques, the clarification of host species requirements, irrigation methodology and the planting regime. The research program has since been scaled up into fully operational trials which have refined knowledge about the soil and site requirements of the species, suitable host species and dry-season irrigation. Tests have shown that Indian Sandalwood trees grown in these circumstances are producing heartwood at 5 years of age and so long as current growth rates are sustained, trees could be harvestable 12 years after planting.

The ORIA is ideal for the growing of Indian Sandalwood because of the abundance of readily available water and the fact that its soils are fertile, free draining and of the heavy cracking type which deters attack from the Giant termite (*Mastotermes darwiniensis*).

### 3.3 WHO WILL MANAGE THE PLANTATIONS?

TFS will manage the plantations. TFS is an experienced manager of Indian Sandalwood plantations. TFS currently owns and manages Indian Sandalwood plantations in the ORIA covering a total area of 350 hectares, and has qualified professional staff with experience in all relevant disciplines.

### 3.4 TAXATION CONSIDERATIONS

#### TAX DEDUCTIONS

TFS believes that all annual management fees incurred by an investor will be allowable as deductions under section 8.1 of the ITAA 1997 when incurred. For those investors who lease land, the annual rental fees should also be allowable deductions under section 8.1 of the ITAA when incurred. Investors who prepay rent and management fees should obtain allowable deductions for these fees on a straight line basis over ten years, ie. 1/10 per year.

#### PRODUCT RULING

An ATO Product ruling in relation to this investment is attached to this Information Memorandum. A Product Ruling is a binding public ruling under the Taxation Administration Act 1953, in relation to the income tax and fringe benefits tax law. A Product Ruling provides certainty for investors by confirming that the tax benefits set out in the Product Ruling are available, provided that the arrangement is carried out in accordance with the information provided to the ATO by the persons described in the Product Ruling as providing information.



## 03. Investment Overview

A Product Ruling confirms that the relevant provisions of Part IVA of the Income Tax Assessment Act 1936 will not be applied to cancel a tax benefit obtained under a tax law covered in the Ruling. In addition, a Product Ruling evidences the conditional exercise of the Commissioner of Taxation's discretion contained in Division 35 of the Income Tax Assessment Act 1997. If a Product Ruling is granted it will ensure that the provisions limiting the deductibility of losses from non-commercial business activities will not be applied to an individual Grower, provided the Project is carried on in the manner described in the Arrangement section of the Product Ruling.

The granting of a Product Ruling does not mean that the ATO sanctions this investment or gives any assurance that the production of sandalwood is commercially viable. You should obtain individual tax advice before deciding to invest in the Project.

### CAPITAL GAINS TAX

If investors dispose of land acquired for use as a Sandalwood Lot capital gains tax may apply to any gains made on disposal.

### GOODS AND SERVICES TAX

The Goods and Services Tax ("GST") is a broad based indirect tax. It is a tax that is charged on the supply of goods and services in Australia and on imported goods. The GST is charged at 10%.

This means that an investor will be required to pay 10% GST on payment of all rental and management fees. Where investors are registered with an Australian Business Number (ABN) for GST purposes, they should be entitled to claim an input tax credit equal to the GST that they have paid. An investor may register for an ABN even if the investor's annual turnover is less than the \$50,000 registration threshold. The main implication of an investor not registering is that the investor will have no entitlement to an input tax credit for GST paid. However as the GST is an expense incurred in deriving assessable income, any GST incurred by an unregistered investor will be an allowable deduction from the assessable income of that investor in the year in which it is incurred.

Unless otherwise stated, dollar amounts detailed in this Information Memorandum exclude GST.

### 3.5 RISKS

This investment should be viewed as speculative and long term. It may be affected adversely by unforeseen events and events beyond the control of TFS. The risks of the investment include, but are not limited to, the following:

- the plantation will not be completely harvested until 15 years or more, after planting. During that time, political, economic or social events may occur which have a significant impact upon the investment;
- new technologies may be introduced which create a substitute for Indian Sandalwood or render the method of cultivation obsolete;
- the sale price for Indian Sandalwood may be depressed due to oversupply, or poor quality or a lack of demand;
- the proceeds of harvest in Australian dollars may be reduced due to unfavourable exchange rate variations at the time of harvest;
- the Product Ruling that has been obtained from the Australian Taxation Office ("ATO") may be withdrawn if the arrangement is not carried out in accordance with the information provided to the ATO. Amendments to taxation legislation may adversely affect the tax treatment of payment of fees, or impose significant taxes in relation to the investment;



## 03. Investment Overview

- changes in other legislation affecting the viability or profitability of the investment;
- risks associated with primary production generally such as pests, diseases and natural disasters such as storms, fires and cyclones;
- spray drift from neighbouring properties adversely affecting the Indian Sandalwood trees or their hosts;
- the oil yield from the heartwood is lower than expected hence reducing the value of the heartwood timber;
- the oil quality from the heartwood is lower than expected hence reducing the value of the heartwood timber;
- the amount of heartwood production is less than 60,000 kg per Sandalwood Lot; and
- currently, there are no Indian Sandalwood plantations under cultivation in Australia which have grown to maturity and harvest. In this respect it is a pioneering project for commercial Indian Sandalwood plantation forestry and is subject to agricultural and commercial risks that may not be apparent now.

### 3.6 OPPORTUNITIES

Against the risks identified in Section 3.5 must be weighed the opportunities. These include:

- the opportunity for better investment returns due to:
  - (a) the sale price of Indian Sandalwood increasing from present day values;
  - (b) the heartwood yield per Sandalwood Lot exceeding 30kg; and
  - (c) the proceeds of harvest in Australian dollars increasing due to favourable exchange rate variations at the time of harvest;
- the opportunity of obtaining commercial returns from the sapwood contained in the Indian Sandalwood tree;
- the opportunity of adding value to the raw timber for example, by producing oil and other value added products from the timber;.
- the opportunity to be a market leader with a product that is experiencing high demand and rapidly declining global resources;
- the opportunity to obtain a premium price for the Indian Sandalwood due to it being cultivated from a sustainable resource rather than dwindling native stands; and
- participating in an investment that has many environmental benefits as well as commercial benefits. These benefits include the establishment of deep-rooted vegetation which will assist in lowering the water table thus counteracting potential salinity problems, providing a habitat for wildlife (particularly birds) and the replacement of agricultural/horticultural crops which have a high use of pesticides, some of which can enter local water courses.

### 3.7 DEFAULT

In the event that an investor defaults in the payment of fees, and/or rent, TFS may terminate the investment in accordance with the terms and conditions of the Management Agreement (and the Lease if applicable). TFS may also sue to recover fees due under the Management Agreement (and the Lease if applicable).

### 3.8 THE AGREEMENTS

Copies of the standard Management Agreement, and the standard Lease Agreement are available upon request from TFS.



## 04. Indian Sandalwood Background and History

### 4.1 PAST AND PRESENT

The mystique and romance, and the use of sandalwood in every day life, has been part of Asian, Pacific and Indian cultures for over 2000 years. There are references to sandalwood in Indian mythology, folklore, and ancient scriptures dating back beyond the birth of Christ (BC). It is mentioned in Buddhist Jataka stories of the 7th century BC and in ancient scriptures - Dhammapada, Anguttara, Vinayapitaka (400 - 300BC), Milinda pahana (200BC) and Patanjali Mahabashya (100BC).

The oil extracted from the heartwood of the sandalwood tree is among the oldest known perfumery materials. In the early literature, there are constant references to its use as a perfume and in personal hygiene.

Sandalwood oil has also been used for thousands of years as a medicine and an embalming tool. Contemporary and historical reports indicate that there may be a significant potential use for sandalwood oil in the pharmaceutical industry.

In recent times, western cultures have also placed great value on sandalwood oil for perfume, soaps, cosmetics and aromatherapy, with famous French, United States and Italian perfume houses accounting for a steady demand.

The sandalwood timber is also highly sought after for woodcarvings and for incense sticks burned during religious ceremonies throughout India, China, Japan, Indonesia and the greater Asian region. It is used to make coffins, producing a sweetly scented smoke during cremation that is thought to carry the departed's spirit away and is said to demonstrate extreme wealth and social position. It is thought that 4 tons of sandalwood was used in the cremation of Ghandi in 1948. There are 16 species of sandalwood. Five of these occur in Australia. The most widespread of which is *Santalum spicatum*, which is native to Western Australia and has generated significant export revenue for the State.

