



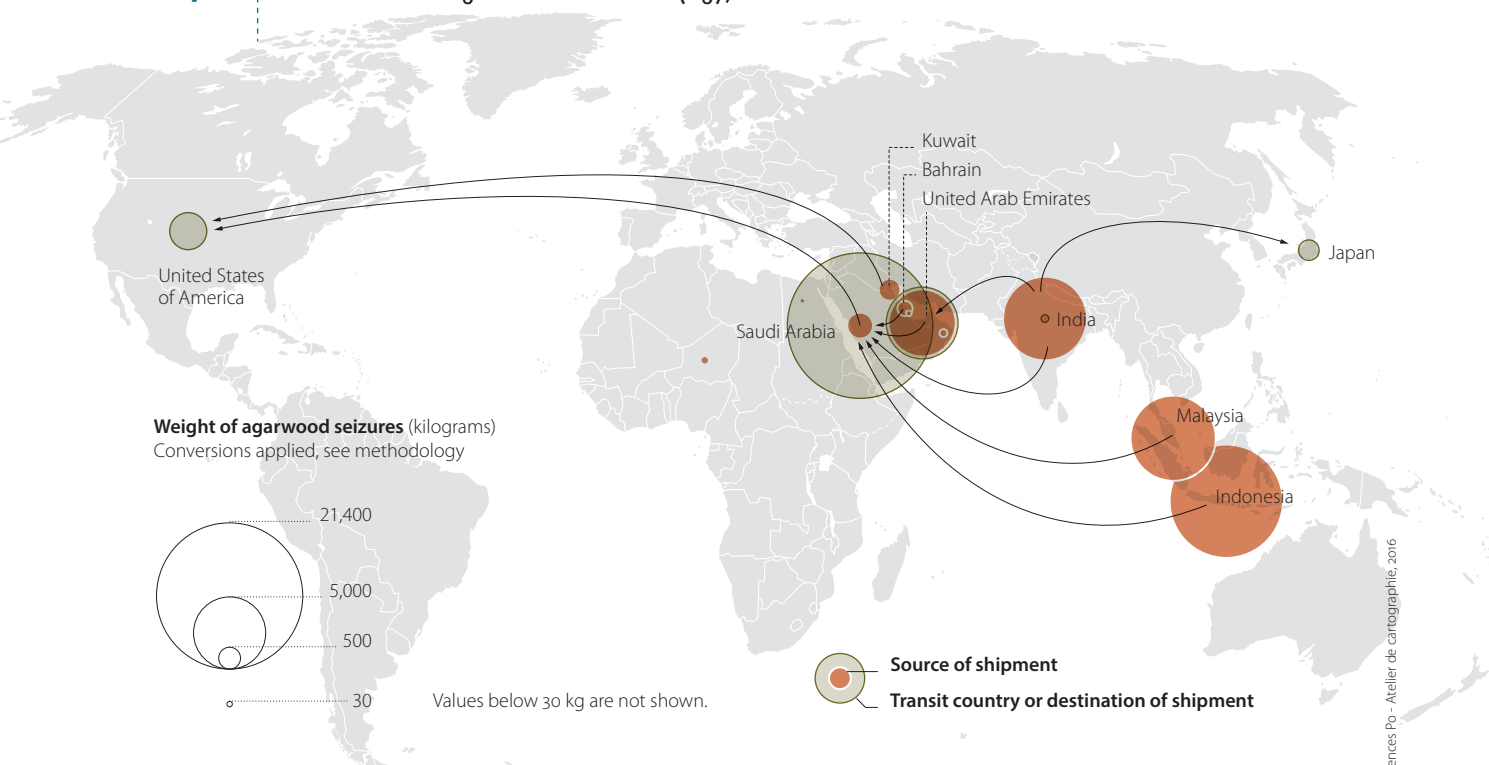
COSMETICS AND PERFUME

Case study: OUD

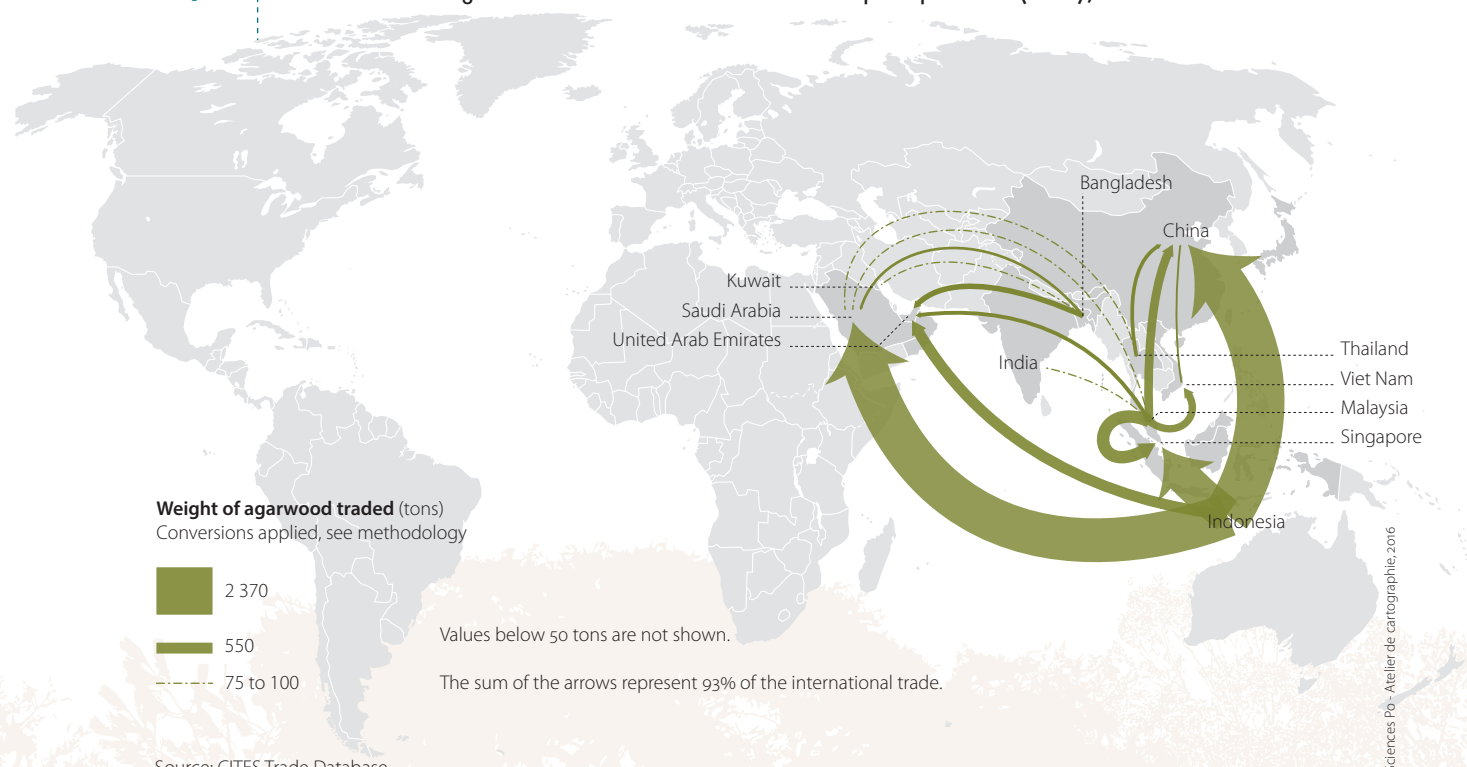
WILDLIFE IN COSMETICS AND PERFUMES

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Map 1 Main flows of agarwood seizures (kg), 2007-2014



Map 2 Main flows of agarwood trade based on CITES export permits (tons), 2005-2013



Note: The boundaries shown on this maps do not imply official endorsement or acceptance by the United Nations. Dashed lines represent undetermined boundaries. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas). The final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined.



