WOOD FOR THE TREES : A REVIEW OF THE AGARWOOD (*GAHARU*) TRADE IN MALAYSIA

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Cover: Specialised agarwood retail shops have proliferated in downtown Kuala Lumpur for the Middle East tourist market

Photograph credit: James Compton/TRAFFIC
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Wood for the trees : A review of the agarwood (*gaharu*) trade in Malaysia

Lim Teck Wyn

Noorainie Awang Anak

A report commissioned by the CITES Secretariat

James Compton/TRAFFIC

Agarwood oil is often sold pure, or blended with other fragrances, known as attars

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LIST OF ABBREVIATIONS & GLOSSARY

ad valorem	value based
bdellium	A tree, especially of the genus *Commiphora*, yielding a fragrant gum resin
Bendahara	vice regent of a Malay Sultan
BNBCC	British North Borneo Chartered Company
Cap.	chapter
CHP	chips
c.i.f	cost insurance and freight
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
Com.	Communication
CoP	Conference of Parties
d.b.h.	diameter at breast height (diameter at 1.3 m above ground)
DWNP	Department of Wildlife and National Parks
DER	derivatives
Doc	document
Dyaks (Dayak)	indigenous tribes of Borneo
e.g.	*exempli gratia* (for example)
EDP	Eau de Parfum (perfume water)
EDT	Eau de Toilette (toilet water)
En.	enactment
et al.	*et alia* (and others)
f.o.b	Freight on Board
FRIM	Forest Research Institute Malaysia
g.b.h.	girth at breast height (girth at 1.3 m above ground)
gaharu	agarwood
gaharu merupa	agarwood pieces with unusual shapes, used as charms
ha	hectare
HS	Harmonized Commodity Description and Coding System
Hulu	up river
IDEAL	IDEAL Time Sdn Bhd
in litt.	*in litterarum* (via correspondence)
Inf	information
INCI	International Nomenclature for Cosmetic Ingredients
IUCN	International Union for Conservation of Nature
JNPC	Johor National Parks Corporation
kg	kilogramme
kris	small curvy dagger
l	litre
lignum resinatum	resinous wood
LIV	live
m^3	cubic metres
MTC	Malaysian Timber Council
Merdeka	independence

minyak kayu gaharu	agarwood oil
MTIB	Malaysian Timber Industries Board
mukholat	*gaharu* oil mixed with other essential oils
MYR	Malaysian Ringgit
NFI	National Forest Inventory
No.	number
oleum	oil
Ops	*operasi* (operation)
Orang Asal	indigenous people (Malaysia)
Orang Asli	indigenous people (Peninsular Malaysia)
Oudh	agarwood
PC	Plants Committee
pengiran	local chieftain in Borneo
pers. comm.	personal communication
picul or *pikul*	a unit of weight equal to about 60 kg
Pt	part
s	section
Sch	schedule
SEABCIN	South East Asia Botanical Collection Information Network
SITC	Standard International Trade Classification
t	tonne
Taman Negara	National Park
tasbih	rosary beads used by Muslims
Tola	11.7 g
towkay	middleman
TRAFFIC	The wildlife trade monitoring network of WWF and IUCN
UK	United Kingdom
ultra vires	beyond the powers of
UAE	United Arab Emirates
USD	United States Dollars
VU	Vulnerable
WG	Working Group
WWF	World Wide Fund for Nature

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EXECUTIVE SUMMARY

Agarwood, also known as *gaharu*, is an important non-timber forest product. As incense, perfume and medicine, it has been used for hundreds of years by many cultures throughout the world. Today, the international trade in *gaharu* involves at least 18 countries and involves hundreds of tonnes worth millions of US dollars annually. Indeed, due to the growth in the population and affluence of *gaharu*-consuming markets (including Taiwan [Province of China], Saudi Arabia, Japan, and the United Arab Emirates), the demand for *gaharu* has risen considerably over the past 30 years. However, the increase in demand appears to have led to diminishing supplies, leading to rising prices and concerns over the future supplies of the commodity. Furthermore, there are fears that the *gaharu* trade may drive some *gaharu*-producing species to extinction.

In 1995, in order to ensure the sustainability of the *gaharu* trade, the main *gaharu* producer and consumer countries agreed to put in place controls to limit the volume of trade in the main *gaharu* species. This was done through the listing of a single species, *Aquilaria malaccensis* in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). In 2004, all remaining species of the Genus Aquilaria, as well as the related Genus Gyrinops, were listed in CITES Appendix II at the 14th Conference of the Parties to CITES. However, to date there has only been partial implementation of CITES controls due to the numerous complexities of the nature of the *gaharu* trade. These complexities are illustrated by the *gaharu* trade in Malaysia, an important *gaharu*-producing nation.

The Malaysian example highlights the fact that there remain numerous challenges to effecting controls on the *gaharu* trade on the supply side of the industry. Challenges arise due to the fact that *gaharu* is not a uniform commodity: the substance has a highly variable chemical composition and is produced by a wide variety of tree taxa. In the absence of standard grading rules or species identification procedures, effective regulation is often frustrated. Furthermore, small quantities of top grade *gaharu* are easy to conceal and thus difficult to regulate in trade despite their high value. Due to the complexity of the nature of the species, the coordination among the various agencies involved in regulating the *gaharu* industry is particularly challenging. The challenges include coordination among the various agencies involved in regulating the various aspects of the *gaharu* industry. These agencies span several ministries (at both Federal and State levels) in Malaysia. A degree of coordination is provided by inter-agency committees; however these committees do not always include all the relevant agencies, or individuals with specific expertise on gaharu.

In the Malaysia, these many challenges were combined with the fact that there was a significant slump in the *gaharu* trade between 1930 and 1970. When the trade picked up in the mid-1970s, *gaharu* was classified under "minor forest produce"[1] and thus regulation of the harvest, trade and processing of *gaharu* was not given priority. However, more recently several sectors of the Malaysian government, at Federal and State levels, have begun to put greater emphasis on developing industries related to biodiversity and biotechnology. In this regard, the government has recognised the significant potential for developing Malaysian *gaharu* in terms of downstream processing and added-value industries such as perfumery and

[1] In accordance with the National Forestry Act 1984.

pharmaceuticals. This recognition has resulted in increased attention regarding the regulation the harvest, processing and trade in *gaharu*.

In order to encourage the trend towards increased appreciation and regulation of the *gaharu* industry both in Malaysia and globally, the following recommendations are made:-

To the Federal Government of Malaysia:

1). The Federal Government of Malaysia should amend the Customs legislation to ensure (i) that all exports of agarwood chips, oil and powder require the prior issuance of a CITES export permit from the relevant CITES Management Authority; and (ii) that all relevant wildlife trade legislation from Sabah and Sarawak is adequately incorporated.

2). The Malaysian CITES Authorities should monitor the trade in agarwood to ensure that all trade is carried out in compliance with the requirements of CITES, specifically with relation to the design and implementation of robust Non-Detriment Finding assessments and adaptive management approaches. This needs to be carried out not only for *Aquilaria malaccensis*, but for all agarwood-producing taxa native to Malaysia.

3). Malaysia has already derived a basic formula to calculate a 'cautious quota' for *A. malaccensis* in 2007. Because the information considered for carrying out a CITES NDF, as well as the setting of any harvest or export quotas, is dependent upon updated information, establishment of a monitoring and verification system that can guide adaptive responses to changing harvest and trade dynamics is essential. This could be based upon all relevant Malaysian jurisdictions implementing the so-called Standard Operating Procedure (SOP) for agarwood/gaharu.

4). The Malaysian CITES Scientific Authority should liaise with the State forestry authorities in Sabah and Sarawak to carry out an inventory of the present standing stock of agarwood trees in those States. This would build upon the information available in the 4th National Forest Inventory (NFI 4) collected in the States of Peninsular Malaysia.

5). The Malaysian CITES Scientific Authority should coordinate a national-level assessment of the conservation status of all agarwood-producing tree species in Malaysia.