*Santalum album*, which is commonly known as Indian Sandalwood and is the species that will be grown under this Investment, is the most valuable of all of the sandalwood species due to the high oil content of its heartwood (on average three times as much oil as *Santalum spicatum*) and the high quality of its oil. The quality of sandalwood oil is determined by its santalol content. Indian Sandalwood oil can contain over 90% santalol, whilst *Santalum spicatum* contains up to 30% santalol. The Western Australian Department of Conservation and Land Management (CALM, and formerly the Forests Department) has been researching the growing of Indian Sandalwood in the Ord River Irrigation Area (ORIA) since the mid 1980s. CALM has made significant discoveries in a variety of areas, including propagation of seedlings, selection of host species, density of planting and plantation management practices all of which have been integrated into the plantation establishment and management practices of TFS. TFS has been establishing and managing Indian Sandalwood plantations in the ORIA since 1999.

### 4.2 PHARMACEUTICAL APPLICATION

Historically sandalwood oil in its natural form has been used as an antiseptic, antipyretic, diuretic, expectorant stimulant and in the treatment of bronchitis, gonorrhoea and urinary tract infections.

Over the course of the next few years TFS intends to support the exploration of the commercial pharmaceutical application of Indian Sandalwood oil.

### 4.3 THE MARKET

At present, there is a strong international market for Indian Sandalwood. Indian Sandalwood and Indian Sandalwood oil is currently imported by the Middle East, Japan, Taiwan, Hong Kong, Korea, Germany, Sweden,



## 04. Indian Sandalwood Background and History

Switzerland, France, Australia, the UK and the USA. The USA and UK account for the majority of export sales however it is anticipated that with the increasing affluence of China, that country could once again become a major importer of Indian Sandalwood.

Although Indian Sandalwood can be used for woodcarving and for various cultural and religious uses, the perfumery and cosmetic industries ensure that Indian Sandalwood commands a particularly high price through the demand for its oil. Indian Sandalwood, because of its high oil content and quality, is the most highly sought after species of Sandalwood and is used in most of the world's quality perfumes. There is also a considerable and growing demand for Indian Sandalwood oil in Asian countries for use in scented chewing tobacco with demand expected to rise steadily in the future.

The residue from the processing of Indian Sandalwood heartwood and the sapwood are both used in the production of incense sticks and other value added products. There is strong demand for incense sticks in many Asian countries.

Pursuant to a marketing agreement TFS has appointed Mt Romance Australia Pty Ltd to be its agent to sell the Indian Sandalwood timber, oil and other value added products that may be derived from the investor's Sandalwood Lots.

### 4.4 SUPPLY

The principal sources of supply of Indian Sandalwood are India, Indonesia, New Caladonia, Fiji, and the Philippines, with India accounting for over 95% of total annual world production.

Due to the illegal cutting and smuggling of Indian Sandalwood in India statistics on the overall supply of the product to the world markets is unreliable. However consumption statistics are more reliable. Domestically India consumes 800 tonnes of heartwood and 60 tonnes of oil (equivalent to 1200 tonnes of heartwood) per year. India exports 2000 tonnes of heartwood and 100 tonnes of oil (equivalent to 2000 tonnes of heartwood) per year. Accordingly, the total demand for Indian Sandalwood heartwood is estimated to be 6000 tonnes per year. India can only harvest on a sustainable basis 1000 tonnes of heartwood per year. These statistics are confirmed in the expert's report of Mr Padmanabha at section 8.

Indian Sandalwood in India and Indonesia is supplied almost exclusively from natural stands. The high value of this resource has led to over-exploitation and widespread illegal cutting and smuggling. These activities have led to a dwindling of supply. As a result, India and Indonesia have now imposed strict controls on sandalwood ownership, harvesting and export such that the remaining production is only available to meet domestic requirements. Indeed Indonesia has banned the export of Indian Sandalwood due to the almost total extinction of this resource from the Timorese Islands prior to Timor gaining its independence from Indonesia.

### 4.5 PRICE

The world market price for Indian Sandalwood fluctuates depending on the source and quality of the timber. As at the date of this Information Memorandum, the current international market price for Indian Sandalwood as cleaned logs, sourced from India, is US\$35,191 per tonne (US\$35.19 per kg). Over the course of the past 12 years, the international market price has increased by on average over 25% per annum due to short supply of raw material and higher demand. Since January 2002 the price of Indian Sandalwood sold at auctions in India has increased by 60%.

The price ultimately obtained for Indian Sandalwood grown in the ORIA is unknown as no commercial quantities of Indian Sandalwood have yet been sold from the ORIA, however it is anticipated that Indian Sandalwood grown in the ORIA should achieve similar prices to Indian Sandalwood grown in India as they are the same genetic species.



## 05. Farming of Indian Sandalwood in the ORIA

### 5.1 GROWING CONSIDERATIONS

In order to grow Indian Sandalwood successfully in Australia the following growing conditions must be met:

- a tropical climate;
- regular watering;
- free-draining soils;
- land which has a flat to undulating topography and not subject to water-logging; and
- freedom from termite attack.

The land on which the plantations will be established will possess all of the above characteristics. Its soil type is described as heavy cracking clay which is generally free-draining and free of termite attack. The land is or will be flat with access to abundant irrigation water resources from Lake Argyle via the Ord River. This land has previously been farmed requiring no clearing.

### 5.2 PLANTING

The Indian Sandalwood tree is a semi-parasitic tree that needs host trees to survive. The Indian Sandalwood tree's roots penetrate the roots of the host to draw water and nutrients. Such is the voracity of the sandalwood that a progression of hosts is needed. The hosts selected by TFS are broadly classified in terms of the period of their association with the Indian Sandalwood, these being: short-term hosts, medium-term hosts and long-term hosts. The medium and long-term hosts selected by TFS are all legumes. Generally legumes are considered to be the best hosts due to their nitrogen fixing qualities.

TFS has selected those hosts which it considers to be the best for development of the Indian Sandalwood. The potential value of the host trees has not been a consideration in the selection of hosts.

Newly planted areas will be hand-watered initially and then flood irrigated on an as needs basis.

### 5.3 ONGOING MAINTENANCE

The Plantation will be maintained in accordance with a detailed Management Plan. Annual maintenance will include weeding and pruning, nutrient analysis to determine fertiliser requirements, fire control management, inventory measurement and regular reporting. The Plantation will also be monitored and controlled for pests.

### 5.4 TIME OF HARVESTING

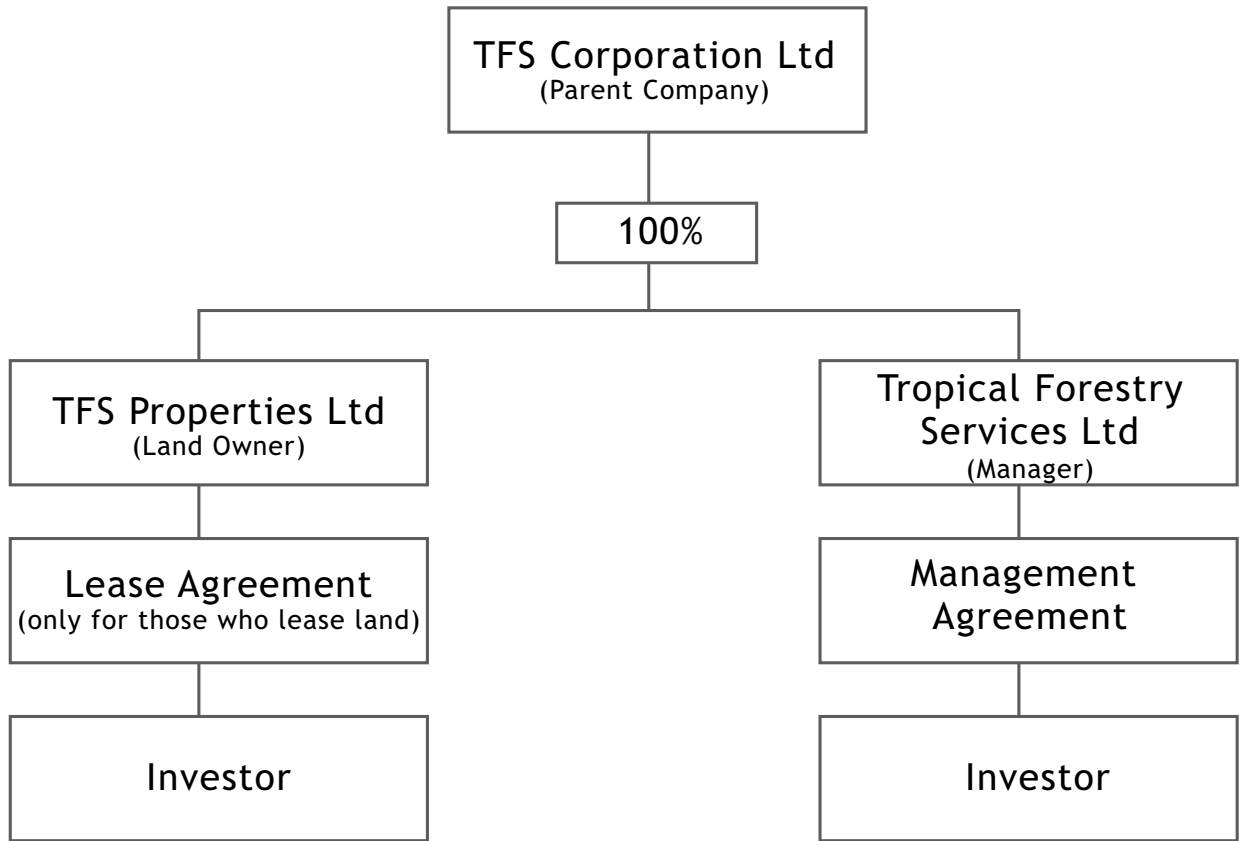
TFS proposes that harvest of the Indian Sandalwood will commence in year 1-3 and occur progressively until the expiration of the Investment. Trees will be selected for harvest on an individual basis. The precise timing of the harvest will be determined by forestry management criteria, the aim being to maximise the revenue generated by the Investment. The conclusion of harvest could be earlier or later than year 15. Provision exists under the Management Agreement to enable TFS to harvest early or to defer the harvest of the trees to a later date where TFS reasonably believes it would be in the best interests of the Investor.