Wild plants and animals have long formed the basis of cosmetics and perfumes. Exotic animal products like musk and ambergris have largely been replaced with synthetic alternatives, but demand for wild-sourced plant inputs for the cosmetics and perfume industries remains strong. For many of these plants, cultivation is an alternative, but illegal wild sourcing remains a risk where this is not cost-effective.

The global trade in essential oils, perfumes, cosmetics, and toiletries was worth just under US\$112 billion in 2014.¹ That year, Europe alone imported 89,000 metric tons of essential oils, 40,000 metric tons of plant extracts, and 194,000 metric tons of raw plant material for the cosmetics trade, worth around 2.5 billion euros.² It is estimated that over 70% of the European trade volume in medicinal and aromatic plants comes from wild collection.³

Wild plant populations are generally less well documented than animal populations, complicating the determination of sustainable offtake of plants. Increases in demand can lead to rapid overharvesting and when the species in question is slow to recover, as is the case with many tree species, the impact can be severe. The overharvesting of *Aquilaria* species in South and Southeast Asia, due to the exploitation

of a product sometimes referred to as “oud”, provides a prime example.

Oud

Oud, also known as agarwood, jinkoh, or gaharu, does not refer to a particular species of tree. Rather, it is the name given to a highly aromatic, resin impregnated wood found in a number of species of the *Thymelaeaceae* family. The complex fragrance of this unusual resin has been used in perfumery and incense across a wide range of cultures for millennia. It has also been ascribed medicinal and cosmetic benefits, used in both Chinese⁴ and Ayurvedic therapies. Its role is prominent in religious observance, especially in Muslim, Hindu, and Buddhist traditions.⁵

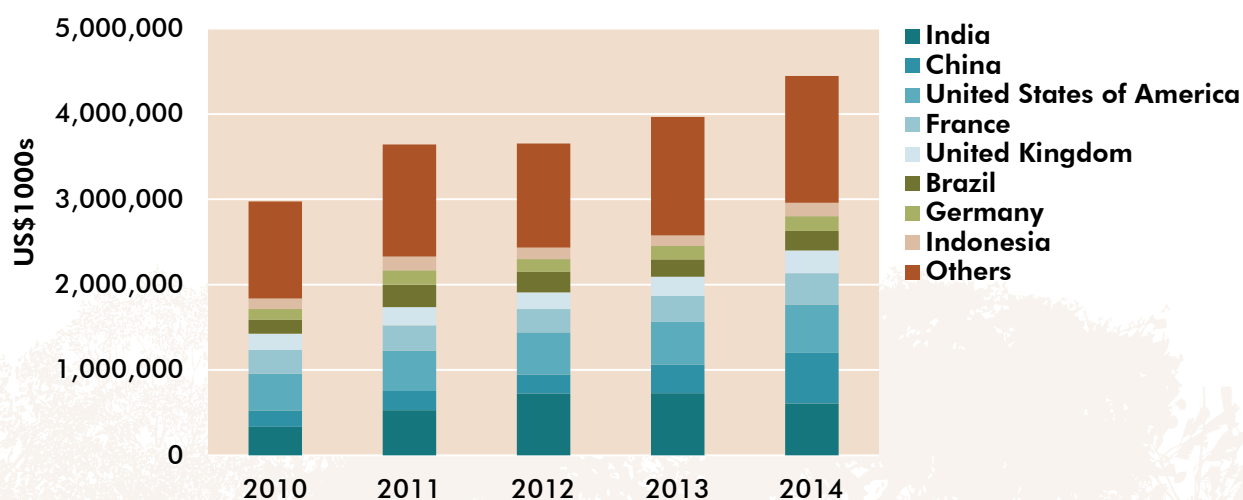
Oud is produced in trees of six genera, primarily the *Aquilaria* genera, and, to a lesser extent, *Gyrinops* and *Gonystylus* (ramin) species. The primary agarwood producing species indicated in trade, *Aquilaria malaccensis*, was placed on CITES Appendix II in 1995, while the other species were listed a decade later. The primary threat to these species is illegal harvesting for the agarwood trade, because a single kilogram of high quality oud chips can be worth hundreds of thousands of dollars.⁶ It is likely the single most value-intensive wildlife commodity.

