



AUSTRALIAN AGRIBUSINESS GROUP

# MARKET OVERVIEW – THE AUSTRALIAN SANDALWOOD INDUSTRY

Independent Assessment – November 2006

## Industry Snapshot

- The Sandalwood tree contains aromatic oils in the heartwood, butt and roots and is one of the world's most valuable timbers.
- Sandalwood timber is a generic term for the *Santalum* genus of which Indian Sandalwood (*Santalum album*), and to a lesser degree, Western Australian Sandalwood (*S. spicatum*) are considered the most valuable.
- Due to overexploitation and a lack of harvest protection, India and Australia are the only countries which have significant supplies of Sandalwood.
- Australia is one of the major players in the international Sandalwood market, harvesting up to 2,500 tonnes of mostly Western Australian Sandalwood every year.
- In the mid term future, Australia's supply of Sandalwood is predicted to increase substantially as plantations of both *S. spicatum* and *S. album* come on line to be harvested.
- The outlook for Australian plantation Sandalwood appears to be attractive and it will be a question of resource management and strategic market planning which will determine the ultimate success of the industry rather than demand uncertainties.

## 1 Introduction

Sandalwood is a small shrubby tree which grows to between 3-12 meters in height. The Sandalwood tree contains aromatic oils in the heartwood, butt and roots and is one of the world's most valuable timbers.

Sandalwood has significant cultural importance in Asia and is highly prized for its aromatic properties. In more recent times, the aromatic features of the Sandalwood timber have become valuable in Western societies where it features as an ingredient in high priced perfume, scented tobacco, incense sticks/ joss sticks and is used for carved wood products and ornamental furniture <sup>1</sup>.

It has been claimed that Sandalwood oil also has a variety of therapeutic benefits where inhalation of the oil vapour is said to aid relaxation, stress relief and asthma, while anti-bacterial, anti-microbial and anti-inflammatory effects have also been associated with the product <sup>2</sup>.

Sandalwood timber is a generic term for the *Santalum* genus, of which 29 tropical and sub-tropical species are known across the world. Six species of Sandalwood grow naturally throughout Australia and of these only Western Australian Sandalwood (*Santalum spicatum*), that is native to Western Australia and to a minor degree it's closely related North Queensland species Bush Plum (*S. lanceolatum*) are grown for commercial use.

Indian Sandalwood (*S. album*) which is found naturally in the Indian subcontinent, produces the highest average oil content and is subsequently the most strongly demanded of the Sandalwood species.

Many of the Sandalwood species of timber, including *S. album* and *S. spicatum*, are partially or completely parasitic which means that its water and nutrients are extracted from the roots of host plants <sup>3</sup>. For this reason, both Sandalwood and pre-established host plants are grown in plantations.

Due to the complex sandalwood-host relationship, growing Sandalwood successfully in plantations has traditionally been much harder to achieve than most other species, such as pines or eucalypts. There have been significant amounts of research around the world on the requirements for successful growth in plantations and today several operators have established Indian and Western Australian Sandalwood plantations in Australia <sup>4</sup>.

Australia and Western Australia in particular, has had a long and distinguished history in the production and trade of Sandalwood. The first exports of *S. spicatum* from Western Australia occurred in 1845 and by 1848, exports mainly to China, had rapidly increased to 1,335 tonnes <sup>5</sup>. At this stage, annual sales of Sandalwood reported to be averaging over 45% of the WA export trade and were returning almost 40% more income volume than the State's wool exports <sup>6</sup>.

## 3 International Supply and Demand

**Due to commercial secrecy and illegal trade in the Sandalwood market, we strongly emphasise the fact that attaining reliable information in relation to international supply and demand is very difficult.**

Because of overexploitation and lack of protection for the resource, India and Australia are the only countries which have supplies of Sandalwood of any significance. In India, Sandalwood is mostly protected through active Government efforts, but illegal harvesting still endangers its survival. At the current time, it is estimated that India produces approximately 1,000 tonnes per annum, all of which is produced from the *S. album* species<sup>8</sup>. Illegal and unofficial harvesting is thought to account for an additional 3,000-4,000 tonnes per annum.

Sandalwood of different varieties is also grown in the Indonesian archipelago and the Pacific Islands, but overexploitation and restrictions on harvesting has meant that the volume produced is minor.

Current world market demand for Sandalwood is thought to be around 5,000-6,000 tonnes per year, with this figure incorporating demand for a number of different products, sourced from a variety of Sandalwood species<sup>8</sup>. The Asian market revolves around the use of Sandalwood in the supply of Sandalwood Sapwood and De-oiled Sandalwood for production of incense sticks. Only a few Asian countries have their own supplies of Sandalwood and of this supply most is consumed domestically<sup>9</sup>. Today the main market destinations for export sandalwood are Taiwan, China, Malaysia, Korea, Hong Kong and India<sup>9</sup>.

With Asian markets already struggling to meet their own supply requirements it has meant that the international market has limited sources of supply for this Western market demand<sup>9</sup>. The Western market is dominated by the demand for Sandalwood as an ingredient in perfume, aromatherapy and fragrant body care products. As a result of declining volumes of sandalwood on the market, synthetic substitutes have become available on the market, but at a much reduced cost compared to natural Sandalwood oil<sup>8</sup>.