### 5.5 MARKETING AND SALE

At the time of harvest, TFS and its agent Mt Romance Australia Pty Ltd will determine the most profitable and appropriate markets for the timber. This may include processing the timber into oil at a plant constructed by TFS in the ORIA.



## 06. About the Manager



### 6.1 T.F.S. CORPORATION LTD

T.F.S. CORPORATION LTD  
(Parent Company)

T.F.S Corporation Ltd is the ultimate holding company of TFS.

T.F.S. PROPERTIES LTD  
(The land owner)

T.F.S Properties Ltd owns the land at Packsaddle on which the Sandalwood Lots will be established for those investors who elect to lease land.

TROPICAL FORESTRY SERVICES LTD  
(The Manager)

TFS will manage the Sandalwood Lots using the services of a skilled management team and in accordance with the Code of Practice for Timber Plantations in Western Australia.



## 06. About the Manager

### 6.2 DIRECTORS

The Directors are persons with strong corporate, legal, accounting and business skills each of whom are highly experienced in company management.

The Directors as at the date of this Information Memorandum are:

#### FRANK CULLITY WILSON Executive Chairman

Mr Wilson is a founding principal and the Managing Partner of the legal firm Wilson & Atkinson, which specialises in taxation, property and commercial law. Mr Wilson is an experienced businessman, who is a director of a number of private and public companies, and who has a long standing involvement in the forestry industry as an adviser to various listed public and large private forestry groups. Mr Wilson has been a director of TFS since its formation in 1998.

#### GRAEME ERIC SCOTT Executive Director

Mr Scott is a practising chartered accountant of over 40 years' standing and the principal of Graeme Scott & Co Pty Ltd, a chartered accounting firm. Before establishing this firm 12 years ago, Mr Scott was a partner of Ernst & Young and its predecessor firms for 17 years. He is a trustee of a public charitable trust, a director of a number of companies, both public and private, and a former director of the Heytesbury Group which had interests in the building, construction, agriculture, theatre and wine industries. Mr Scott has been a director of TFS since its formation in 1998.

#### STEPHEN LEE ATKINSON Non-Executive Director

Mr Atkinson was a founding principal and a partner of the legal firm Wilson & Atkinson. Mr Atkinson is experienced in the area of managed investment schemes having advised Vasse Felix and Palandri Wines in relation to their legal, compliance and other obligations. Mr Atkinson has been a director of TFS since its formation in 1998.

#### RONALD LIONEL EACOTT Non-Executive Director

Mr Eacott is the current Managing Director of Expo Document Copy Centre (WA) Pty Ltd, a leading company in the reprographic industry. Mr Eacott is highly experienced in company management having been the State Manager of Union Steel (seven years) and National Manager (New Zealand) for Elders Pastoral for a period of three years. Mr Eacott was previously the State Manager (Western Australia) of Boral Steel and later Boral Cyclone over a period of 18 years. Mr Eacott continues to be actively involved in the community. Mr Eacott became a director of TFS in 1999.

#### BLAINE DAVID KIDD Executive Director

Mr Kidd is a Certified Practising Accountant and is the principal of BDK, an accounting firm specialising in small to medium sized business clients. Mr Kidd has experience in the agricultural, fishing, property development, textile manufacturing and product marketing industries. Mr Kidd became a director of TFS in 2002.

#### JULIUS MATTHYS Non-Executive Director

Mr Matthys is the Vice President of global marketing (iron ore division) for BHP Billiton. Mr Matthys holds a degree in commerce from the University of Western Australia and currently resides in Singapore. Mr Matthys became a director of TFS in 2002.





## 06. About the Manager

### 6.3 MANAGEMENT

The management team of TFS comprises persons experienced in agricultural matters. TFS has appointed Peter Kimber of Kimber Environment Services Pty Ltd as the Expert Forester. Mr Kimber has been an expert consultant to TFS for the past 3 years. The Expert Forester has a critical role in this Investment, overseeing the Investment from a technical forestry point of view. The Expert Forester will provide regular reports to TFS and will regularly inspect the plantation and provide ongoing advice to TFS with respect to the establishment and maintenance of the plantations. Mr Sam Hondros (Operations Manager) and Mr Brett Blunden (Plantation Manager) have overseen the successful establishment of past plantations of Indian Sandalwood on the TFS Packsaddle property.

### 6.4 MANAGEMENT PLAN

The Plantation will be maintained in accordance with a detailed management plan. The management plan outlines the procedures to be followed to ensure that the Investment is carried out generally in accordance with the West Australian Code of Practice for Timber Plantations and in a manner designed to both mitigate the investment risks and maximise the growth and yield of the Plantation.

The management plan will detail the work required for site preparation, seedling propagation, planting, fire control, silviculture, nutrition, harvesting and environmental management. The management plan will also specify the frequency of independent assessment of and reporting on all technical aspects of the Investment.

The management plan will reflect two phases in the operation of the Plantation - the establishment phase and the maintenance phase. The establishment phase is intense and more costly than the recurring phases. The fee structure reflects the high start up costs of the Investment in the establishment phase.

Activities in the establishment phase include:

- preparing the land for the Indian Sandalwood seedlings and the hosts;
- raising the Indian Sandalwood seedlings and the hosts;
- planting of the Indian Sandalwood seedlings and the hosts; and
- supervision and management to ensure proper host attachment and growth.

The maintenance phase involves the balance of the period of the investment and incorporates irrigating, pruning, weeding and routine silviculture techniques to ensure the Plantation achieves optimum production.

### 6.5 INVESTOR INVOLVEMENT

The Investor has power under the Management Agreement to exercise "day to day" control over TFS and the manner in which it performs the provision of the services. TFS is required to follow all reasonable directions of the Investor and to consult when reasonably required with the Investor.



## 07. Expert Forester's Report

KIMBER ENVIRONMENT SERVICES

ABN 39 703 774 980

15 DE GREY CLOSE, MANDURAH WA 6210

Phone/Facsimile 08 9535 7705

The Directors  
Tropical Forestry Services Ltd  
26 Clive Street  
WEST PERTH WA 6005

Dear Sirs

This report has been prepared for inclusion in an Information Memorandum to be issued by Tropical Forestry Services Ltd (the Manager) for the establishment of a plantation of Indian Sandalwood in the Kimberley Region of Western Australia in 2003.

It has been prepared by Kimber Environment Services (the Consultant), a forestry and environmental consultancy practice that has specialised in tropical forest plantations, in particular in the establishment and management of irrigated plantations of Indian Sandalwood (*Santalum album*).

The Consultant has been involved in the development of Indian Sandalwood as a plantation subject since the first introduction of the species into the Kununurra area in 1981, and has kept abreast of developments in plantation techniques and procedures tested in Western Australia, Indonesia and New Caledonia.

Kimber Environment Services is retained by Tropical Forestry Services Ltd as a consultant to advise the Company on the management of its sandalwood plantations.