Only a very small share of *Aquilaria* trees actually manifest oud and the resin impregnated wood cannot always be detected externally, leading to many trees being felled fruitlessly. The resinous wood is produced as a defensive reaction when the tree is damaged but its incidence is rare and difficult to predict. In the past, source trees were used sustainably by local communities, but commercial pressure has led to widespread illegal logging.

Similar to wine, the value of agarwood is subjectively determined and prices can vary greatly between ostensibly similar products. Agarwood connoisseurs can differentiate between the scent profiles of oud wild-sourced in particular regions, and the quality of extracts is greatly dependent on the skill of the manufacturer. As particular regional stocks are harvested to extinction, there is evidence that speculative buying is taking place.⁷ The growing demand for this highly valuable wood has led to both a looting of the wild material (as evinced in the seizure data), and the launch of many large-scale cultivation operations across the region (as documented below).

Rival buyers are engaged in a race to acquire the few remaining wild stocks. Local communities in the traditional source areas are generally aware of the

Fig. 1 Value of global exports of “essential oils, resinoids, and terpenic by-products” by country of export (US\$1000s), 2010–2014



Source: International Trade Centre Trade Map, using COMTRADE data

value of agarwood and scout for these buyers. As a result of this intensive prospecting, protected areas contain some of the few remaining specimens in the wild.⁸

While *Aquilaria* species grow well in plantations, production of high quality oud from cultivated stock has been elusive. *Aquilaria* species require up to a decade to reach maturity and current harvesting techniques, both wild and in cultivation, involve destroying the entire tree. The process of inducing oud production has not been well understood until recently and the industry has been fraught with secrecy and misinformation. For example, in the past, it was thought infection with a specific fungus (such as *Cytosphaera mangiferae*) was necessary for resin production but this does not appear to be the case.⁹

As a result, present capacity to produce cultivated oud is unclear, and claims of high-volume production should be scrutinized. There remains a risk that wild sourced agarwood may be laundered through firms involved in cultivation, particularly those that are vertically integrated with firms producing items for sale. The value of the wood is so great that the possible extinction of some *Aquilaria* species in the wild as a result of high demand remains a matter of serious concern.¹⁰

Based on CITES trade data, there are three principal ways that pure oud is traded internationally:

- Resinous timber and wood chips
- Distilled oil for perfume
- Exhausted powder for incense

Raw agarwood, usually in the form of chips, can be an end use product. The highest quality wood is burned as whole chips for its fragrance, while somewhat lesser quality wood is reserved for oil extraction. Lower grades of wood may also be carved into objects, like sculptures and beads, that retain their aromatic qualities for years, although it appears that most beads in circulation are actually lesser woods soaked in oud oil.¹¹

Oil extraction techniques are considered proprietary and often closely guarded. Good technique is said to drastically increase both quality and yield with most production today.¹²

Once the oil has been extracted, the remaining wood still retains some aromatic qualities, and is generally reduced to powder for use in incense or *bakhoor*, bricks burned in censers in some Arabic countries. It can also be pressed into small statues, often of religious significance. For statistical purposes, these three product categories are combined into raw agarwood equivalents in the analysis below, based on conversion rates.¹³

