Global Impact of New Plantations

Changing the dynamics of the aromatic ingredient market.

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How can plantations—or longer-term investments—change the dynamics of the aromatic ingredient market? Some crops take longer than others to materialize, but whenever there's a change in the air the markets appear to be in a state of confusion.

Why is this? The most likely reason is that there is never just one individual, investor or company thinking into the future, but many, and never do these many get together and paint one true picture of the market. These many are likely to be future competitors, and each investor or company can have different time frames and motivations as to why they're looking into the future, as well as how the future might evolve.

There's an inevitable assumption that if new plantations start to supply oil to the market, the oil price will start to come down. These are simple supply and demand principles. However, investors often don't wish to see this happen. Controlling any sudden influx of fresh material is critical to maintaining prices; after all, it is likely that a higher oil price that attracted such investors to a plantation project in the first place.

Of course, this all sounds fairly straightforward, but plantations don't always come online when expected and may not yield the same standard of oil as older plantations or wild-harvested areas to which the market is accustomed. One should remember that producers are dealing with natural products, which can be full of surprises.

Often, plantations can replace wild-harvested areas, offering conservation or economic benefits. This article presents insights into two new plantations coming on stream in 2015. Both have been in the pipeline for some time, up to 20 years, and yet continue to cause confusion and surprises in an expectant market.

Australian Sandalwood

This is one ingredient that is close to the heart of this author, who recently spent five years in Australia. When the author started in the industry in 1998, Western Australian (WA) sandalwood (*Santalum spicatum*) was new to the market; just a couple of years later, there were stories and rumors about future plantations. It was then revealed that these plantations were not WA sandalwood but the more commonly known Indian sandalwood (*Santalum album*). Confusion set in, and for years different stories from different companies emerged until the fog slowly dispersed. Even now, with supplies of both *S. album* and *S. spicatum* seemingly short, many remain confused as to when the market will see the benefits of these 15-plus-year investments.

WA is a vast state that is almost four times the size of Texas and five times the size of France. It has extremely diverse climates, ranging from a tropical high-rainfall region in the north, desert and dry areas in the middle, and more temperate climates in the south. This allows for the growing of *S. album*, an introduced species, in the north, and *S. spicatum*, a native species, in the east, central and southern areas of the state.

There is absolutely no doubting the commitment within WA toward the sandalwood industry, with total investment approaching, if not passing, $1 billion. This investment will see WA as the global hub for the two major traded species of sandalwood for some time to come.

WA Sandalwood: Wild Harvest and Plantations

The current supply of WA sandalwood comes from a wild harvest that has been state-managed since 1929 and is currently around 2,000 tonnes of wood per annum. This is made up of approximately 65% greenwood (live trees) and 35% deadwood (trees that have died naturally).

It is the greenwood trees that are used in oil production and, in particular, the roots, butts and larger logs which give the highest oil yield and quality. On average, across these three grades of wood, the oil yield would be between 2.3% and 2.6%. However, one of the major advantages of WA sandalwood is the ability to steam distil the oil without the need to remove the sapwood, which in a country like Australia with high labor costs would be a very expensive exercise.

A 10-year-old plantation of WA sandalwood, Santalum spicatum*; courtesy of WA Sandalwood Plantations.*

Since 1996, the WA government has only supplied one local oil-producing company, which has effectively created a monopoly. This is scheduled to change in mid-2016, when the supply agreement runs out. The review for the following 10 years has been announced, and the government agency controlling the harvesting has strongly indicated that it will continue to harvest at close to current levels until 2026. On the face of it, this is good news—it is hoped that this opening up of wood availability will allow more companies to produce and sell WA sandalwood oil, a benefit to the whole market.

Currently, this exclusive supply arrangement has allowed the production of approximately 13,000 kg of oil annually, plus additional oil that may have been extracted from other local privately owned wood. In total, approximately 15,000 kg of WA sandalwood oil was produced in WA during 2014.

Currently, there are more than 20,000 hectares (approximately 10 million trees) of *S. spicatum* growing in WA. They range in age from one to 13 years, and should start to produce strong supplies of wood for oil from 2018. These plantations are on the poorer soil areas of the region's Wheatbelt, which is located three hours east of Perth. This is the trees' traditional, natural growing region, so no fertilization is required, just weed-killing for the first few years, after which natural sheep management can be used. This management practice should see some of these plantations gaining organic accreditation in the coming years. It is expected that some oil production from these plantations will start in mid-2015, slowly gaining momentum as the months pass.

Future production from the WA sandalwood plantation industry is expected to peak at about 30,000–40,000 kg in mid-2025 when it is likely there will be three or four key producers. It is important to note that WA sandalwood is preferred by the traditional incense markets in China, Taiwan and Hong Kong, which require unprocessed wood, thus reducing the amount of wood available for oil extraction.