Irrigated plantation forestry with Indian Sandalwood is a developing industry in Western Australia, and the present state of knowledge is based on 16 years of research and operational trials, more than 6 years of commercial plantation ventures and extensive experience with the management of the native Australian Sandalwood (*Santalum spicatum*) which is at present the basis of the existing sandalwood industry in Western Australia.

### THE SANDALWOOD TREE

Worldwide there are 16 species of sandalwood distributed through Papua-New Guinea, Indonesia, India, Australia, and a number of Pacific Island groups. Most populations of sandalwood have been over-exploited due to their high value, and the majority of those 16 species that contain essential oils have been reduced to the level where they can meet only restricted local, domestic market demands. Some are close to extinction.

Indian Sandalwood, which is the subject of this investment occurs naturally in India, Indonesia and to a very minor extent in the Northern Territory of Australia.

All sandalwood species are partially parasitic, and they need other "host" trees closely adjacent, with which they can form a union via their roots. The host trees provide the sandalwood with its requirements for nutrients, some metabolites, and some of its water needs. Sandalwood seedlings can survive without a host for the first 6 to 12 months of life, however after that period they become unthrifty and yellow in colour, and they decline and eventually die. Although catholic in their choice of hosts, Indian Sandalwood trees will only thrive and show rapid growth rates when grown with carefully selected host species that have been identified through research trials.

The Indian Sandalwood is a small to medium tree with a dense crown of leaves. In its native India it may reach 20 metres in height and almost half a metre in diameter. However, a tree of these dimensions would be very old.



## 07. Expert Forester's Report

Grown in plantation for 15 years, which is the period proposed for this investment, trees can be expected to reach no more than 9 metres in height and 25 cm in diameter.

Sandalwood is valued for the aromatic oil it produces in the darker coloured central core of wood in the bole and roots which is known as heartwood. The quantity and quality of oil produced varies widely from species to species. Native Australian Sandalwood (*Santalum spicatum*) heartwood yields up to 2% oil (when extracted by conventional steam distillation) and the highly aromatic components, which are called santalols and for which the oil is valued, make up no more than 30% of the oil. Indian Sandalwood (*Santalum album*), in contrast, yields up to 6% oil with a santalol content generally exceeding 90%.

### BACKGROUND TO THE SANDALWOOD INDUSTRY

Sandalwood has been traded as a commodity for more than 2000 years according to Indian literature. It is marketed both as timber, and as sandalwood oil after extraction by steam distillation.

Its use is frequently associated with religious ceremony in Asian countries where large volumes of low-quality heartwood are ground to a powder and used in the manufacture of joss sticks and incense rings. In India, where the widest range of uses probably occurs it is used, in addition to joss sticks, for high quality carvings (often valued at several thousand dollars a piece), for cosmetics and toiletries, for medicinal purposes, and for flavouring chewing tobacco. Large quantities of Indian Sandalwood are distilled for the production of the extremely highly-priced oil. Major markets for sandalwood oil are Europe, the USA and the middle eastern countries where it is a component of all high quality perfumes.

In some perfumes sandalwood oil may be used for its own fragrance, however, in the majority of cases it is used as a fixative to reduce the volatility of the rare essential oils extracted from flowers that give the distinctive aroma to the various products.

The major producers of sandalwood and its products were until recently India, Western Australia and Indonesia. Following Indonesian military activity in Timor associated with the East Timor crisis a few years ago, Timor's sandalwood resources, which were the majority of Indonesia's national resource, were plundered to the point where the Indonesian government has banned the export of sandalwood and that country no longer contributes to world markets.

Australia's harvest comprises the native sandalwood of which the oil content was generally regarded as too low and of too poor a quality to warrant its extraction and marketing as a commodity. The majority of production has traditionally gone into the joss stick trade. However there is a small local industry in the south-west of WA that has commenced oil extraction using solvents. A small quantity of a tropical native sandalwood (*Santalum lanceolatum*) with a very low oil content is harvested and sold in Queensland.

India now remains the only source of the highly sought-after oil derived from the Indian Sandalwood tree.

While demand has remained constant (and possibly on the increase more recently with a more liberal approach to religion in mainland China), the resource in India has declined alarmingly over the past two decades. While Indian state governments have instituted sustained harvesting levels, they are quite unable to control the widescale theft of sandalwood trees from state forests and lands. Some estimates put the illegal removal of sandalwood in India at a level several times greater than the legal harvest. So serious is the problem, that Indian governments have been forced to reduce their estimate of the sustainable level of cutting from over 3000 tonnes per annum 20 years ago to less than 1000 tonnes in the year 2001.

A concomitant of the declining resource has been a rapidly increasing price for all Indian Sandalwood products.



## 07. Expert Forester's Report

### THE PLANTATION SITE

**Location:** The plantation will be established on the farming property known as King Location 385. It is situated about 10 kilometres south-east of the town of Kununurra on Packsaddle Road. The property has all-weather access on a sealed road and is conveniently close to town from where the labour force to work the plantation will be drawn.

**Soils:** Soils of the Packsaddle Plain are quite variable and grade from sands to sandy loams to levee soils to heavy clays. Substantial trials were established in the late 1980's to determine the preferred soil types for growing Indian Sandalwood in the Ord River Irrigation Area. They provided conclusive evidence that the heavy clays of the 'Cununurra Series' provided the best medium for growing sandalwood. For the first three years of trial, sandalwood grew more than double in height on Cununurra Clays compared to its growth on Cockatoo Sands.

The soils of the Packsaddle Plain were surveyed and mapped many years ago by the West Australian Department of Agriculture. 98 percent of the soils on King Location 385 were found to comprise Cununurra Clays of the normal and alkaline phases, the remainder being small intrusions of sandy clay on the eastern boundary of the property. The Consultant is familiar with the property and has inspected the area proposed for this investment. It was found to be among the best patches of soil available in the area for growing Indian Sandalwood and comprises approximately 70 percent of the normal phase Cununurra Clay and 30 percent of the alkaline phase.

Indian Sandalwood adapts well to growing on the Cununurra Clays, but it is essential to ensure that the land has adequate slope to shed excess water rapidly if waterlogging effects are to be avoided. The Manager has had the entire property laser-levelled to a slope that is adequate to achieve this criterion.

**Climate:** Indian Sandalwood is a species that occurs naturally in hot monsoonal tropical climates which experience heavy rains over a few months in the wet season followed by an almost rain-free period of several months. The tropical north of Western Australia falls comfortably into this category, but is somewhat hotter and drier than many sites that grow sandalwood. The heat is a bonus promoting fast growth, provided that adequate water is available to the trees. The natural rainfall of the Kununurra area is less than 800 mm per annum which is barely adequate considering the high open tank evaporation level in the area of over three and a half metres a year. The deficit will be made up by irrigating the plantation throughout the dry season.

**Availability of Water for irrigation:** Irrigation water for the area comes from Lake Argyle, a dam completed early in the 1970's to provide water for farms on the Ord River Irrigation Area. Lake Argyle Dam is situated on the Ord River 55 kilometres upstream of Kununurra township and water released from the dam flows through the natural channel of the Ord River until it reaches Lake Kununurra, a smaller diversion dam on the outskirts of Kununurra. The Lake Kununurra Dam raises the level of the water which can then be gravity-fed into the main irrigation channel for farms on the Ivanhoe Plain north of Kununurra. The Packsaddle Plain is at a somewhat higher elevation, and irrigation water has to be lifted by high volume pumps to reach the main irrigation channel in this development.

When Lake Argyle is filled to its maximum capacity, it covers an area of more than 2,000 square kilometres, and it extends to 150 kilometres up-stream of the dam wall. At normal storage levels the lake may cover only half this area but is still capable of yielding enough water each year to irrigate the 70,000 hectares of irrigable land in the Ord River Irrigation Area. The present area of developed irrigation farms is around 13,000 hectares.



## 07. Expert Forester's Report

### PLANTATION ESTABLISHMENT

**Seed supply:** The Manager has procured sandalwood seed for the investment from sources in India and from local Kununurra seed collections. The seed of Indian origin was collected from an area of good quality naturally growing sandalwood, specifically set aside for a supply of high quality seed. While this seed comes from a large number of trees representing a wide genetic base, it is not always collected under ideal conditions and from time to time may give poor germination. As a backstop, locally collected seed which has a high germination rate, but a rather narrower genetic base is also sown to ensure nursery stocks are adequate to establish the plantation. Seedlings from both seed sources perform equally well when planted in a plantation.