The standard of these substitutes is low and traditional uses of sandalwood have tended to refuse to use of the inferior substitute.

Although Sandalwood stocks in India continue to decline, Vernes et al (2002) notes that there is a possibility that recent changes in state regulations in parts of India providing incentives for large scale private plantation development may boost production levels of *S. album* from India in the mid to long term future.

## 4 Australian Supply and Demand

Australia is one of the major players in the international Sandalwood market, harvesting just over 2,000 tonnes of *S. spicatum* from Crown Land in Western Australia and somewhere in the order of 200 tonnes from private landholders in the same state<sup>10</sup>. A further 250 tonnes is harvested from Queensland plantations of *S. lanceolatum*.

The majority of Western Australian Sandalwood is exported to South-East Asia for the manufacture of incense or joss sticks and to India for the production of oil. Taiwan and Hong Kong are the largest importers of Western Australian Sandalwood accounting for in excess of 60% of Australia's annual production<sup>11</sup>. Both these are seen as key markets for Australian grown Sandalwood to go forward, for both this reason and also the fact that they have no native stands for their own supply<sup>9</sup>.

After peaking in 1920 at almost 14,000 tonnes for the year, the Australian export market collapsed late in the same decade when civil war broke out in China<sup>5</sup>. At this time, the Western Australian Government agreed to underwrite the Sandalwood stocks remaining and passed the Sandalwood Act in 1930, from which time the Western Australian native grown Sandalwood industry has been carefully managed in order to promote sustainability and higher returns per tonne<sup>6</sup>.

The Queensland industry, mainly based in the north of the state harvesting *S. lanceolatum*, began in 1886, however ceased in 1940 and then started again in 1982, when the 1934 Queensland Sandalwood Act was revoked. Small quantities of this species, which is not as high in oil rich heartwood, are still harvested and exported each year.

## 2 Growing Regions In Australia

The natural range of Western Australian Sandalwood is throughout the medium and low rainfall regions of Western Australia from just north of Carnarvon, along the coast to above Albany, through the wheatbelt and goldfields to some small areas of South Australia<sup>7</sup>. Because it was cleared from land for cropping, Western Australian Sandalwood is now mainly found on Crown Land in arid parts of the state.

Today, Western Australian Sandalwood located on Crown Land is managed by the Forests Product Commission of Western Australia (FPC) which ensures the long term viability of the Sandalwood industry. According to FPC, the current estimated total area of distribution of Western Australian Sandalwood is approximately 161 million ha, of which 49% is protected from any form of harvesting.

Natural stands of *S. lanceolatum* or Bush Plum Sandalwood are restricted to northern parts of Queensland where there is a small but successful international export mill in Richmond, Queensland.

In the past, due to the inferiority of the heartwood in the *S. spicatum* compared to the *S. album*, there has been limited commercial interest in producing plantations of Western Australian Sandalwood in Australia<sup>3</sup>. During the past decade however, dwindling supplies in India in addition to increased demand for the wood and oil has made the option of planting Western Australian Sandalwood in plantations on Australian farms viable.

John Brand (2006) from the FPC states that approximately 2,000 ha of non-irrigated of *S. spicatum* plantations have been established in the wheatbelt zone of Western Australia and another 2,000 ha will be in the ground by the end of the year. Plantings of *S. spicatum* are expected to increase rapidly in the future as prospectus companies raise increasing amounts of capital for plantation establishment.

The last 5 years has also seen a rapid expansion in *S. album* plantation development in the Ord River Irrigation Area (ORIA) of north Western Australia. The area of Indian Sandalwood plantations is approximately 1,500 ha, with Brand (2006) advising that this area is expected to increase at a rate of in the order of 500 ha/year. All Indian Sandalwood plantations established in the ORIA are irrigated.

According to Vernes and Robson (2002), there are no commercial Sandalwood plantations in Queensland, but there has been some investment in a number of small research plots in south western and north Queensland.

China is another significant market for Australian Sandalwood, being the leading customer until the Communist Government banned imports in 1966. Since 1999, this market re-opened and over recent years China has rapidly increased its imports of Western Australian Sandalwood<sup>12</sup>. This is seen as a significant gain to the Australian industry and will benefit Sandalwood growers in the future.

Unlike in the past where all the value adding to Sandalwood took place overseas, on the domestic scene, there are a small number of buyers who utilise Sandalwood for the production of Sandalwood oil and incense sticks or export direct to buyers overseas<sup>12</sup>. The most significant domestic customer and largest Sandalwood product factory in the world is Western Australian company, Mt Romance who purchases between 600-700 tonnes or 27%-32% of Western Australian Sandalwood production per annum<sup>10</sup>.

In the mid term, Australia's supply of Sandalwood is predicted to increase substantially as plantations of both *S. spicatum* and *S. album* come on line to be harvested. Consequently, there is a risk that increased supply will result in a downward pressure on prices received for Sandalwood.