The ownership of these plantations ranges from a primary grower comprising 12,000 Australian Forestry Standard-certified (AFS) hectares down to hundreds of smaller growers with wood lots of 10–50 hectares. The WA government is also an owner and share farmer, with more than 3,000 hectares. Establishment of new plantations is expected to continue at between 800 and 1,200 hectares per annum.

The introduction of plantation oil should see a stabilization of pricing, if not some reduction in price, as the production volume grows over the coming years. However, in reality there is unlikely to be too much volume until 2018, hence the reason why the WA government wishes to keep the wild harvest going for at least a further 10–12 years.

There is a general view in WA that the wild harvest volume of wood taken annually is likely to be reduced over the coming 12 years as the WA sandalwood plantations come on line and begin to replace the wild harvest wood in most applications, including the production of oil.

In summary, it certainly looks as if there will be an ongoing supply of WA sandalwood oil for the long-term, and therefore using it in fine fragrances and other applications can be done with confidence. While the price of WA sandalwood oil continues to creep up, the broadening of future wood availability and new production of plantation wood and oil should bring about stability and even a slight cost reduction as competitive pricing tension emerges in the marketplace.

A seven-year-old plantation of S. spicatum *set in long straight rows to attract local wildlife and simplify harvesting; courtesy of WA Sandalwood Plantations.*

Indian Sandalwood Plantations

The planting of Indian sandalwood trees in Australia started in a small way around the end of the 1990s, growing steadily since 2000. Today, there are more than 12,000 hectares (approximately 5.7 million trees), ranging in age from one to 15 years.

The spread of plantations has moved out from the "food bowl" of northern WA and into the Northern Territory and Queensland regions of Australia where land is more readily available and at lower cost. These new areas allow for continued planting in future years, and are expected to expand at a rate of about 1,000 hectares per year.

The Indian sandalwood plantations are in areas that are not typical of the traditional growing areas in India, but rather in tropical environments, which speeds up growth. While the benefit is that the trees grow quickly, the down side is the requirement for increased weed management to keep the trees alive.

The first significant harvest to produce Indian sandalwood oil on a commercial scale was undertaken in 2014. The good news is that the quality and odor profile of the oil is quite good and very acceptable to the fragrance industry. While the volume produced in 2014 was small, believed to be less than 1 tonne, future years will see significant growth, with many forecasting annual oil production in excess of 150,000 kg if 50% of the heartwood is converted to oil. This is estimated to be four-times greater than current total production of Indian sandalwood oil in India itself. This is likely to change the dynamics of the Indian sandalwood market for a long time.

There are primarily two Indian sandalwood producers, who have similar amounts of trees in the ground to ensure an even supply of oil through 2022. This should bring stability of supply to Indian sandalwood oil that has not been seen for many years. However, the anticipation of lower prices from the first producer has not yet occurred, with early supply being priced significantly higher than the market price, which for the fragrance industry appears to be too high. No doubt when the second producer enters the market this year the industry should start to see some competitive tension in the market. It would be enjoyable to see Indian sandalwood oil at an affordable price for use in perfumes, just like it used to be.

Strong heartwood shown in 12-year-old S. spicatum *plantations; courtesy of WA Sandalwood Plantations.*

Certainly the long-term supply of Indian sandalwood oil from WA appears assured and secure. The benefit of two key suppliers will assist in giving choice and reliability of supply to the market and hopefully introduce some price tension to enable the use of the oil in new fine fragrances.

There is no doubt that Australia will be the number-one source of sandalwood oil for the perfumery industry in the foreseeable long term. How the Indian and WA sandalwood oils find their place alongside each other may be the next big question.

Indonesian Nutmeg

The nutmeg tree, *Myristica fragrans*, is indigenous to the Maluku Islands in Indonesia. For those unfamiliar, the fruit contains a nut, which is covered by a hard shell. A red-colored webbing (known as mace) covers the shell. Once ripe, the fruit will open, revealing the mace, which will fall to the ground to be collected, or it can be picked just before falling. The mace will then be carefully removed, leaving the nutmeg (nut) available to be ground and processed. The mace is also further processed as oil or sold as a ground spice after being grated.

Fresh nutmeg fruit containing nut covered with mace; photo: P.T. Van Aroma.

The oil market is secondary to the spice market, which dominates the global demand for nutmeg. At times over recent years, spikes in demand from the spice industry have had damaging effects on the oil markets, often creating shortages as less product reached processors.

The spices in their ground form are mainly used in the food processing industry, in particular for meat seasoning. Nutmeg is also often used in many sweet and savory dishes, especially in India and in many other culinary cuisines in Thailand, Japan and its native Indonesia. The oil is commonly used in beverage flavors and in many perfumery applications, as well as being found in pharmaceutical products. Its sensory qualities add spice, warmth and sweetness to any flavor or fragrance. Nutmeg also has known benefits for fighting illnesses related to sore throats and digestive issues for pharmaceutical/healthcare applications.