Seed of three of the host species is collected locally in Kununurra, a fourth is supplied by an Australian seed merchant, and the pot-host for the sandalwood comes from cuttings (or slips) from stock plants owned by the Manager.

On receipt at the nursery, seed of all species is stored in a cool-room at a temperature of 4 degrees Celsius.

**Raising Seedlings in the Nursery:** The Manager has constructed a large state-of-the-art nursery on the property on Packsaddle Road in which both sandalwood and host species seedlings are to be raised for the investment. The Consultant has inspected the nursery and has found it has adequate capacity to produce all the seedlings needed for this investment and has suitable conditions for hardening-off the seedlings in the month prior to planting. The Manager employs a Nursery Supervisor who is experienced in tropical nursery management and in the techniques for raising sandalwood seedlings, and is familiar with the standard of plant required for a tropical tree plantation.

**Site Preparation:** One of the main factors affecting the success of a plantation in its establishment phase is the correct preparation of the soil. At the beginning of the dry season in the year of planting, when the soil has reached a suitable moisture level, the area will be cultivated then mounded and the mounds deep-ripped to a depth of 40 to 50 centimetres. Following ripping, the mounds are reformed and the area is irrigated to promote the growth of weed seeds that have been exposed by the soil working. Once weeds have germinated, they are killed using a herbicide spray. This procedure may be repeated if weed growth is prolific and if there is an opportunity before the planting begins. In some years, the wet season becomes extended to the point where there is no time for irrigating and pre-planting weed control. In this case weed control becomes more onerous in the post-planting phase. Soil preparation a few weeks before reduces the clay soils to a remarkably fine tilth ready for the planting operation.

**Planting Pattern and Layout:** The procedures for site preparation produce mounds approximately 50cm high on which the trees are planted. Mounds are spaced apart at 1.83 metres, and every second mound is planted. The spaces between mounds act as furrows for the delivery of irrigation water. Sandalwood seedlings are planted at the rate of 463 plants per hectare and alongside each sandalwood seedling are planted two short-term hosts which will support the sandalwood until its root system is extensive enough to be in contact with the two long-term host species in an adjacent row. So in addition to the sandalwood seedlings, a total of at least 1620 host seedlings are planted per hectare.

**The Planting Operation:** Planting commences as soon as the weather has started to cool down early in the dry season. This may be as early as the beginning of May or as late as the beginning of June/Planting must generally be confined to cooler weather which lasts until the end of August. Sandalwood seedlings and the more delicate species of hosts are watered in by hand at the time of planting. The entire area planted in any one day is furrow irrigated immediately after the end of the day's work. These watering procedures have in recent plantations resulted in close to 100 percent survival among the seedlings.



## 07. Expert Forester's Report

The Manager will assess the results of the planting in late July to early August, and will replant any gaps that would result in a woodlot being less than 95 percent stocked. The long-term aim of the planting operation is to achieve a minimum stocking of 416 sandalwood trees per hectare, reasonably well spaced over the area of the plantation. In the event of an early onset to the hot season, it may not be possible for the Manager to undertake a successful replanting to fill gaps.

### MANAGEMENT OF THE PLANTATION

**Irrigating:** For the first 4 months after planting, the trees are irrigated at 7-day intervals, and this can be extended to 10 days towards the end of the first dry season. A 14-day interval between irrigations is adopted for the first half of the second dry season, and the frequency increased to up to 28 days for the second half. In the third dry season the frequency between irrigations is extended to a nominal 35 to 42 days. However, in practice the trees are irrigated when the soil dries out to the point where the clay begins to crack. This irrigation regime is followed for the rest of the life of the plantation.

**Weed Control:** The control of weeds in the early life of the plantation is critical to the survival of the tree seedlings. In the first dry season weeding is necessary at least once every four weeks. Unplanted mounds and the furrows between the planted mounds are weeded using a custom-made harrow with spear-shaped tips to the tines. The mounds on which the trees are planted can only be weeded by hand labour, chipping with hoes. Occasional unusually dense weed growth and intractable weed species may be treated very carefully by spraying a herbicide from spray nozzles that are shrouded to prevent spray drift on to the tree seedlings. In the second year of the plantation the trees have become quite deep rooted and are able to successfully compete against soft herbaceous weeds. However, selective hand weeding using machetes is needed for the control of large woody weeds and of creepers which are capable of smothering the young trees. A similar attention has to be paid to the control of woody weeds and creepers in the third year and possibly into the fourth. In the fifth year and beyond the trees in the plantation will have formed a dense overhead canopy that effectively shades out or stunts weed growth.

**Pruning:** Indian Sandalwood has a tendency to develop a branchy bole when young. In older trees these branches are shed as the tree increases in height and the lower branches become shaded out by those higher in the tree. This self-pruning does not take place in the plantation situation as the trees will be harvested at the relatively early age of 15 years. Consequently, in order to develop a clear lower bole (which the market favours) it is necessary to manually prune the branches from the lower two and a half to three metres of the bole.

Pruning to this height takes place gradually over a period of three years starting when the trees are about 18 months old. This extended period of pruning is necessary to avoid the removal of too much of the tree's live crown and foliage in any one year

**Pest Control:** Indian Sandalwood grown in the Ord River Irrigation Area has to the present remained remarkably free of insect pests. However, one of the short-term hosts which is planted with the sandalwood may be subject to defoliation by looper caterpillars and by melon beetles in the wet season or early in the dry season. In the event of severe attacks with the potential to result in successive defoliations, the Manager may decide to control these insects using an insecticidal spray. Generally the host species will recover from the insect attack with no interference by the Manager.

**Fertilisers:** Because the land on which the plantation is to be established has a long history of cropping, there has been a build-up in the residual fertility of the soil.



## 07. Expert Forester's Report

This factor, together with the experience that applying fertilisers early in the life of the plantation promotes weed growth, has persuaded managers of sandalwood plantations in the area to generally apply no fertilisers. However, fertiliser applications may be necessary to restore fertility where the initial laser-levelling operation has removed the topsoil from an area.

Later in the life of the plantation, when the tree canopy has shaded out weed growth, the Manager may opt to make applications of fertilisers at no less than four-year intervals provided research has shown them to be beneficial in increasing the growth of the plantation, and provided it can be shown that fertilisation provides positive financial benefits.

**Maintaining Irrigation Structures and Service Tracks:** The water-supply channels and the drains of the irrigation system, and the service tracks that run parallel to them need ongoing maintenance throughout the life of the plantation. These maintenance operations involve annual grading of the tracks, delving of the water supply channels and cleaning drains with a backhoe. A number of herbicide spays are also needed each year to keep weeds under control in these areas. Irrigation furrows within the plantation will be maintained by periodic cultivation of the alternate unplanted mounds using an implement known locally as a "go-devil". This cultivation maintains the adjacent irrigation furrows in a weed-free condition, so allowing irrigation water to run through them readily.

### ESTIMATED YIELD FROM THE PLANTATION

As no commercial plantations of Indian Sandalwood have yet been grown to maturity in the Ord River Irrigation Area, the Manager's estimate of production is speculative to some degree.

The Manager has estimated the yields to be expected from its plantations from a number of data sources. These include the growth of groups of trees grown locally, published growth rates of non-irrigated stands in India, and detailed analyses of the distribution of heartwood in trees of the closely related species *Santalum austrocaledonicum* grown in New Caledonia.

In making estimates the following factors are to be taken into account:

- the development of heartwood has been found to have commenced in most trees by the fifth year, and it will continue to develop until the tree is harvested at around 15 years. It follows that at this age the core of heartwood should be the same dimension as the trees bole was at 10 years of age. This assumption is supported by growth and heartwood data from sources in India and New Caledonia;
- heartwood also occurs in the roots of the tree. No data is yet available on this factor in trees grown in the Ord River plantations. However, a very detailed study of heartwood production in the stump and roots has been made in the closely related *Santalum austrocaledonicum*. In this species the heartwood content of the stump and major roots was determined to be between 18 percent and 45 percent of the weight of the heartwood in the bole. The Manager has adopted an estimate at the lower end of this range for application to Ord River sandalwood; and
- the quality and quantity of oil in the heartwood, according to Indian sources, is likely to be quite variable, is probably subject to genetic control in the tree and will improve as the tree gets older. While testing for oil content in 15 year-old trees has yet to be carried out, the heartwood in trees at this age has an aroma of sufficient intensity to indicate a good oil content.