Source of agarwood

Although all the known agarwood producing trees are found in broader South and Southeast Asia, there have been no recent, global population assessments for these species. Even the number of species within the six genera has not been scientifically resolved. Trade data suggest that most agarwood exports involve *Aquilaria* species, but *Aquilaria* are seen across a very wide area, and not all species produce oud. For example, according to IUCN, *Aquilaria malaccensis* grows wild in a number of countries in the region, including Bangladesh, Bhutan, India, Indonesia, the Islamic Republic of Iran, Malaysia, Myanmar, the Philippines, Singapore, and Thailand.¹⁴

Legal trade

The value of agarwood, and its scarcity in the wild, has been recognized since the early 20th Century, so cultivation occurs in a number of range states. Based on CITES trade data, however, between 2005 and 2013, only 30% of agarwood exports by volume were from cultivated sources (Table 1). While several countries reported cultivated exports (including Bangladesh, Indonesia, Lao Peoples Democratic Republic, Myanmar and

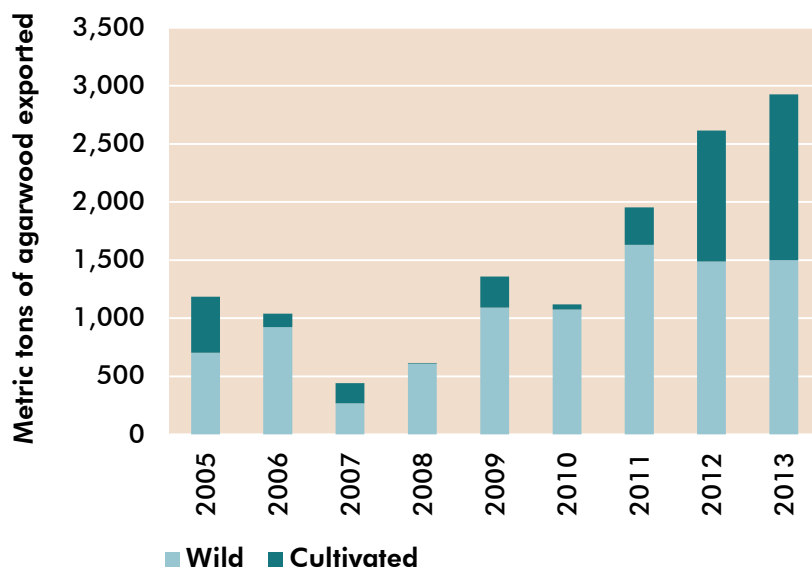
Table 1 Known agarwood populations in selected countries

COUNTRY	KNOWN POPULATION	EXPORTS
Bangladesh	6,000 ha on government plantations	About 124 tons of chips from private growers in 2014
Bhutan	About 23,000 trees cultivated ¹⁵	None
China	About 130,000 trees in the wild	Negligible in 2012-2015 ¹⁶
India	About 10 million trees in plantation	None, just re-exports
Indonesia	3.5 million in plantation	700 tons in 2013, about 80% low quality
Malaysia	Just under 1 million trees in plantations	200 tons quota
Myanmar	34,475 trees in home gardens; 680 ha in plantations	None
Thailand	Unknown	8 tons of oil, 15 tons of chips in 2013
Viet Nam	18,000 ha in plantations; 1 million trees in home gardens	300 tons of wood exported 2009-2014

Source: ITTO¹⁷

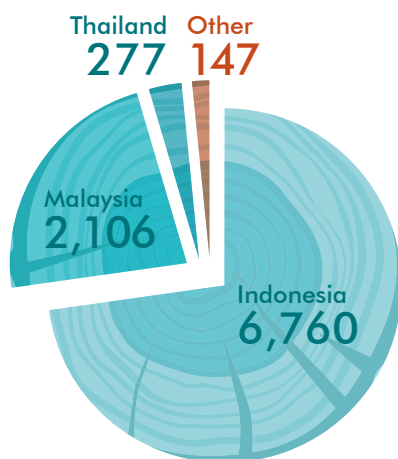


Fig. 2 CITES-listed agarwood legally exported by wild or cultivated source (metric tons), 2005-2013



Source: CITES Trade Database

Fig. 3 Share of wild-sourced agarwood exports by country of export (metric tons), aggregated 2005-2014¹⁸



Source: CITES Trade Database

Viet Nam), more than three-quarters of the cultivated exports during that period were reported by Thailand.