As such it is imperative that the industry and in particular the main prospectus companies can work together to enable the careful release of product over time. AAG believes that this will facilitate market growth opportunities, rewarding price returns and supply sustainability.

## 5 Possible Price and Yield Scenarios

The prized properties of the Sandalwood tree are concentrated in the heartwood. As such, the price paid by a buyer will primarily depend upon the oil content and volume of the heartwood, with the more heartwood a piece of timber contains and higher the oil content, the greater its value. In addition to this, timber that has been value-added and timber that have been harvested from native stands will attract higher prices<sup>12</sup>.

Outlined in Table 1 is the average oil content for Sandalwood species as reported in the Australian Forestry Journal.

As Table 1 suggests *S. album* or Indian Sandalwood has the highest oil content of Sandalwood species (6-7% oil content) compared to other species including *S. spicatum* (2%) and *S. lanceolatum* (1%). This explains the reason Indian Sandalwood is the most strongly demanded of the Sandalwood species.

| Species                     | Origin                 | Oil Content |
|-----------------------------|------------------------|-------------|
| <i>S. album</i>             | Indonesia, India       | 6-7%        |
| <i>S. spicatum</i>          | Western Australia      | 2%          |
| <i>S. lanceolatum</i>       | Queensland             | 1%          |
| <i>S. austrocaledonicum</i> | Vanuatu, New Caledonia | 3-5%        |
| <i>S. yasi</i>              | Fiji                   | 5%          |

It is important to note that heartwood, the central part of older trees, is only formed over time and that the sapwood (outer parts of trees) is of lesser value. The length of time required for heartwood formation is thought to be around 15-20 years, but is still a topic of research.

With *S. spicatum* and *S. album* plantations only in the development stage, expected yields are difficult to predict, with yields varying significantly depending on management techniques, location and other environmental factors.

Some industry commentators have stated that a *S. spicatum* plantation will produce approximately 8 t/ha, presuming a yield of 20 kg per tree, over 30 years with a planting density of 400 trees per hectare<sup>14</sup>. Others argue that yields for *S. spicatum* are more in line with 2-3 tonnes per hectare assuming a stocking rate of 200-300 stems per hectare over 20 years<sup>15</sup>.

In relation to *S. album* plantations growing in the ORIA, there is no concrete yield evidence currently available. According to Vernes et al (2002), yields of up to 15 tonnes per hectare assuming 460 stems per hectare with a rotation length of 15 years have been used by prospectus companies.

Table 2 outlines a list of possible price assumptions for *S. album* and *S. spicatum*. AAG emphasises the fact that obtaining reliable price statistics is difficult. As such, AAG has included Table 2 as a guide only and recommends that it should not be used as a definite list of possible price scenarios.

We note that during the past decade, as the gap between Sandalwood supply and demand has widened over time, there has been a simultaneous increase in price.

| Source                                   | Price                                                   |
|------------------------------------------|---------------------------------------------------------|
| Avon Sandalwood Network <sup>12</sup>    | \$3,000-10,000/t *                                      |
| Westcorp Sandalwood <sup>16</sup>        | \$16,500/t*<br>\$32,000/t - \$41,000/t**                |
| Anantha Padmanabha, H.S, <sup>9</sup>    | \$5,000/t - \$11,000/t*<br>\$43,200/t**                 |
| Indian Sandalwood Auctions – 28 Jan 2005 | \$29,403 - \$82,250**                                   |
| Jonathon Brand <sup>10</sup>             | \$6,000 - \$8,000 tonne*<br>\$20,000 - \$30,000 tonne** |

\* Western Australian Sandalwood (*S. spicatum*)

\*\* Indian Sandalwood (*S. album*)

AAG understands that legally sourced Indian Sandalwood currently trades at between \$30,000 and \$85,000 per tonne, with Sapwood prices ranging from \$1,000-\$2,500 per tonne.

Despite the market potential and demand for Australian Sandalwood, it still does not attract anywhere near the premiums which the Indian product does. Table 2 suggests that timber prices for Western Australian Sandalwood range from between \$3,000 - \$16,000 per tonne.

## 6 Future Outlook and Conclusions

The Australian Sandalwood industry is in the fortunate position of being one of the few nations to have significant and sustainable supplies of Sandalwood. We note that at the same time, world native grown stocks continue to decline resulting in an increasing gap between consumer demand and world supply.

Australia is already a market leader in the Sandalwood industry and because of the inherent use of Sandalwood products in many cultures, large market demands and historic market access, is expected to maintain



and increase this position as planned plantations come on line in approximately 15 years time.

The main question for producers is how the international market will react when significant volumes of product come onto the market from Australian plantations. It is expected that an increased supply will place a downward pressure on prices, but by how much will ultimately depend on the market conditions at the time of sale.

In the short term, the inability of Growers to meet current demand is the main threat to the Australian Sandalwood industry, as increased competition from alternative products intensifies. The fact that Sandalwood oil is a complex structure and attempts to synthesise the oil since the mid 1950's have had little success, somewhat mitigates this risk<sup>17</sup>.

The outlook for Australian plantation Sandalwood appears to be positive and it will be a question of resource management and strategic market planning which determines the ultimate success of the industry rather than demand uncertainties.

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