The Manager proposes to harvest the plantation over a three year period in order to contribute (in cooperation with other local plantations) to a sustained supply of sandalwood to world markets from Western Australia. This extended harvest will start at age 13 and continue through the 14th and 15th years. The Manager



## 07. Expert Forester's Report

proposes to harvest only trees that have reached a size where their heartwood content is expected to be 30 kilograms or more in the first two harvests at the 13th and 14th year. Such a procedure will require the removal of the largest trees in the plantation at each harvest. The first removals will reduce the density of trees in the plantation, and may result in increased growth rates among the residual trees.

Yields from each hectare of plantation are estimated by TFS to be at least 416 trees each with 30 kilograms of heartwood. This equates to 60 tonnes of heartwood from each 5 hectare Sandalwood Lot.

The Consultant is of the opinion that this yield is achievable from Ord River plantations provided that establishment and cultural operations are performed as described earlier in this report and are successful.

### RISKS TO THE INVESTMENT, AND THEIR MANAGEMENT

**Climatic Risks:** The Kununurra area lies within the tropical zone of Western Australia that is regarded as liable to experience cyclones. In practice, the plantation area is situated far enough inland not to experience the full force of cyclones, which have generally declined to the status of rain-bearing depressions by the time they reach Kununurra. Of more concern are the thunderstorms accompanied by violent winds associated with the break of the seasons. These events can result in the snapping off of the tops of young sandalwood trees at the edges of the plantation. As a safeguard, the Manager now follows a policy of planting only host species around the edges of the plantation, to act as a windbreak to the sandalwood trees.

**Fire:** Although the Kimberley Region experiences annual grass fires in its savannah woodland vegetation, these do not enter the irrigated farming areas and are unlikely to encroach onto a well managed sandalwood plantation in the same area. King Location 385 however, adjoins native bush on its eastern boundary, and an intense bushfire has the capability of scorching trees on the edge of a plantation when driven by strong winds. The manager has responded to this risk by maintaining a wide firebreak, which doubles as an access track, clear of vegetation on this boundary of this property.

**Disease:** The infection of some host tree species by fungal pathogens has been recorded in some of the earlier trial sandalwood plantings. The species affected were not any of those currently used as hosts, and fungal problems only appeared in areas of less than adequate drainage. Any risk of fungal problems will be minimised by maintaining good drainage from the plantation.

**Cattle Intrusion:** The native bush to the east of the property is under Pastoral Lease, and the lease is unfenced. There is a possibility that cattle will stray into the plantation area, which is irrigated, in search of green feed. This presents a distinct risk to young sandalwood trees which are highly palatable to stock. The Manager will undertake to fence the eastern boundary of the property should cattle start to be a problem.

**Rising Groundwater:** In common with most large irrigation schemes around the world, the Ord River Irrigation Area is experiencing rising water tables. This is far from being a problem in the Packsaddle Plain, where the average annual rise is of the order of 10 to 15 centimetres in a water table that lies generally more than 4 metres below ground level on the property. Tree plantations also have a history of lowering water tables. Nevertheless, the Manager intends monitoring the situation by installing a series of measurement bores, known as piezometers, in addition to the 4 bores already existing on or very near the property.

**Other Risks:** This category of risk is included to again raise matters that were discussed earlier in this report and which could be regarded as a risk to the success of the investment. No Indian Sandalwood trees have been grown to commercial maturity in a commercial plantation situation in the Kimberley Region, and few have been harvested and analysed to determine local rates of heartwood development. Heartwood yields are accordingly speculative.





## 07. Expert Forester's Report

All the technology to be used in the investment has been developed and tested locally over more than 16 years, and it can be regarded as robust and reliable as a result. The Consultant believes from experience that the long-term host species selected for this investment can withstand the parasitic demands of the sandalwood, and will survive for the 15 year life of the plantation. In the event that this may not be so, the Manager has the option to re-establish the fastest growing and most favoured of the hosts by sowing its seed directly into the plantation.

### HARVESTING, PROCESSING AND EXPORTING

**Harvesting:** Because sandalwood develops oil in its roots it is not harvested by the conventional means of cutting down by saw. Depending on their size and the depth of their roots, sandalwood trees are either pulled out of the ground using a chain pulled by a heavy tractor, or forcibly lifted out of the ground by hydraulic forks. Once out of the ground the tree will be trimmed and cut into components and sizes that suit the market of the day.

I have assessed the present day costs of harvesting, processing and transporting the product to store at approximately \$7,000 per hectare. I therefore regard the Manager's assumption of these present day costs of \$35,000 per Sandalwood Lot (approximately 5 hectares) to be reasonable.

**Processing:** By the time the crop from this Investment has been harvested, there is a possibility that a processing plant may have been established in Kununurra to extract the sandalwood oil from the timber. If this is the case, subscribers may find the opportunity to add value to their product an attractive option.

**Exporting:** The major consumers of sandalwood and its products live in Asia, Europe and America, so the products from this Investment will have to be exported to reach consumer markets. Wyndham is the nearest seaport, 100 kilometres from Kununurra by sealed road, and this port services east Asian countries. To reach markets in India, Europe and the USA, the sandalwood would have to be shipped from Darwin, 800 kilometres northeast of Kununurra and connected by a sealed road.

### ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

Sandalwood plantations, in addition to their probable contribution to lowering ground water tables, will benefit the Ord River irrigated farming area in a number of positive ways. The man-made sandalwood forests will provide a new habitat for forest-loving birds and animals which in the arid climate of the East Kimberley Region are confined to the forest habitats that occur naturally only along the fringes of water courses, and as small patches of rainforest. Both of these forest vegetation types have become much reduced since European settlement through grazing by domestic and feral animals and by fire.

They will also provide some visual relief and diversity to the farming area, while their contribution to the pollution of run-off waters by fertilisers and pesticides will be much less than under a farming regime due to the benign management practices followed in forestry.

Socially, the sandalwood plantations provide a level of year-round work, compared to the highly seasonal employment offered by conventional farming in the area, and at the same time inject substantial funds into the local economy through the payment of wages and the purchase of services and materials.

### MANAGEMENT CAPACITY OF THE MANAGER

The proposed plantations will be the fifth Indian Sandalwood plantation managed by the Manager. The experience gained from the already established projects has been invaluable and has allowed the Manager to develop a highly skilled and experienced field staff on the ground in Kununurra.

Management of the plantations follows a management plan, supported by detailed manuals which prescribe nursery procedures and plantation establishment procedures. Both the management plan and the manuals have



## 07. Expert Forester's Report

been written by professional forestry consultants who are experienced in all facets of the establishment and maintenance of Indian Sandalwood plantations in the Ord River Irrigation Area.

It is the Consultant's opinion that the Manager is a fit and proper organization to run the proposed sandalwood plantation as a successful Investment.

### ASSUMPTIONS BY MANAGER

The Manager has used the following assumptions, among a number of assumptions, which it has included in the Information Memorandum:

- there should be an average of approximately 2,000 Indian Sandalwood trees per Sandalwood Lot to be harvested;
- the total production of heartwood per tree to be harvested should be 30kg's;
- the total average heartwood product per Sandalwood Lot should be 60 tonnes (60,000kg);
- the trees should be harvested progressively from the commencement of the year 13 in accordance with the following ratios:
  - year 13 - 15%;
  - year 14 - 30%;
  - year 15 - 55%; and
- the present day costs per Sandalwood Lot of harvesting, processing and transporting to store of Sandalwood should be \$35,000 per Sandalwood Lot.

These assumptions are supported by the independent conclusions that I have drawn earlier in this report. Accordingly, I have verified these assumptions as reasonable.