6). The relevant Malaysian CITES Management Authorities should conduct a study, in collaboration with Malaysian Customs, of the trade in agarwood/*gaharu* products (specifically wood chips and agarwood oil) for personal effects, especially by tourists from the Middle East in order to consider a value- or volume-based threshold for personal effects exemptions. Efforts in this regard will complement CITES *Decision 14.138*, and prepare Malaysia to make substantive inputs to any proposed amendment to the current Annotation #1 applicable to CITES-listed agarwood-producing taxa.

7). The relevant Malaysian CITES Management Authorities should institute systematic cooperation activities with Police and Customs in Malaysia as well as bilateral discussions with counterpart agencies in neighbouring trading countries with the objective of reducing the illegal trade in agarwood and supporting the development of a legal and sustainable industry. Such activities will enhance Malaysia's already active engagement with its immediate regional neighbours under the ASEAN Wildlife Enforcement

Nework (ASEAN-WEN), as well as its commitments under the *ASEAN Regional Action Plan on Trade in Wild Fauna and Flora 2005-2010*. In addition, Malaysia's trade with the United Arab Emirates and Saudi Arabia, both direct as well as re-exports of Malaysian country-of-origin agarwood from Singapore, should be given special attention in terms of further developing producer-consumer co-operation.

8). The relevant Malaysian CITES Management Authorities should liaise with Local Government Authorities to inventory commercial enterprises selling agarwood/*gaharu* products in Malaysia and create awareness among these traders of the requirements of CITES and relevant national and State legislation in Malaysia.

9). Malaysia should consider a national register of agarwood industry participants in an effort to formalise the agarwood trade structure, and assist with more comprehensive monitoring of the trade. Such a register could also be referenced to licensing systems for harvesters, collectors, processors, vendors and exporters, depending on the regulations of at State level.

10). The Ministry of Plantation Industries and Commodities and other Federal bodies should continue to support initiatives for the establishment of agarwood plantations, but bear in mind the need to strictly protect representative wild populations as seed sources to preserve genetic diversity. Clear definitions need to be set for 'cultivated agarwood' or plantation-sourced materials, as this is a rapidly emerging component of future potential supply in Malaysia that would need to be separated from, but informed by, wild harvest regulations. Such plantations or cultivated production systems should be registered with relevant Federal and State agencies in order to monitor (eventual) production output and enable the distinction of cultivated or non-wild sources from wild-harvested agarwood.

To the State Governments of Malaysia:

11). All States of Malaysia should be encouraged to follow the examples by the States of Sarawak and Kelantan and begin to regulate the gaharu industry by issuing licences and permits for the collection of agarwood/*gaharu* on a sustained-yield basis.

12). The relevant Malaysian CITES Management Authorities should verify Removal Passes to ensure that only specimens obtained by licensed or permitted collectors be issued with export permits. Implementation of the Standard Operating Procedure by all States would strengthen the chain of custody from forest (point-of-harvest) to point(s) of processing and/or export, and would enable the distinction between legally and illegally harvested agarwood.

13). At State level, a verification system for harvesting and supply chain management from production areas (whether sourced from wild harvest or cultivated stocks), should be carried out by the relevant CITES MA with the participation of the CITES SA, the State forestry authority and any licensed harvest/trade participants. Such a system will ensure State-level contributions towards monitoring national quotas and considerations of non-detriment findings.

14). The State Forestry Departments should continue with their initiatives for the establishment of agarwood plantations. In addition, such plantations or cultivations should be registered (including an iventory of trees and stocks) with relevant Fedeal and State agencies in order to monitor (eventual)

production output and enable the distinction of cultivated or non-wild sources from wild-harvested agarwood. This should extend to oil distillation and other associated agarwood processing activities.

15). The State Forestry Departments should explore the possibility of setting up integrated agarwood complexes where one company can be involved in the licensed collection, manufacturing and trade in agarwood/*gaharu* products.

To the Parties to CITES:

16). The Parties to CITES should consider whether additional agarwood-producing species in trade, such as *Aetoxylon sympetalum* which has been stated to be an important source of agarwood/*gaharu* in Sarawak, should be included in CITES Appendix II in order to comprehensively harmonise international trade regulations;

17). The Parties to CITES should consider whether it would be more appropriate for agarwood-producing taxa to be included in CITES Appendices under an annotation that specifies chips, oil and powder as these are the forms of agarwood which dominate international trade – thus enabling the concentration of enforcement efforts on products where they would be most effective. This recommendation urges action under the current CITES *Decision 14.138*;

18). A glossary of terms should be developed that considers cultural aspects of the agarwood industry and trade in order to allow better understanding between producers, traders and consumers, including government regulators. Other definitions that need to be established are agarwood powder/dust, wood chips, logs, wood pieces, oil, non-timber forest product, incense (as this refers to raw agarwood in some cultures) and even 'agarwood' itself (separate from the tree). This recommendation urges action under the current CITES *Decision 14.140* and *Decision 14.142*.

BACKGROUND

Introduction

Agarwood, aloeswood, eaglewood and *gaharu*[2] are all names for the resinous, fragrant and highly valuable heartwood produced primarily by *Aquilaria* species, in the family Thymelaeaceae[3]. Trade in agarwood has been recorded for over 2000 years, with primary markets in the Middle East and East Asia being supplied from sources ranging from the north-east of the Indian sub-continent through continental South-east Asia and the Indo-Malesian archipelago (Hou, 1960).

Historically, agarwood has been used for medicinal, aromatic[4] and religious purposes in Buddhist, Jewish, Christian[5], Muslim[6] and Hindu societies. What was a traditional trade for centuries to supply very specific markets and a relatively limited amount of users has increased dramatically since the 1970s with economic growth in both the Middle East and North-east Asia consumer markets. This rise in levels of trade (and by implication, harvest) has given rise to concerns that demand may outstrip sustainable supply (Barden et al, 2000).

Persistent and possibly increasing demand for agarwood has caused populations of eight *Aquilaria* species to decline to the point where they are categorised as Threatened according to *2006 IUCN Red List of Threatened Species* (Hilton-Taylor, 2006). Of these, six are considered at risk from over-exploitation for agarwood[7]. Concern over the effect of trade has led to the genus *Aquilaria* (along with the genera

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2 *Gaharu* is the Malay term for agarwood, and is also used by most Malaysians involved in the trade. This report will refer to the product derived from agarwood trees as gaharu. Yule and Burnell (1903) provide a detailed etymological treatment of *gaharu.*

3 There are at least seven genera with species that produce agarwood-like substances, this includes the following: *Aetoxylon* (Airy Shaw) Airy Shaw; *Aquilaria* Lam. (syn. *Gyrinopsis* Decne.); *Enkleia* Griff. (syn. *Kerrdora* Gagnep., Macgregorianthus Merr.); *Gonystylus* Teijsm. & Binn.; *Gyrinops* Gaertn. (syn. *Brachythalamus* Gilg); *Phaleria* Jack (syn. *Leucosmis* Benth.); and *Wikstroemia* Endl. (syn. *Farreria* Balf.f. & W.W.Sm.). Not all individual plants of a particular taxa produce *gaharu,* the substance being thought to be induced in response to fungal infection (Mohd Parid and Lim (2003) identified the following fungi as possible agents *Aspergillus* spp., *Botryodyplodia* spp., *Diplodia* spp., and *Fusarium* spp.).

4 Luca Turin, an acknowledged aromatics expert, has described the scent of *gaharu* as follows: "It's a drop-dead smell, very complex, honey, fresh tobacco, spices, amber, cream. … Incredibly strong, first of all. It knocks you over, clubs you like a falling stone. But its vast dimension is what astonishes: a huge smell, spatially immense, and incredibly complex, a buttery layer as deep as a quarry, entirely animalic in impact, and yet the *oudh* itself is not actually an animalic, spicy without being a spice." (Burr, 2002).

5 Mentioned as holy trees, a substance for perfuming beds and garments, a precious spice as well as for embalming the dead (*Numbers* 24:6; *Proverbs* 7:17; *Psalms* 45:8; *Song of Solomon* 4:14; *John* 19:39; *Enoch* 31:2).