The multimillion-dollar nutmeg market comprises as much as 10,000 tons of ground nutmeg, which are traded in the spice market each year, with Indonesia accounting for approximately 75% of the world production. Indonesia annually exports 350–400 tonnes of nutmeg oil, which accounts for approximately 80% of global production. Until recently there had been a reasonable supply and demand balance, and at times a seasonal under-supply, ensuring prices remained firm. However, this has changed recently due to the impact of plantation material.

Nuts with mace removed for drying before being ground and distilled for oil; courtesy of P.T. Van Aroma.

Plantations began in Indonesia after a run of poor crops from the Aceh region about seven years ago. Old trees had been attacked by worms, resulting in short-term crop losses. As a result, prices began to rise on the back of limited supply, finally peaking in late 2013 and early 2014. Many saw the opportunity to start new plantations on other islands, in part because nutmeg trees require only a limited investment.

Plantations are relatively easy to develop. Some even refer to nutmeg as a "lazy man's crop." While plantations cannot tolerate dry or waterlogged conditions, the survival rate for plantations is very good. They thrive in warm tropical conditions with good rainfall, but allowing for good drainage can commonly be seen on hillsides (such as patchouli), up to 1,300 meters above sea level. Currently, it is estimated that there are around 2,000 hectares of nutmeg plantations in Indonesia (predominantly in Java, Sulawesi and Sumatra, including Aceh).

Farmers who established new plantations following the difficulties in Ache knew that maturity would occur after five to eight years. Just as envisaged, as these plantations neared maturity, prices began to peak. Good forward-thinking one may say.

However, the good forward thinking has hit a problem. Global demand is not growing. In fact, for most spices demand is flat, especially in Europe and North America where economic growth has been poor in recent years. This could be a result of higher market prices for the last several years, as without the needed assurances of price and supply stability, many formulators and end users can be reluctant to use spices in any new product development.

Wild and plantation growing areas in Indonesia for nutmeg; courtesy of P.T. Van Aroma.

So, with plantation material coming online, 2014 saw the impact of what happens when there is a flat market and an unregulated influx of supply of fresh raw materials. Prices soon started to weaken and, during the last quarter of 2014, nutmeg oil lost about 40% of its value. The next logical questions are "how far can it fall" and "where is the bottom?" The most likely answer would be that prices could continue to fall until one variable changes. Can demand grow again with lower prices? At these lower price levels is it still a profitable business for farmers? Will investments in new plantations continue with lower market price expectations? The dynamics are seemingly complicated and could go either way.

The impact of a large amount of oil hitting the market can be very damaging. There is a good price saving for end users in the short term, but overall it is destabilizing for the markets. If the new lower price levels are not sustainable, it will pose more instability should the prices bounce back at some point in the future. Today, we have an oversupply situation. Perhaps this could remain for the next 12 months, but will it continue? Probably not.

Other variables could affect market conditions, such as yield loss from older trees. As yields diminish over time and with younger trees having lower yields, could the industry see supply quickly brought back to more balanced levels? At a certain price level it will also become undesirable to harvest and process nutmeg, so fewer collections could occur. One must remember that if the fruits are not harvested, stored and/or processed in the correct time frame they quickly become unusable.


Ripe nutmeg fruits ready for harvesting; courtesy of P.T. Van Aroma.

It is unlikely that at current reduced market price levels there will be additional investment in new plantations. If there are no replanting schedules, then supply patterns may remain a cyclical process, meaning that, despite today's influx of material, nutmeg is not sustainable and supply, and therefore prices, will continue to fluctuate widely over time.

It is also worth noting that with plantation material one can often get variations in quality. The industry has seen what happens to patchouli quality when grown in different parts of Indonesia, and the same may be true of nutmeg. Sulawesi is now a producing island, contributing about 20% of total oil production, but the qualities are notably different. Whether Sulawesi supply is sustainable when prices are at the same levels as the preferred Sumatra/Java qualities may become another variable, as buyers are likely to buy the better quality first.

During these times it is advisable to engage in a good dialogue with suppliers, ensure that quality standards do not drift (without good cause) and to work with supply partners. No one likes a volatile market, and with any successful supply chain process there has to be something in it for everyone.

Summary

Much can be drawn from these stories of new sandalwood and nutmeg plantations. Both will have an impact on creating additional supplies for the market, but the way in which these are sustained, controlled and managed are very different.

For buyers in the market it can be difficult to see what demands are just around the corner, so it is always a challenge to envisage what market demand may be in five, 10 or 20 years' time. Investments in plantations can be highly successful. They can provide a strong basis to develop sustainable products for the future, but if poorly managed and unregulated they can cause more problems than the benefits for which they were initially intended.

Man-made influences are yet another set of variables that can affect the ingredient marketplace. Future articles will review additional factors impacting the supply of tropical products and explain why buying natural isn't always such a straightforward process.

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