Legal wild-sourced exports more than doubled between 2005 and 2013. The volume in 2013 was 591 tons of chips, about 218 liters of oil, and 875 tons of powder were declared exported from the wild.

The primary legal exporters of wild-sourced agarwood today are Indonesia

and Malaysia. Between 2005 and 2013, Indonesia reported exporting almost 7,000 tons of wild sourced agarwood. If each *Aquilaria* tree yields a half a kilogram of agarwood,¹⁹ for example, this could be the equivalent of approximately three million trees.

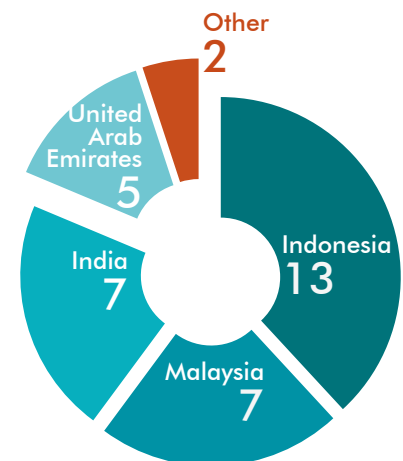
The value of this trade is highly uncertain, as high quality products can cost hundreds of times as much as their low quality equivalents.

Illegal trade

The volume of illegal agarwood seized amounts to approximately a half percent of the volumes in legal trade. It is likely, however, that a very small share of the illegal trade is detected, since the product can assume many forms, and awareness of this among enforcement officers is often very low. High quality agarwood is so valuable that it can be couriered by passengers on commercial air flights, a technique with a low chance of detection. Given questions about the ability of plantations to produce high quality agarwood, it also appears likely that some wood exported as cultivated was, in fact, wild sourced.²⁰

Still, even the volumes seized are significant in terms of both value and environmental impact. The two

Fig. 4 Share of total agarwood seizures by country identified as source (metric tons), aggregated 2005-2014²¹



Source: World WISE

countries listed as primary sources of detected illegal shipments are the same two countries reporting the greatest volumes of wild-sourced legal exports: Indonesia and Malaysia. In addition India, which is within the range but which may also be serving as a conduit for shipments from Bangladesh, features prominently in illegal detections. In the Arabian Peninsula, the United Arab Emirates has been detected as a re-exporter.

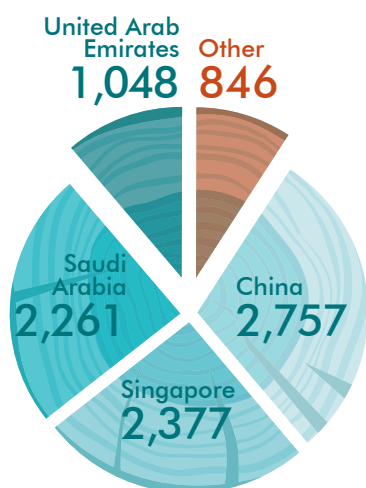
Destination markets

Based on CITES trade data and seizure data, at least four distinct destination markets can be identified for agarwood:

- the Arabic market for oud oil, high quality chips, and lesser quality products for *bakhoor*;
- the Asian market for exhausted powder, used for making joss sticks;
- the Asian market for small solid wood products, such as prayer beads and small sculptures;
- The Asian market for medicinal agarwood products.