6 An old Malay manuscript (Sal. 188) notes that Muslim tradition dates *gaharu* back to Adam (Wilkinson, 1955). Adam was supposed to have brought a tiny shoot from the Garden and planted it in the land where he lived and died (Lynne, 1994; Anon., 2001). The double-roof of the Kaaba is said to be supported by three octagonal pillars of Aquilaria wood (Goodrich, 1835); the Hadith state that the Messenger used *gaharu* for perfumery and medicine (*Sahih Muslim*, 'Al-Faz', 27: 5601; *Sahih Bukhari*, 7:7:611) as well as mentioned that it will be used by the first group of people to enter paradise (*Sahih Bukhari*, 4:54:468); the Sunna mention *gaharu* used for burial rituals (*Fiqh-us-Sunnah*, 4: 33b); *gaharu* oil is said to be applied by Sufis to treat physical and spiritual ailments associated with imbalances in the Third and Forth Stations of the Soul - being those connected with the 'Pure Spirit' and 'Divine Secrets' (Shaykh, 1985). *Gaharu* also has an important place in Muslim literature, being mentioned in the tales of *Sinbad the Sailor* as well as in the *Arabian Nights* (e.g. "Gold-dust is dust while it lies untravelled in the mine; And aloes-wood mere fuel is upon its native ground; And gold shall win his highest worth when from his goal ungoal'd; And aloes sent to foreign parts grows costlier than gold." Tale of Nur Al-Din Ali and his Son, *Alf Laylah wa Laylah* (Burton, 1885)).

7 The ecological function of the taxa is not fully known, however Chivers (1980: 329) found that banded leaf monkeys (*Presbytis melalophos*) eat the fruit of *A. malaccensis* and Prevost's squirrels (*Callosciurus prevostii*) eat the seeds.

Gyrinops and *Gonystylus*) being listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). An Appendix II listing aims to ensure that the trade is well-regulated, and that it proceeds under a system of permits based on conditions of legality and sustainability – it is not a trade ban.

TRAFFIC has been monitoring the trade in agarwood since before the CITES listing (Chakrabarty *et al.*, 1994). The TRAFFIC report *Heart of the Matter* (Barden *et al.*, 2000) reviewed the state of knowledge of agarwood use and trade and CITES implementation for *Aquilaria malaccensis*. The report also provided individual country reports for the 10 countries known at that time to be either range States for *A. malaccensis* and hence likely to be engaged in harvest and trade in agarwood (Bangladesh, Bhutan, India, Indonesia, Lao PDR, Malaysia[8], Myanmar, Philippines, Singapore, Thailand) as well as Viet Nam, a range State for *A. crassna* and possibly other species. Following concerns raised by Barden *et al.* (2000), the Conference of Parties to CITES decided that *A. malaccensis* warranted a formal "Review of Significant Trade" (*CITES Conf. 12.8*). TRAFFIC was contracted to carry out this research which reviewed the biological, trade and other relevant information on the species to identify problems and solutions concerning the implementation of CITES (Annex 2 of *CITES PC14 Doc. 9.2.2*).

The Review of Significant Trade came up with specific recommendations for a number of countries, including Malaysia[9], which were then further refined by the Plants Committee (*CITES PC14 WG 3.2 Doc 1*) – including the need to hold a consultative workshop on agarwood trade, and establishing a cautious national quota for trade in agarwood. At the fifty-fourth meeting of the CITES Standing Committee at Geneva (Switzerland), 2-6 October 2006, it was reported that Malaysia had complied with most of the recommendations and steps had been taken to strengthen and improve the procedures for licensing the harvest of, trade in and processing of *Aquilaria* spp. However the CITES Secretariat had not been advised of the establishment of a cautious harvest and export quota for *A. malaccensis*. As a result, the Secretariat proposed that the Standing Committee recommend that all Parties suspend trade in all specimens of *A. malaccensis* from Malaysia if Malaysia did not establish a cautious harvest and export quota (*SC54 Doc.*

James Compton/TRAFFIC

An agarwood retail shop in Kuala Lumpur displaying large pieces of agarwood

[8] Many sections of Barden et al. (2000) dealing with Malaysia were based on the Country Report by Salahuddin (1999).

[9] Malaysia became a Party to CITES in October 1977, with the Convention entering into force in January 1978. Past reviews of the implementation of CITES in Malaysia for tree species include Chen and Perumal (2002) and Lim *et al.* (2004).

42). In response, the Malaysian delegation notified that it had established an export quota of 200 000 kg of powder and woodchips for 2007 (180,000kg for Peninsular Malaysia and Sabah and 20,000kg for Sarawak)[10]. However, there were concerns regarding the scientific basis for this quota and the Committee requested Malaysia to submit a report to the Secretariat explaining how it had established this quota, stating "If the Secretariat, after consulting with the Plants Committee, is not satisfied with the explanation, it will issue a Notification to the Parties recommending a suspension of trade in all specimens of *A. malaccensis* from Malaysia with effect from 1 January 2007" (*SC54 Sum. 8 (Rev. 1) (06/10/06)*). Subsequently on 7 December 2006 Malaysia submitted an explanation which was accepted by the Secretariat on 11 January 2007.

In support of Malaysia's response to the Review of Significant Trade and in furtherance of CITES decisions on the need for more research (*CITES Decision 12.71, 13.63*) TRAFFIC Southeast Asia was contracted by the CITES Secretariat to carry out further field research in the trade dynamics of agarwood in Malaysia, as a major agarwood exporter. This report documents the findings of this research, including the results of case studies carried out in the three administrative regions of the country: Peninsular Malaysia, Sabah and Sarawak.

Taxonomy, distribution and conservation status

Taxonomy and etymology

There are 19 plant species native to Malaysia that are thought to produce agarwood (gaharu) (Peninsula: 13 spp., Sabah: 11 spp., Sarawak: 13 spp.) (see **Appendix 1**). These species belong to five genera: *Aquilaria* 7 spp. (trees); *Gonystylus* 6 spp. (trees); *Wikstroemia* 4 spp. (shrubs); *Aetoxylon* 1 sp. (tree); *Enkleia* 1 sp. (vine). This report focuses on *Aquilaria* in general and *Aquilaria malaccensis* in particular as this genus is thought to be the most important source of *gaharu*.

There are numerous vernacular names for agarwood-producing species (see **Appendix 2**). For example, in addition to '*gaharu'*, Malay names for *Aquilaria* spp. include the following root-words *karas, tabak, candan, kepang,* and *depu.* Numerous other names build on these roots, *karas* yielding *angkaras/engkaras, bengkaras, kekaras, mengkaras,* and *tengkaras.* Reference to some of these names is found in Malay literature, *peribahasa* (proverbs) and *pantun* (quatrains) which mention the collection of agarwood in the forest and the burning of agarwood as incense (Winstedt, 1950; Anon., 2006c). Numerous place-names throughout Malaysia have connections with agarwood-producing species (**Figure 1a**).

[10] For calendar year 2008, Malaysia has set export quota levels for A. malaccensis agarwood chips and powder at 170 t for Peninsular Malaysia and Sabah, and 10t for Sarawak. No quotas are specified for other agarwood-producing taxa.

Figure 1a
Places in Malaysia named after agarwood-producing species

Source: Mapped from coordinates obtained from www.earthsearch.net.
Excludes road names:- Jln Gaharu: Johor Baru; Jln Ramin: Sibu, Kota Kinabalu; Lrg Ramin, Limbang; Jln Aquilaria (Bukit Nanas Forest Reserve), Kuala Lumpur.

Figure 1b
Places in Malaysia mentioned in the text

Map prepared by Noorainie Awang Anak

Aquilaria malaccensis in Malaysia

The first agarwood-producing species to be included in Appendix II of CITES was *Aquilaria malaccensis* in 1995. This species is the most common *Aquilaria* species found throughout in Peninsular Malaysia and Sabah (Whitmore, 1973; Cockburn, 1980). The species is widespread however it does not appear to occur at particularly high stocking densities (see 'Conservation status in Malaysia', below).

However, there has been some historical uncertainty as to whether *A. malaccensis* is found in Sarawak. Browne (1955) noted that several species of *Aquilaria* had been recorded in Sarawak and probably all were known in the local dialect as *gaharu mengkaras*. He added that in most parts of Sarawak the double name was used for the trees, whether they contained the scented wood or not. The trees were of the lowland forests where they were "not uncommon but by no means abundant". He speculated that the most important *Aquilaria* species in Sarawak was probably *A. malaccensis*, but added that it was difficult to identify trees to the species level as they were rarely seen in flower or fruit.