### DISCLAIMER

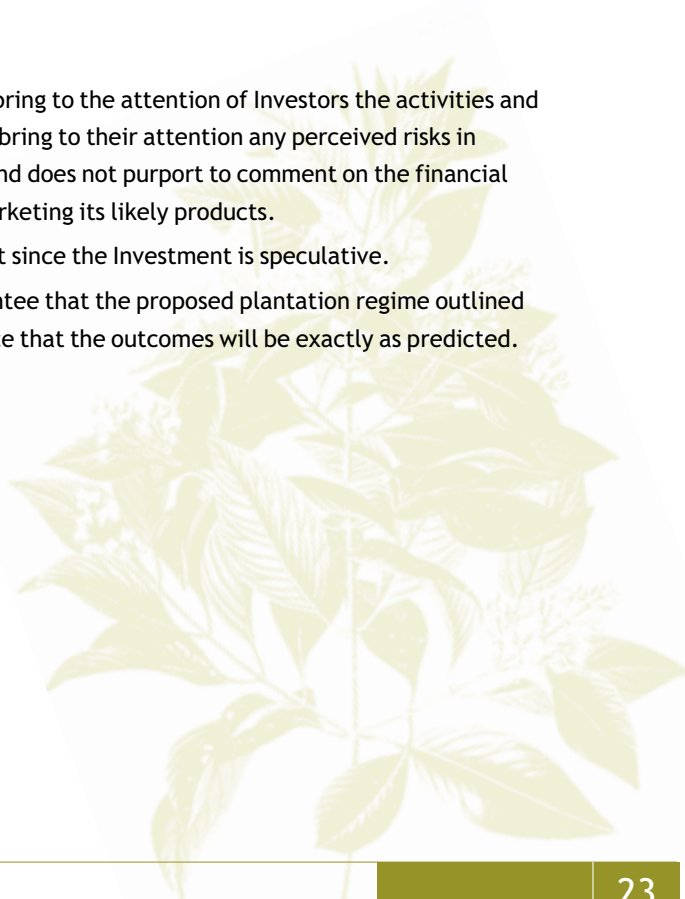
Kimber Environment Services has prepared this report to bring to the attention of Investors the activities and operations necessary to achieve a successful outcome, and to bring to their attention any perceived risks in undertaking the Investment. This report does not comment, and does not purport to comment on the financial and taxation aspects of the Investment, nor with regard to marketing its likely products.

Actual results may vary from those predicted in this report since the Investment is speculative.

Kimber Environment Services gives no assurance or guarantee that the proposed plantation regime outlined in this report will be successfully carried out, nor any assurance that the outcomes will be exactly as predicted.

Kimber Environment Services

28 May 2003





## 08. Expert Sandalwood Marketing Report

H.S. Anantha Padmanabha  
Forestry Consultant

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28 May 2003

### MARKET REPORT ON SANDALWOOD

Dear Sirs

This report has been prepared for inclusion in an Information Memorandum to be issued by Tropical Forestry Services Ltd (the Manager).

It has been prepared by Anantha Padmanabha, a qualified scientist with over 35 years experience in forestry in India. Mr Padmanabha was a senior scientist at the Institute of Wood Science and Technology in Bangalore (India) from 1964 to 1998, during which time he was responsible for guiding a number of research projects on sandalwood, including but not limited to techniques of growing sandalwood and diseases and pests affecting sandalwood. Mr Padmanabha has co-authored books on sandalwood and has published over 125 publications in both Indian and International Journals. From 1994 to 1998 Mr Padmanabha was designated Chief Technical Advisor for sandalwood projects with the World Bank FREE project (ICFRE) in India. Mr Padmanabha is currently a Forestry Consultant and Director of Karnataka Research Foundation for Advance Science Technology Transfer in Bangalore

### SANDALWOOD - A VALUABLE COMMODITY

Sandalwood and its oil has been the most valuable and wanted perfumery material in the world from the earliest times of civilisation. Powder of Indian sandalwood (*Santalum album*) heartwood upon distillation yields what is known as "East Indian Sandalwood oil" which is highly rated for its fixative properties and for its persistent, heavy, sweet, woody scent.

Indian sandalwood fetches the highest export price of any Indian forest product.

### HABITAT AND PROPERTIES

#### OCCURRENCE

Apart from India, *Santalum album* is grown in Indonesia, New Caledonia, Fiji Islands and Philippine Islands.

In India, Indian sandalwood is found throughout the length and breadth of the country but particularly in South India, where the states of Karnataka and Tamil nadu account for nearly 80% of total Indian resource.

#### HEARTWOOD FORMATION

The Indian sandalwood tree is harvested for its heartwood which is rich in fragrant oil. The formation and development of heartwood is dependent on age, growth, soil and rainfall; and genetic factors also seem to play an important role.

The heartwood is described as astringent, bitter, antipyretic, moderately hard, heavy, durable, slow seasoning, pleasantly and strongly scented, yellow or brown in appearance, even textured (straight, close grains and uniform fibres) with an oily feel and almost free from knots.



## 08. Expert Sandalwood Marketing Report

### COLOUR OF HEARTWOOD AND OIL CONTENT

In trade, superiority of wood is generally judged on the basis of colour and the portion of the tree from which the wood is taken. Sandalwood's heartwood ranges in colour from light yellow to dark chestnut brown.

Colour of Wood	Oil percentage (%)	Santalol* percentage (%)
Yellow	2.7 - 3.5	90
Light brown	2.5 - 6.0	85 - 90
Brown	About 2.5	Less than 85
Dark Brown	Less than 2.5	75 - 85

\* alcohol contained within sandalwood oil

Heartwood is contained within the trunk, butt, roots and major branches. The oil content in the butt and the roots is slightly more than that of the trunk and the branches. It is said that 1 tonne of a good sandalwood will yield on distillation 50.9 kgs of oil.

### USES FOR SANDALWOOD

Sandalwood is one of the finest woods for carving and turning next only to ivory for intricate workmanship. Sandalwood is used for carving idols and utility items like furniture, jewellery boxes, cabinet panels, chess boards, pen holders, paper weights, picture frames, caskets, wall plaques and other curious items of interest.

Powdered heartwood from which the oil has been extracted is used in the manufacture of incense sticks, which are burned during religious ceremonies and for meditation.

Powdered heartwood upon distillation yields East Indian Sandalwood oil which is a highly priced raw material in the perfumery industry. In perfumery, it is valued for its fixative properties and for its persistent heavy sweet, woody scent. The fixative property of the oil is due to its high boiling fragrant constituents and santalols. The oil is also used extensively in the cosmetics industry in the manufacture of soaps, face creams, toilet powders and air fresheners.

Medicinally, sandalwood is used as an antiseptic, antipyretic, diuretic, expectorant stimulant and for the treatment of bronchitis, gonorrhoea and urinary infections.

Sandalwood has many important cultural uses. Sandalwood paste is smeared on the forehead during puja (prayer) and the paste is mixed with water and given as thirth (Prasad). Sandalwood chips are burned in yagna to carry scented fumes to "God" in India. Sandalwood is also used in the funeral pyre in Hindu culture.

In India about 15 to 20 percent of wood extracted every year is sold to registered handicraft artisans at a subsidised rate of 25 to 30 percent of the value. Small amounts are purchased by individuals for making paste during puja and to use as household medicine. The majority of wood is sold for export or for the extraction of sandalwood oil.

### HARVEST OF SANDALWOOD IN INDIA

In India, the proportion of wood harvested officially is small in proportion to that illegally harvested. As the wood has become increasingly valuable the amount of wood illegally harvested has grown and this has in turn necessitated a reduction by government of its annual harvest due to concerns over sustainability.

During 1961 to 1965 the official government harvest of sandalwood was on average 3,200 tonnes per annum, this increased to on average 4,000 tonnes during 1965 to 1970, meeting 80 to 90 percent of world demand. Unfortunately, in the period since 1970 the official government harvest has dwindled to a current level of a mere



## 08. Expert Sandalwood Marketing Report

1,000 tonnes per annum. (*Report on the sandalwood marketing in India, Govt. of India*).

It is estimated that the actual annual harvest of sandalwood is currently approximately 5,000 tonnes per annum. The difference being that which is illegally harvested of approximately 4,000 tonnes.

Grave concerns are held over the future sustainability of the sandalwood harvest unless the illegal harvesting can be restricted.

### PRODUCTION OF SANDALWOOD OIL IN INDIA

India is maintaining the international quality of oil to "Agmark" standard (Ag representing agriculture, mark representing the standard) and has a monopoly on world trade.

Due to the decline in the official government harvest, the official production of oil has also declined.

During 1958 to 1970 India was officially producing nearly 180 to 200 tonnes of oil meeting 90 percent of world demand. From 1981 to 1994 the production of oil showed a decrease in trend gradually until reaching a fairly constant level of 60 tonnes per annum. This production reduced to 50 tonnes during 2001 however it increased to 60 tonnes during 2002.

It is estimated that the actual production of oil is approximately 150 tonnes. Approximately 2.5 times official government harvest.

The biggest producer of sandalwood oil in India is the Sandal Oil Factory in South India, where they are distilling approximately 1,200 tonnes of wood annually to produce oil. The oil is exported to different countries; at present the available raw material is not enough to meet their captive consumption.