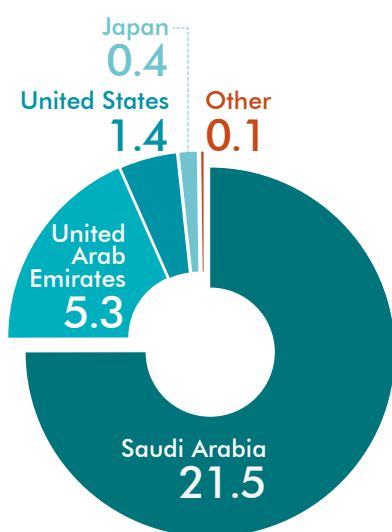
The primary importers of legally traded wild-sourced agarwood today are China, Singapore, Saudi Arabia,

Fig. 5 Share of CITES-listed wild-sourced agarwood legally imported by country of import (metric tons), aggregated 2005-2014²²



Source: CITES Trade Database

Fig. 6 Share of agarwood seizures by country identified as destination (metric tons), aggregated 2007-2014²³



Source: World WISE

and the United Arab Emirates. Most of China's imports appear to be exhausted powder moving from Indonesia to Taiwan Province of China, used in incense manufacture. Only a relatively small amount (about two tons per year on average) is imported directly to mainland China. Singapore appears to be both a consumer and

a re-exporter of agarwood products. The Arabic market is also clearly indicated in the legal import data.

With regard to seizures, the most prominent destination is clearly the Arab peninsula, with over 90% of the seizures by weight indicating Saudi Arabia or the United Arab Emirates, when the destination was known.

Analysis

Interviews with traders in the field suggest a perilous situation for the *Aquilaria* species. Attempts to cultivate agarwood have produced very mixed results, and connoisseurs will pay outrageous amounts for the most sought-after wild strains. This has produced a kind of gold rush in the woodlands of Southeast Asia, where prospectors scour the wild in the hope of a lucky find, and specialised distillers feel obligated to buy what they can, rather than allowing the last of this precious commodity to fall into less skilled hands. These suppliers are competing for a limited number of volume buyers, who may be willingly blind to the source of their stock. Laundering of wild-gathered product through plantations appears to be occurring.²⁴

World WISE contains data on seizures of about 35 metric tons of agarwood between 2005 and 2014, which could be the result of the illegal harvest of up to 70,000 trees. Agarwood chips made up the largest share of these seizures by estimated value, although large volumes of powder and some oil were detected. There are several reasons to regard this as a serious underestimate of the scale of the illegal trade, as clearly not every illicit shipment was seized. World WISE contains only 230 agarwood seizure records, so most of the value comes from a small number of large interdictions. As a result, the seizure record is extremely volatile. Given that wood worth thousands of dollars can be carried in a pocket, it is highly likely that "ant" trafficking takes place across borders of Southeast Asia. Some of the key countries in the contraband

flow, based on seizures made in other countries, have never reported an agarwood seizure. It is also possible that a share of the legal exports were illegally sourced – at present, the legal trade (about 10,000 metric tons 2005-2014) is over 300 times the size of the detected illegal trade (about 30 metric tons in the same period).

Furthermore, it is likely that agarwood, like other forms of timber, is under-detected because of the difficulties in distinguishing between wood species. To those unfamiliar with it, the chips appear as rather unremarkable, although fragrant, bits of wood. As an oil, it can be bottled like other perfumes or cosmetics. As a powder, it is essentially saw dust. The high quality wood and oil are value-intensive, and personal couriership on commercial air flights appears to be an issue. Finally, the current exceptions to CITES requirements could allow resinous powder to be exported as exhausted powder, and other products to be packaged for retail sale before export, so evading import regulations.