On the basis of limited herbarium collections, Anderson (1980) thought *A. malaccensis* to be present, but very rare in Sarawak. Only a single herbarium specimen of *A. malaccensis* was recorded as coming from Bt. Mentagai, Marudi, Sarawak (South East Asia Botanical Collection Information Network (SEABCIN) <herbaria.plants.ox.ac.uk> downloaded 4 September 2005). However, this specimen has subsequently been determined by Tawan (2004) to be *Aquilaria beccariana* (Forest Department, Sarawak, Herbarium Specimen No. "S 23015" viewed by LTW on 16 February 2006. Forest Research Centre, Sarawak Forestry Corporation, Kuching, Sarawak).

Nevertheless, recent inventories at Lambir Hills National Park record *A. malaccensis* (Lee *et al*., 2002). Furthermore, the Forest Department Sarawak website (Anon., 2006d) lists *Aquilaria malaccensis* as one of the protected plants of Sarawak, stating that the species is "rare but widespread in Sarawak". Indeed, the Forest Department Sarawak website (Anon., 2006e) states that "the chief sources [of *gaharu* in Sarawak] are *Aquilaria malaccensis* and *Aetoxylon sympetalum* while other *Aquilaria* species produce gaharu of inferior quality". In addition, there are at least three other species of *Aquilaria* recorded in Sarawak (see **Appendix 1**).

James Compton/TRAFFIC

High grades resinous agarwood (gaharu) are still harvested from Malaysia, but in lesser quantities

Gaharu buaya

Aquilaria is generally considered to produce the 'true' *gaharu*, with other genera thought to produce inferior types. In particular, the designation '*gaharu buaya*' (or 'crocodile *gaharu*') is sometimes used to distinguish the product of genera such as *Gonystylus* and *Aetoxylon*. In Sarawak, *A. sympetalum* is noted as being "locally frequent in Kerangas in West Sarawak", while in comparison *Aquilaria* species are said to be rare (Anderson, 1980). Given this predominance, *Aetoxylon sympetalum* could be the main source of *gaharu* in Sarawak. Indeed, the Forest Department's checklist of the trees of Sarawak (Anderson, 1980) states that *A. sympetalum* produces the "true *gaharu* wood". An authoritative note on an *Aetoxylon* herbarium specimen sheet labelled '*gaharu buaya*' states that: "This species is the principal producer of *gaharu* - the incense wood exported to India" (Anderson, 1959). Browne (1955) notes that *gaharu buaya*, when burned, "has a pleasant aromatic smell, lacking, however, the suggestion of lemon given by true aloes-wood (*gaharu mengkaras*). *Gaharu buaya* is probably exported from Sarawak in larger quantities than any other incense wood, mainly to Singapore."

Sandalwood

All incense woods are sometimes referred to using generic names of common species. In Malaysia, the terms '*cendana*' (sandalwood) and '*kemenyan*' (benzoin) are often used as generic names for all incense woods. Due to the use of these generic names, fragrant wood from *Aquilaria* and other Malaysian species are fairly often referred to as '*cendana*' ('sandalwood'). Conversely, '*gaharu*' is also used as a generic name for incense woods[11], with a wide variety of substances termed loosely as '*gaharu'* (see also section on 'Fake' *gaharu*, below)[12]. Botanically, agarwood-producing species are in a separate family (Thymelaeaceae) from what are considered to be the true sandalwoods *Santalum* spp. (Santalaceae) and red sandalwoods *Pterocarpus* spp. (Leguminosae). Nevertheless, attempts to standardise nomenclature (e.g. *CITES Notification No. 1998/19*) show that the confusion of *gaharu* with sandalwood is not confined to Malaysia, with one Indian vernacular name for *Aquilaria malaccensis* being '*Aggalichandanam*' and one Indian vernacular name listed for *Pterocarpus santalinus* being '*Agaru*'.

'Fake' gaharu

In addition to the confusion regarding 'sandalwood' and '*gaharu* buaya' mentioned above, a substantial amount of what is claimed to be true '*gaharu*' is not actually genuine. Normal *Aquilaria* wood or wood from other species is sometimes soaked in *gaharu* hydrosol and then sometimes also carved to look like high grade *gaharu*, and is often referred to as 'black magic wood' or 'BMW' in trade. In addition, so-called '*gaharu*' oil is often a petroleum-based synthetic. Furthermore, genuine *gaharu* oil is often diluted with cheaper oils.

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11 The term 'kedai gaharu' is used in Penang to refer to a shop that sells joss sticks. The term 'agarbatti' is used in the Customs codes to refer to all incense sticks (Customs Duties Order 1996, HS Code 33.07.41).

12 Ridley (1901) identified 'chandan' with Aquilaria hirta. However, the Colonial Customs classed 'gharu' separately from 'Chindana' - which was valued slightly below 'Gharu lempong No. 1' (Anon., 1914). In 1913, "Kayu Chandana" was reported on sale for MYR0.46-0.50 per kg (Anon., 1913).

IUCN Red list

While seven agarwood-producing species found in Malaysia are categorised as Vulnerable (VU) by the IUCN Red List (IUCN, 2008), the most recent assessment was carried out in 1994. Malaysian delegations to CITES have questioned this assessment (Chen, 2004) and consistently pointed out that "not all *Aquilaria* spp. are in danger of extinction" (e.g. *CITES PC13 Doc. 9.3*). However, most agarwood-producing species found in Malaysia have not had their conservation status evaluated and one species, *Aquilaria rostrata*, is categorised as Data Deficient (DD)[13]. Recognising the need to evaluate the status of all agarwood-producing species, in 2002 the Twelfth Meeting of the Conference of the Parties to CITES (CoP12) recommended that IUCN should re-evaluate the threatened status of all agarwood-producing taxa (*CITES Decision 12.69*), which was retained in *Decision 13.64* following CITES CoP13). At the Fourteenth Meeting of the Plants Committee (16-20 February 2004), this recommendation was indicated to be of a high level of priority (*CITES PC14 Doc. 5.3*). However, no IUCN Red List re-evaluations had yet been carried out by the time of publication of the *2008 IUCN Red List of Threatened Species (*IUCN, 2008).

Conservation status in Malaysia

Some popular media reports have gone so far as to claim that "in the forests of Malaysia and Indonesia, the eight species of agarwood have already reached the point of no return" (Ziauddin, 2003). However, even for most of those species that have been evaluated on a global level, the local status often remains uncertain. Prior to 1994, the IUCN Red List Category system considered the Malaysian population of *A. malaccensis* to be "Indeterminate".

However, there is in fact a substantial amount of information available about *Aquilaria* at a generic level and specifically regarding *Aquilaria malaccensis*. Historically, the genus *Aquilaria* was reported to be quite common in Malaysia. In the 17th Century, Eredia noted "dense groves" of *Aquilaria* trees in the hinterland of Malacca (Mills, 1930). Indeed, *Aquilaria malaccensis* derives its species epithet from this historical trading port and State on the west coast of the Malay peninsula. It was given the name by the French naturalist Jean-Baptiste Lamarck, who described the species in 1783 from a specimen presented to him by his associate Pierre Sonnerat as "Garo de Malacca". Similarly, Adams (1848) noted that *Aquilaria* was one of the most common trees in the forests of north-west Borneo near Abai at the mouth of the Sungai Kinabatangan, in what is now the State of Sabah.

Aquilaria malaccensis grows up to an altitude of 1000 m, Corner (1978), and has even been recorded growing in freshwater swamp forest in Sedili, Johor (Corner, 1978). Detailed inventories carried out in the mid-20th Century (Wyatt-Smith, 1995) noted that *A. malaccensis* was a 'rare to uncommon tree, usually of poor form"; noting per-hectare stem stocking densities (>4' g.b.h., i.e. >38.8 cm d.b.h.) of 0.297 (Kedah), 0.507 (Malacca) and 0.349 (Kelantan); as well as 1.65 stems per hectare (>6" g.b.h., i.e. >4.85 cm d.b.h.) (Pahang). The species has also been reported from Bukit Nanas Forest Reserve, in the heart of Kuala Lumpur, which has a path running through it named 'Jalan Aquilaria'.