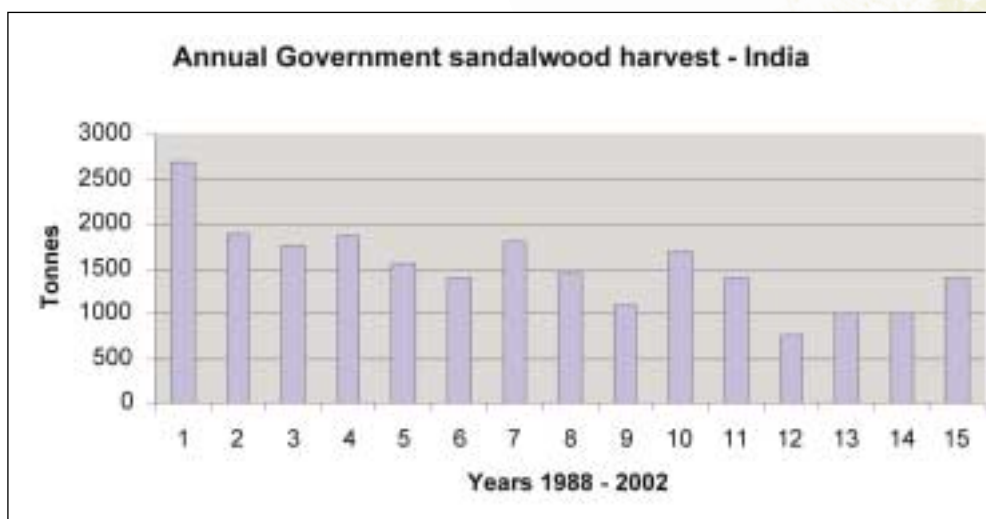
### ESTIMATED WORLD WIDE RESOURCE

Apart from India, Santalum album is grown in Indonesia, New Caledonia, Fiji Islands and Philippine Islands. Indian contribution to the world market is around 95 percent, Indonesia contributes about 2-3 percent and the rest would barely contribute 2 percent.

### RATE OF DEPLETION OF WORLD RESOURCE

The rate of depletion of India's sandalwood resource is very rapid and is as a result of illicit felling, biotic interferences (such as fire, grazing, browsing and hacking) and spike disease.

The depletion of the resource is illustrated by the level of annual government harvest which has been in decline over the past 12 years.





## 08. Expert Sandalwood Marketing Report

Concerted efforts are now being made to raise new plantations in India since the State Forest laws have been amended in favour of growers, but it will take another 20 years to reap the harvest, if proper protection is taken.

And in Indonesia there has been a sharp decline in the production of sandalwood over the past 12 years and it is estimated that there may not be any production in the current years because of a logging ban. To prevent collapse of the established industries they may have to import wood from Australia or India (Sandalwood Newsletter, May 2000).

### CONSUMPTION OF SANDALWOOD IN INDIA

In India, sandalwood oil is one of the essential oils required in perfume formulations, cosmetics, beauty-aids and religious functions. The consumption of wood and oil is mainly in the following industries:

- Perfumery;
- Attar preparations;
- Soap and toiletries;
- Incense sticks;
- Medicines; and
- Chewing scented tobacco.

Internal consumption is increasing regularly and annual requirement of wood is estimated as being 800 tonnes and the annual requirement for oil is approximately 60 tonnes. The official figures available with regard to wood production and oil would not match the quantity in use by various industries because of the level of illicit dealing.

Because of short supply of natural oil, industries making incense sticks and pan masala (scented chewing tobacco) have switched over to synthetics, unmindful of the harmful effects to human beings.

### EXPORT OF SANDALWOOD FROM INDIA

The Government of India controls the export of sandalwood and oil. There is no fixed annual volume or quantity for export. Export permits are given to the exporters based on their possession of material. During the year 2002 the Government of India gave permission to export 2000 tonnes of wood. Merchants who had stored wood over the years exported wood to various countries.

The bulk of Sandalwood material comes from Tamil Nadu State in India. The forest department advertises for open bidding competition approximately 4 times per year for the sale of wood. The quantity of wood auctioned every year depends on the extracted stock position. Sale of wood in 2001 was approximately 1,000 tonne of wood and during 2002 it increased to approximately 1400 tonnes. The Indian buyers either use it for the distillation of oil or export both wood and oil to different countries after obtaining permits.

The major export markets for Indian Sandalwood wood and oil are France, Taiwan, Hong Kong, Japan, Malaysia, Singapore, Dubai, South Africa, the UK and the USA, with the UK and the USA accounting for approximately 75% of all export sales. It is anticipated with the increasing affluence of China, that China might once again become a major importer of sandalwood.

In Asian countries like India, Pakistan, Bangladesh and Sri Lanka, nearly 10 to 15 percent of the population are regularly using scented tobacco. It is claimed that this industry alone requires about 20 tonnes of oil annually and is fast growing. The demand for sandalwood in scented tobacco can be expected to triple over the next five years.



## 08. Expert Sandalwood Marketing Report

### MARKETING TRENDS

#### INDIAN PRICE TRENDS

From 1990 to 2002, the sale price of sandalwood in India has increased from US\$4,000 per tonne to US\$32,000 per tonne, an average increase of 38 per cent per annum. The latest auction in Tamil Nadu in January 2003 recorded average prices across all categories of wood of US\$35,191 per tonne. There has been a steep rise in sale price from the year 2001-2002 to 2002-2003 of about 70%. This trend in increase is due to liberalisation of export by the Indian Government. It is likely that this trend will continue due to dwindling supplies.

#### PRICE TREND

1990 - 91	US\$4,000
1991 - 92	US\$5,700
1993 - 95	US\$7,000
1996 - 97	US\$13,000
1998 - 99	US\$14,100
1999 - 2000	US\$14,600
2000 - 2001	US\$19,150
2002 - 2003	US\$32,000

Based on the current market price of sandalwood, oil distilled should be sold for not less than US\$640 per kg, assuming 1 tonne of wood distilled produces around 50 kgs of oil. This includes overhead charges. It is to be noted that the spent powder from the oil extraction process is also a highly saleable commodity.

#### INTERNATIONAL PRICE TRENDS

Prices in the regulated Indian market are lower than the prices achieved in the international market. Currently sandalwood is sold to other countries on average at US\$41,000 per tonne. This represents a premium of approximately 28%.

#### INFORMATION ON THE CURRENT DEMAND

It is estimated that the annual requirement by Indian essential oil and allied industries is for about 800 tonnes of wood and 60 tonnes of oil. Assuming a conversion rate of 5% of wood to oil, the total annual requirement within India is 2,000 tonnes.

Currently India exports a total of 3,000 tonne of wood comprising 2,000 tonne of wood and 50 tonne of oil (which in wood equivalent is 1,000 tonne).

Accordingly, the total demand for sandalwood is 5,000 tonnes. India can only harvest on a sustainable basis an estimated 1,000 tonne. To ensure long term survival of sandalwood oil industry it shall be necessary to reduce level of harvest.

At the same time as supply is declining, demand is increasing in both domestic and international markets for sandalwood wood and oil. This gap between supply and demand is expected to continue to widen over time causing further escalation of price.

#### FUTURE DEMAND

Mr B.J. Edwards, Vice President, International Bush Boake Allen Ltd., is of the view that the international demand for fragrance and flavours (Fragrances and Flavours in the 21 Century, XIV FAFFAI Seminary 1999), will go



## 08. Expert Sandalwood Marketing Report

beyond US\$12 billion in the 21st century, compared to less than US\$8 billion today. Broad consumption figures indicate that China, Africa and India provide more than 50% of the world population, yet consume only 35% of fragrant and flavoured products manufactured in the world. It can be seen that 20% of the world's affluent society, mainly USA and Western Europe, consumes 65% of fragrant and flavoured products. This means that to upgrade the lifestyle of 80% of developing or underdeveloped populations, there will be tremendous opportunities for fragrance and flavours in the 21st century.

Some of the major perfumery, attar and pan marsala (scented chewing tobacco, Zarada) industries have become aware that users may slowly reject synthetic products because of harmful side effects. Asian countries in particular have become more health conscious and are demanding only natural ingredients to be incorporated in various products.

It may not be possible to meet the growing demand of natural essential oil if new plantations are not raised elsewhere with efficient management practices to produce raw material as quickly as possible.

### ASSUMPTIONS BY MANAGER

The Manager has used the following assumption, among a number of assumptions, when preparing the assumptions on investment returns that it has included in the Information Memorandum:

- As at 31 January 2003, the international market price for cleaned logs is US\$35,191 per tonne (US\$35.19 per kg).

This assumption is supported by the conclusions that I have drawn earlier in this report. Accordingly, I verify this assumption is reasonable.

Yours sincerely

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Forestry Consultant







## 09. Directory

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