Endnotes

- 1 According to Trade Map statistics: http://www.trademap.org/Country_SelProduct_TS.aspx Netherlands,
- 2 Netherlands, Ministry of Foreign Affairs, Natural Ingredients for Cosmetics in Europe (The Hague, 2015). <https://www.cbi.eu/sites/default/files/trade-statistics-europe-nic-natural-ingredients-cosmetics-2015.pdf>
- 3 Belgium, Belgian Development Agency, "Wild-Collected Botanicals and the EU Market" (Brussels, 2015), p. 27.
- 4 As "Chen Xiang"
- 5 Angela Barden and others, "Heart of the Matter: Agarwood Use and Trade and Cites Implementation for *Aquilaria Malaccensis*" (2000), retrieved on 21 September 2015 from <https://portals.iucn.org/library/efiles/documents/Traf-072.pdf>. Retrieved 21 September, 2015.
- 6 ITTO, "Report of the Asian Regional Workshop on the Management of Wild and Planted Agarwood Taxa", (Guwahati, Assam, India, January 2015).



- 7 Interviews with agarwood traders contacted in connection with this report, May-October 2015. See online methodological annex for details.
- 8 According to agarwood traders interviewed for this report: see online methodological annex for details.
- 9 Robert Blanchette and Henry Heuveling van Beek. 2005. *Cultivated Agarwood*. US Patent 6,848,211; Robert Blanchette, Joel Jurgens and Henry Heuveling van Beek, "Growing Aquilaria and Production of Agarwood in Hill Agro-ecosystems", in *Integrated Land Use Management in the Eastern Himalayas*, K. Eckman and L. Ralte, eds., (New Delhi, Akansha Publishing House, 2015), pp. 66-82.
- 10 For example, *Aquilaria malaccensis* is deemed critically endangered in India and its export is prohibited.
<http://www.iucnredlist.org/details/32056/0>
- 11 Based on interviews with agarwood traders conducted for this report: see online methodological annex for details.
- 12 Most extraction today involves one of three broad methods:
 - hydro-distillation;
 - pressured steam distillation; and
 - super critical CO₂ extraction.

Hydro-distillation is perhaps the oldest and most labor intensive of the three and involves soaking the wood, boiling it in water and removing the oil from the water surface. Yields can be as little as 0.1%. Pressurized steam is faster but risks scorching the wood and may include wood extractives which corrupt the primary products demanded by the market. The two techniques may be used by the same producer to bring out different qualities of the wood. The use of carbon dioxide as a solvent is less common but has the potential to produce greater yields. Again, however, the process often extracts waxes and other tree derivatives which can adulterate the final product. Many other techniques are currently being reviewed in the quest for higher yields and quality. These include solid liquid extraction, microwave assisted extraction, spinning band distillation, ultrasonic assisted steam distillation and ultrasonic assisted hydro-distillation.
- 13 Although the resin content of agarwood varies, as does extraction efficiency, in the figures below oud oil is converted at the ratio of 143 kg of agarwood to one liter of oil. "Powder" can connote either exhausted powder or resinous powder; because of this ambiguity, these figures are not converted. All shipments of agarwood chips and timber remain as reported. See online methodological annex discussion of conversion rates for details.
- 14 See IUCN Red List entry for *Aquilaria malaccensis*: <http://www.iucnredlist.org/details/32056/0>
- 15 2,341 trees in the wild, 2,487 trees in plantations, 827 in research, 15,000 in nurseries and 2,443 in home gardens.
- 16 Based on CITES Trade Data.
- 17 ITTO 2015, op cit. The countries listed were the countries providing data at this meeting.
- 18 Oil exports converted to agarwood equivalents at a ratio of 1:143.6. Powder exports are assumed to be resin-infused and so are deemed equivalent to chip or timber exports. See the official conversion figures used by the UAE as cited in Marina Antonopoulou, and others, "The Trade and Use of Agarwood (Oudh) in the United Arab Emirates," (Cambridge, TRAFFIC, 2010)
- 19 Based on interviews with agarwood traders conducted for this report: see online methodological annex for details.
- 20 UNODC field research, for more details see online methodological annex.
- 21 Antonopoulou, and others, 2010, op cit.
- 22 Ibid.
- 23 Ibid.
- 24 Based on interviews with agarwood traders conducted for this report: see online methodological annex for details.