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[13] A study carried out by the Forest Research Institute of Malaysia (FRIM) listed A. rostrata as "endangered" because of rarity and geographical restriction (Ng et al., 1990)

[14] Full details of NFI-4, including survey methodology had yet to be published. However, these figures do not include trees within National Parks.

The Forest Department Peninsular Malaysia carried out a National Forest Inventory every 10 years since 1972. The Third National Forest Inventory (NFI-3) carried out in 1992 showed that 'Karas/*Gaharu*' (*Aquilaria* spp.) was found throughout Peninsular Malaysia in both logged and virgin forest (Chin *et al.*, 1997). It was found that in the 'Best Virgin Forest' stratum there were 1.79 stems per hectare (>10 cm d.b.h.) of 'Karas/*Gaharu*' species (**Table 1**). The Fourth National Forest Inventory (NFI-4) began in 2003 and was due to be published in 2006. Initial analysis (Mohd Paiz, 2006) revealed an estimate of 3.06 million stems (>15 cm d.b.h.) of *Aquilaria* spp. in Peninsular Malaysia (however, stocking density was not given). This translated into an estimated volume of 1.83 million m^3 of *Aquilaria* timber (not necessarily containing *gaharu*). It was also estimated that 95% of the total number of trees are between 15 cm and 45 cm d.b.h., which made up of 66.8% of the total volume of *Aquilaria* trees. Pahang State was regarded to have the highest volume of *Aquilaria*; while Kelantan State the highest number of stems (Mohd Paiz, 2006)[14]

Table 1
Stocking density of "Karas/Gaharu" in Peninsular Malaysia by forest type (stems & cubic metres per hectare)

Forest Strata		Diameter Class (cm)								
(Area)		10+	15+	30+	45+	60+	75+	90+	105+	120+
Best Virgin Forest	Stems	1.79	1.06	0.09	0.04	0.04	-	-	-	-
(430 986 ha)	Volume	0.49	0.42	0.23	0.18	0.18	-	-	-	-
Good Virgin Forest	Stems	0.62	0.62	0.35	0.13	0.04	0.04	0.04	-	-
(578 397 ha)	Volume	0.99	0.99	0.91	0.68	0.46	0.46	0.46	-	-
Moderate Virgin Forest	Stems	0.45	0.18	0.18	0.05	-	-	-	-	-
(635 688 ha)	Volume	0.2	0.19	0.19	0.1	-	-	-	-	-
Poor Virgin Forest	Stems	0.25	0.25	0.25	0.19	0.12	0.12	-	-	-
(184 275 ha)	Volume	0.85	0.85	0.85	0.75	0.51	0.61	-	-	-
Forest Logged 1971-1980	Stems	0.69	0.38	0.22	0.11	0.05	0.03	0.03	0.03	0.03
(864 959 ha)	Volume	1.08	1.06	0.94	0.82	0.72	0.63	0.63	0.63	0.63
Forest Logged 1961-1970	Stems	0.42	0.3	0.18	0.04	0.02	-	-	-	-
(374 717 ha)	Volume	0.34	0.33	0.31	0.13	0.09	-	-	-	-
Forest Logged before 1960	Stems	0.66	0.48	0.3	0.15	0.09	0.03	-	-	-
(373 943 ha)	Volume	0.71	0.7	0.64	0.48	0.37	0.16	-	-	-

Source: Third National Forest Inventory (Chin *et al.*, 1997)

The findings of the national forest inventories were generally consistent with other site-specific inventories. For example, the 1.54 stems per hectare (>10 cm d.b.h.) recorded by Lim and Jamaluddin (1994) in a forest in Negeri Sembilan. However, studies by the Forest Research Institute Malaysia (FRIM) have found that increased competition for *gaharu* has led to indiscriminate felling of *Aquilaria* trees "consequently, the survival of the *A. malaccensis* is threatened" (Lim *et al.*, 2003). Indeed, other FRIM experts have reported that the species is increasingly scarce in Peninsular Malaysia (Cheah, 1997).

[14] Full details of NFI-4, including survey methodology had yet to be published. However, these figures do not include trees within National Parks.

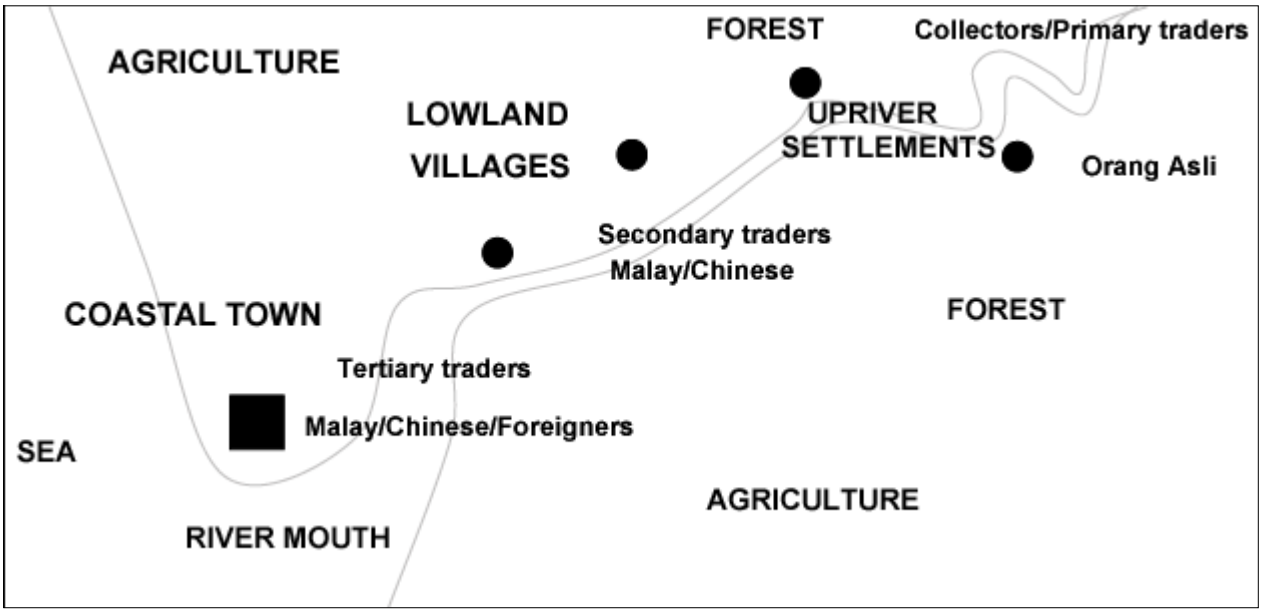
There have been no recent studies on agarwood-producing species in Sabah. However, in Sarawak, Chin (1985) noted the "exhaustion" of *gaharu* in Tinjar due to over-collection in the mid- to late-1970s. Lee *et al.* (2002) reported approximately 190 stems of *Aquilaria beccariana* (>1 cm d.b.h.) from a 52-ha Long Term Ecological Research Plot in Lambir Hills National Park (0.3 stems per hectare >3 cm d.b.h.). However, it was reported that most of the *Aquilaria* trees in this plot had been wounded by *gaharu* collectors and were felt to be too small to sustain the population (Dawend *et al.*, 2005). Similarly, Dawend *et al.* (2005) reported that a study of *gaharu* collection in Belaga found that the local supply had been depleted over the last 50 years. Despite these reports of depletion, the Sarawak Forestry Corporation reported that agarwood-producing species continued to be widespread in Sarawak, with total stocking densities averaged at 0.16032 stems per ha (>20 cm d.b.h.) (S. Bakar, Sarawak Forestry Corporation, pers. comm. 1 March 2006), however, the basis for this figure was not provided.

Harvest

Ethnic groups involved in harvesting

A model for the collection and trading of forest produce in Malaysia is provided by Dunn (1975). This model presents the trade chain from collector/primary trader (usually indigenous forest people) in to secondary traders at the forest edge (usually ethnic Chinese *'towkays'* or middlemen; but also ethnic Malays) to tertiary traders (mostly Malaysians of Chinese descent, but also foreigners) at large towns on the coast (**Figure 2**).

Figure 2
Model for the collection and trading of forest produce in Malaysia



Source: Adapted from Dunn (1975)

The bulk of reports on *gaharu* collection in Malaysia appear to fit with the model put forward by Dunn (1975). Throughout Malaysia (see **Appendix 4**), the Orang Asal (indigenous people) are reported to be the most important *gaharu* collectors/primary traders. In Peninsular Malaysia, the Orang Asal are known as

the 'Orang Asli', of which almost all the sub-ethnic groups have been involved in collection since the early 19th Century (Couillard, 1984); these groups include the Semaq Beri (Kuchikura, 1986; Kuchikura, 1988), Semelai (Gianno, 1986; Gianno, 1990; Kruspe, 2004), Batek (Nicholas, 2000; Anon., 2004g; Lye, 2005), Jakun (Favre, 1865; Almeida, 2002; Faezah, 2005; Ali, 2006), Jahut (Almeida, 2002), Semai (Almeida, 2002), Temuan (Dunn, 1975), Senoi (Logan, 1848), Chewong (Howell, 1983; Aubaile-Sallenave and Bahuchet, 1995), Jahai/Temiar (Lim *et al.*, 2002), Senimba (Kathirithamby-Wells, 2005) and Punan tribes (Aimi, 2001). The dominant ethnic group in Malaysia, the Malays, are also involved in collecting (Skeats, 1900; Albela, 1996; Cheong, 1997; Lim *et al.*, 2003).

In Sabah, there are reports of agarwood collection by local people in the Sook and Kalabakan districts (Judeth, 2000; Sidkan, 2001), as well as individuals of Murut and Lundayeh ethnicity (Goh, 2006). In Sarawak, *gaharu* collectors are reported to include the Melanau (Hose, 1912), Iban, Kenyah (Chin, 1985; Dawend *et al.*, 2005), Punan, Penan people (Hansen, 1988; Hansen, 1998; Manser, 2003) and Sino-Sarawakians (Keppel, 1846).

Foreign nationals are also reported to be involved in illegal agarwood harvesting in Malaysia. These foreigners are predominantly from Thailand, and sometimes Cambodia (collecting in Peninsular Malaysia); Indonesia and the Philippines (collecting in Sabah); and Indonesia (collecting in Sarawak) (**Table 2**). It is also noted that Malaysians have been reported to be involved in illegal agarwood harvesting in Brunei and Indonesia (see **Appendix 5**).

Table 2
Patterns of transnational *gaharu* poaching in Malaysia or by Malaysians

Location	1st Report	Collectors
Perak: Belum Forest Reserve; Sungai Lerik, Chenderiang	1989	Thais
Bintang Hijau Forest Reserve	2003	Thais
Taman Negara National Park (**Pahang, Kelantan, Terengganu**)	1992	Thais
Pahang: Tekal and Tekai Forest Reserve	2003	Thais
Kelantan: Gua Musang	2005	Thais
Sarawak: Hulu Baram (border with East Kalimantan)	1991	Indonesians
Betuang-Karimun National Park border (Indonesia)	1998	Malaysians
Brunei border with Limbang, Sarawak, Malaysia	1999	Malaysians
Gunong Mulu , Lanjak Entimau Wildlife Sanctuary	1999	Indonesians
Lambir Hills National Park	2005	Thais; Filipinos
Sabah: Kinabalu Park	1999	Thais; Indonesians
Maliau Basin, Danum Valley Conservation Areas	2000	Thais; Indonesians
Timbun Mata Forest Reserve, Semporna	2005	Indonesians
Crocker Range National Park	2005	Filipinos
Kedah: Ulu Muda Forest Reserve; Baling, Gunung Inas	2000	Thais
Johor: Gunung Ledang, Endau Rompin National Parks	2004	Thais
Gunung Panti Forest Reserve, Kota Tinggi	2005	Thais
Gunung Ledang National Park	2006	Cambodians

Source: see **Appendix 5**.

Methods of harvest

There are two main methods of harvesting *gaharu*: fatal harvest and sub-lethal harvest. The most commonly reported method is fatal harvest, whereby the whole tree is chopped down to harvest the *gaharu*. There are a number of early reports of fatal harvest of *Aquilaria* being practiced by Malays in Johor (Bland, 1886) and Selangor (Skeat, 1900). Given the dangers of working in the jungle and fact that only around one-in-ten trees naturally contain *gaharu*[15] the Malays practice numerous rituals and taboos when felling *Aquilaria* trees (Skeat, 1900; Maxwell, 1907). The *Sarawak Gazette* (Anon., 1818) noted similar customs and taboos practiced by the Dyaks of Borneo when harvesting the tree[16]. Fatal harvest kills the tree, however there are indications that with an adequate stocking of seedlings, natural regeneration can take place following industrial logging activities – it has been reported that *Aquilaria hirta* "often occurs in secondary forest" (Gianno, 1986). Nevertheless, the headman of one Jahai community in Temengor, Perak, implicated industrial logging in the local decline gaharu yields (Harun, 2005).

Less widely reported is the fact that harvesters sometime practise non-destructive harvesting methods. *Aquilaria malaccensis* is known to be suited to coppicing, i.e. it produces new shoots from a stump (Green, 1999). Corner (1978), found that the bark of *Aquilaria malaccensis* can regenerate completely 7-8 months after being damaged. A report by the Thailand-based WildAid Foundation (now known as FREELAND Foundation) found that *Aquilaria* trees are relatively robust and can be tapped by chipping or cutting the infected part for over 10 years before they die (Anon., 2004l). Indeed, there are indications the Orang Asli routinely practice a sub-lethal harvest method on a rotation of 2-3 months where trees are still alive after 15 years of coppicing (W.P. Hee, pers. comm., 2 March 2006).

History of harvest and trade in Malaysia

Gaharu was collected extensively in the Malay Peninsula during the 19th Century and early 20th Century. The trade in agarwood from Borneo also goes back hundreds of years. A Spanish report from 1530 describes Cerava (Sarawak) as one of the four chief ports of Borneo, inhabited by 'many and rich merchants' whose trade consists of diamonds, camphor, agarwood, provisions and wine (Walker, 2002). Low (1848) and Brooke (1866) also observed the collection, trade and use of *gaharu* among the Malays of Hulu Sarawak. Tregonning (1958: 82) noted that incense woods such as *kayu lakka*[17] were brought from Hulu Kinabatangan to Sandakan and from there shipped to Singapore and where they were ultimately traded with the rest of the world (see 'Historical trade chains', below).

Gaharu collection in Peninsular Malaysia was reported to have ceased between the 1930s and the 1970s due to economic factors and government interference (Gianno, 1986). Indeed, *gaharu* was one of many commodities that experienced a price crash during the Great Depression of the 1930s. After the crash, there does not appear to have been much collection of *gaharu* in Malaysia until around about 1975, when the

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15 Nicholas (2000) notes that some Orang Asli can tell the presence of agarwood in the heart of a tree by noting minute clues such as peeling bark and falling leaves.

16 More recent newspaper articles (Cheong, 1997; Clerizo, 2005) noted that some Malaysian *gaharu* collectors continued to practice similar rituals.

17 Lakkawood (*Dalbergia parviflora*) is another Malaysian incense wood that was probably used as a substitute for *gaharu* in markets such as China (Heng, 2001).

price of *gaharu* experienced an upsurge. This is documented by Chin (1985) who noted that around that time all adult males in the Kenyah longhouse of Long Selatong, Ulu Baram, and indeed in all longhouses throughout Sarawak, began to organise *gaharu* collecting trips. These trips were said to be "destructive", leading to "exhaustion" of stocks in parts of lowland Sarawak by 1980. Collection moved to the interior, where in 1984 Manser (2003) noted that the Penan collected *gaharu* for trade with Bugis and Chinese middlemen. Across the border in Kalimantan over-collection led to the "near-disappearance" of *gaharu* by the mid-1980s with even small saplings being destroyed before they had a chance to set seed (Brookfield *et al.*, 1995).

The pattern of destruction was also being played out in Peninsular Malaysia, where by the beginning of the 1980s, harvesting was reported in Terengganu where "trees of all sizes, from small saplings upward, were felled without sufficient regard to conserving stocks" (Mah *et al.*, 1983: 67). Collection in Pahang was no different, with the high price of the commodity making collection an "all consuming activity" among the Chewong of Kerau Game Reserve in 1981 (Howell, 1983). Gianno (1986) also recorded extensive fatal harvest of *Aquilaria* trees for high-grade *gaharu* among the Semelai of Tasik Bera in the 1980s. It was noted that many Semelai "feel that the forest is doomed anyway and that they should try to extract as much as they can from it first".

Exhaustion of local stocks forced collectors to travel outside their traditional territories in search of *gaharu*. There are numerous examples of Orang Asli spending weeks away from home. For example, collectors from Pos Slim (Perak) are known to travel all the way to Raub (Pahang) on collecting trips (C. Nicholas, Centre for Orang Asli Concerns, pers. comm. to TRAFFIC Southeast Asia, 7 September 2005).

Ironically, the shifting boom-and-bust pattern of *gaharu* exploitation is probably the reason that intensive collection in the past did not cause the local extinction of *Aquilaria* in Malaysia. The theory is that gaharu collection reduces the number of *Aquilaria* trees in an area and thus progressively increases the cost of finding *gaharu* in the original centre of collection and eventually induces collectors to shift to new areas which have more *Aquilaria* trees. Studies in Indonesia have indicated that these shifts occur when there are still enough reproducing adult trees as well as a good density of juveniles to ensure *Aquilaria* regeneration in the old centres (Fuentes, 2002; Vayda, 1997; Yamada, 1995; Paoli *et al.*, 1994).

James Compton/TRAFFIC

Agarwood from eastern Indonesia (Merauke, Papua province) on sale in Kuala Lumpur

However, the latest *gaharu* boom has led to trans-national collection once stocks in one country have been exhausted. Syndicated gangs of *gaharu* collectors were being organised in

Thailand as early as 1987 (Anon., 2004k). These groups started arriving in northern Malaysia by the late 1980s. The Thai collectors worked their way down the Peninsula, illegally harvesting *gaharu* regardless of whether the trees were in forest reserves or protected areas.

One particularly striking example of illegal harvesting of *gaharu* in protected areas is the case of Taman Negara, Malaysia's first National Park which was established in 1938-1939 covering 431 453 ha in the States of Kelantan, Pahang and Terengganu. The park is managed by the Department of Wildlife and National Parks (DWNP). The local Batek tribe had probably been collecting *gaharu* in the area since before the establishment of the park. However, of perhaps greater concern was the advent of foreign *gaharu* harvesters largely of Thai origin, from around 1990 onwards (Faezah, 1995). Compounding this problem was the alleged complicity of officials charged with preventing encroachment into the park. A doctoral dissertation of the University of Malaya contained the serious allegation that although it is illegal to harvest *gaharu* and rattan in Taman Negara, "some of the DWNP personnel are said to be middlemen for the trade in these items" (Nicholas, 2000: 134). However, the Ministry of Natural Resources and Environment has responded that DWNP has no knowledge on this, which - despite being a very serious allegation - is based on hearsay.

In addition to entering Taman Negara, the Thai collectors were reported to have worked their way down to Johor (the southern-most Malaysian State) by 2003 (Abdul Kadir Abu Hashim, DWNP, *in litt*. to TRAFFIC Southeast Asia, 2003; Anon., 2004h). Collectors from Thailand were also reported to be active in Sabah in 1999 and in Sarawak in 2005 (Dawend *et al.*, 2005). Furthermore, given the extensive border shared between Indonesian and Malaysian Borneo, Indonesian collectors have probably been active in Sabah and Sarawak for many years. Collectors from the Philippines have also been reported to be collecting *gaharu* in Sabah and Sarawak. As well as foreign *gaharu* collectors operating in Malaysia, there are also reports of Malaysian collectors operating in Brunei and Indonesia (see Results section).

Legislation governing harvest

Overview

Malaysia has a wide-ranging body of laws that govern the various aspects of the agarwood industry: including cultivation and collection ('protection of flora and fauna'); processing and manufacture; as well as domestic trade, imports and exports. The laws for the protection of agarwood-producing species include two aspects: (1) the establishment of protected areas and (2) the regulation of harvest. Laws that address both of these aspects include the following laws: *National Forestry Act 1984*; *Forests Ordinance 1958* (Sarawak Cap. 126); *Sarawak Forestry Corporation Ordinance 1995*; *Forest Enactment 1968* (Sabah En. 2/68); *Wildlife Protection Act 1972*; *Wildlife Conservation Enactment 1997* (Sabah En. 6/97); *Wild Life Protection Ordinance 1998* (Sarawak Cap. 26). The relevant aspects of these and other laws are highlighted in **Appendix 3** of this report. The laws specifically relevant to the regulation of harvest of *gaharu* in Malaysia are examined in more detail below and the agencies responsible for the enforcement of these laws are displayed in **Figure 3**.

Peninsular Malaysia and Federal Territories

In the 1910s and 1920s, the British put in place measures to gazette forest reserves and restrict the collection of forest produce in what was then known as the Federated Malay States. The *National Forestry Act 1984*, which replaced these laws, is the main piece of legislation regulating the harvest of forest produce in Malaysia. There is no specific category for *gaharu* in the State *Forest Rules* made under the *National Forestry Act 1984*. However, for the purpose of the collection of royalty, *gaharu* would be considered to come under an open clause of the Royalty Rate List that states "Minor Forest Produce: Miscellaneous – Forest produce not mentioned above" (e.g. Pahang *Forest Rules 1987* Sch II (ii) 2.11 (d)).[18] The harvest of such produce requires a licence or permit issued by the State Forestry Department, or by the Wildlife Department if the land is gazetted as a national park.

Sabah

The British North Borneo Chartered Company (BNBCC) recognised the economic value of non-timber forest products which were a significant source of revenue to the BNBCC in the early days prior to extensive timber harvesting (Doolittle, 2005). The framework established by the BNBCC is still evident in Sabah today where the *Forest Rules 1969* fix the rate of royalty on *gaharu* at 10% of the value (Sch II, Pt A, s (h) "Minor Forest Produce (Damar, Fossil, Gums, *Gaharu*, Cinnamon, Sticks, Tengkwang, etc)"). Schedule 1 of *Forest Rules 1969* listed *Aquilaria malaccensis* as a Commercial Species, with a minimum felling diameter of 60 cm d.b.h.; effective 2 January 2004, the Sabah Forestry Department has classified *A. malaccensis* as a "prohibited species" to be retained inside Forest Reserves (Sch C; Clause 1(31) of the *Standard Sustainable Forest Management Licence Agreement* – s 15(1) *Forest Enactment 1968*). In addition, Sabah's *Wildlife Conservation Enactment 1997* requires a permit for harvesting a plant of a species specified in Appendix I or II of CITES.

Sarawak

Sarawak has *Forest Rules* made under the *Forest Ordinance 1954 (revised in 1958)* that contain detailed prescriptions governing the collection of royalties and fees and even provisions governing the collection of latex and resin from a number of species of trees. However, no specific mention is made of the collection of *gaharu*. *Gonystylus bancanus*, an agarwood-producing species, is included in the List of Marketable Trees (*Forest Ordinance 1954*, Sch 2). There is provision for the collection of royalty on *gaharu* harvested in Sarawak under licence (s 52(2); Sch I, Class III, Miscellaneous, "Other forest produce not specified above"), with the rate specified as 10% *ad valorem*. In addition the law provides for produce to be taken under permit with the fees set at MYR1.00 per month (Sch 2 H. "Other forest produce") payable at the time of the issue of the permit (s 52(4)).

The key agarwood-producing species in Sarawak, including *Aetoxylon sympetalum*, *Aquilaria beccariana*, *A. malaccensis* and *A. microcarpa*, are specifically listed as "protected plants" under Sarawak's *Wild Life Protection Ordinance 1998*. A license from the Controller of Wild Life is required to harvest and trade in these species as well as any plant species included in CITES Appendices I and II (thus all species of *Aquilaria* and *Gonystylus*). Dawend *et al.* (2005) noted that the application fee for such license was MYR100 year.

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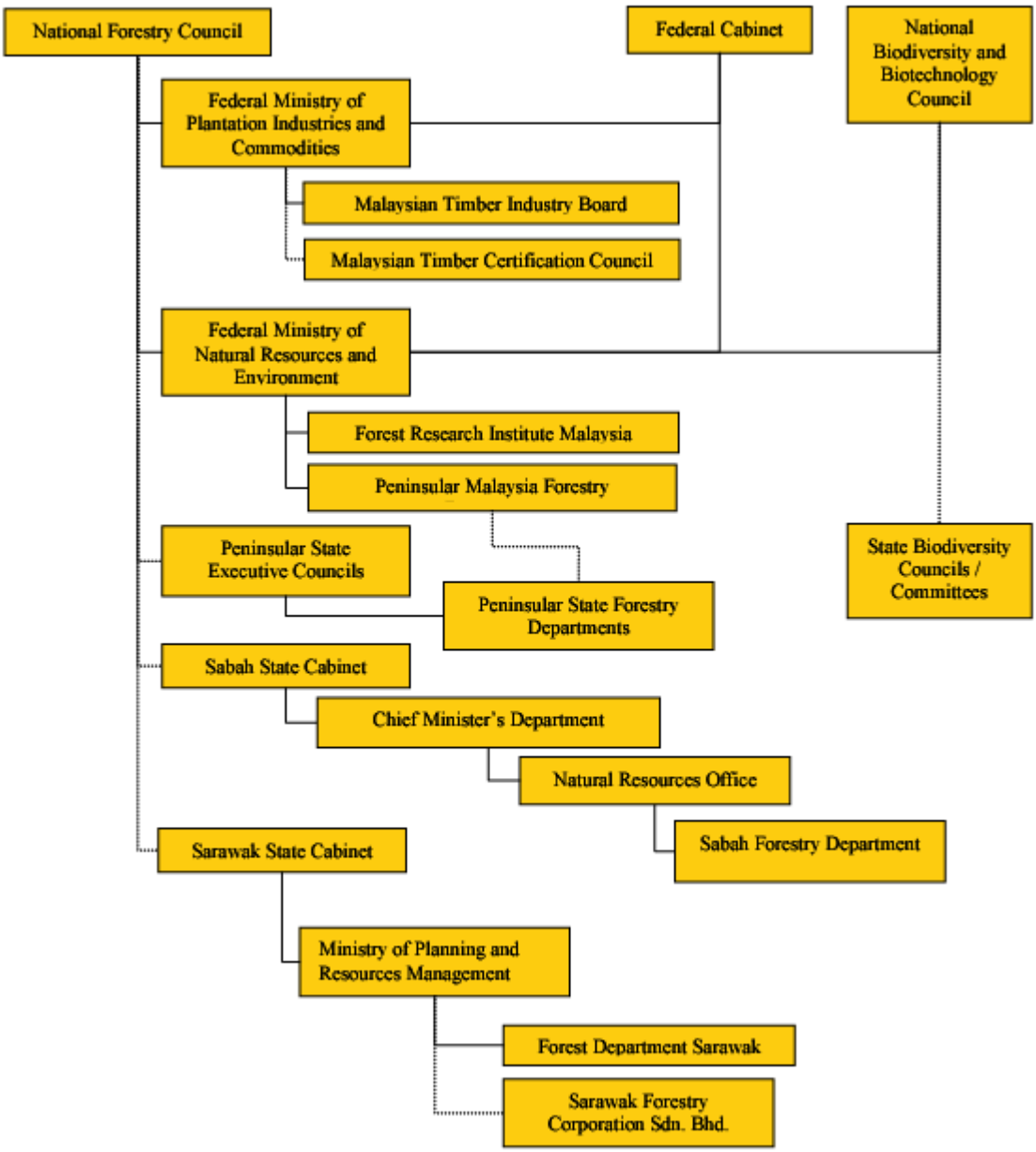
[18] It has been reported that in Perak the premium is MYR100 per 200 ha (USD26 per 200 ha at 1999 rates) and an additional royalty fee of MYR18 per t (USD5 per t) applies to all Aquilaria spp. (E.N.M. Shah, State Deputy Director, Department of Forestry, Perak, pers. comm. to TRAFFIC Southeast Asia, April 1999).

Figure 3
Indicative institutional arrangement for the management of legal agarwood harvest in Malaysia



Source: Adapted from Lim (2006).
Note: This figure illustrates some of the relationships between some of the institutions involved in the management of agarwood in Malaysia: solid lines indicate complete or direct institutional linkages, dotted lines indicate partial or indirect institutional linkages

Enforcement of harvest controls

Prior to Malaysia's independence, known as Merdeka[19], *gaharu* was treated as an important forest product and harvest controls were enforced accordingly. In pre-colonial Peninsular Malaysia, the Malay rulers demanded a monopoly over the collection of select and expensive items of scarcity such as *gaharu* (Kathirithamby-Wells, 2005). Indeed, in the absence of land tax, the rulers' revenues were derived mainly from royalties on the export of jungle produce including *gaharu* (Maxwell, 1884; Graham, 1908). By controlling the river junctions and sealing independent lines of trade, the Malay Sultans could effectively "lock up" the jungles, prohibiting direct trade between the collectors and others[20]. Similarly, the BNBCC in what is now Sabah built on the extensive trade route and collection points that had been established by local ruling chiefs, or *pengirans*, to extract as much revenue as possible from these forest products, emphasising the importance of taxes and trade permits (Doolittle, 2005).

During colonial times, *gaharu* was one of a number of "incense woods" whose collection and trade brought revenue to the State. "Incense woods" were listed as the eighth most important minor forest product on the basis of Forestry Department revenue returns in 1922 (Foxworthy, 1922). The colonial government introduced a system of forest reserves to control the production of forest produce. However, it has been reported that to the local collectors the gazettement of forest reserves and restriction over the collection of forest produce in Peninsular Malaysia since the 1920s was "tantamount to exclusion from the forest economy" and was expressed in evasion (Kathirithamby-Wells, 2005).

Since Merdeka, despite numerous efforts to curb the illegal harvest of *gaharu*, there have been persistent reports of illegal collection. Enforcement is exacerbated by the large extent of forested area as well as an increasing number of *gaharu* collectors. Indeed, there are numerous reports of illegal collection taking place in protected areas such as Forest Reserves, Wildlife Reserves and National Parks (see below).

Numerous attempts have been made to control the illegal collection of *gaharu.* Between 1992-2005 at least 197 *gaharu*-related arrests were reported to have been carried out (see **Table 3**). Since the first foreign collectors were noticed by the authorities in the late 1980s, enforcement agencies have worked together to address the problem of *gaharu* poaching. In addition to work by the State Forestry Department as well as the State Department of Wildlife and National Parks, enforcement has seen the involvement of the Police, and the Armed Forces. In late 1989, an Army patrol was sent to investigate incursions by Thai *gaharu* collectors in Belum, Perak (Fathol, 1998). In 1992, 10 Thais were arrested in Taman Negara (Wan Shahruddin, 1998). Reports of increased encroachment in 1995 sparked public comment:

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19 Merdeka (Independence Day) was 31 August 1957 for the Peninsular States and 16 September 1963 for Sabah and Sarawak.

20 In 19th Century Perak, gaharu was collected by the Senoi under concessions granted by the Malay Sultans (Logan, 1848). In Pahang, extraction was monopolized by the Bendahara under the Sultan of Johor (Kathirithamby-Wells, 2005). Graham (1908) suggests that in Kelantan, the costly rituals and the 'crushing royalties' demanded by rulers over exportable items may have constrained pre-modern extraction. Similarly, Dunn (1975) noted that the historical gaharu trade was centred on barter for cloth, rice and tobacco - with such a pre-capitalist economy being "conducive to self-regulation" and "resource regeneration".

"This is a source of concern and should not be taken lightly," says Malaysian Nature Society president Datuk Dr Salleh Mohamed Nor. "If the Department of Wildlife and National Parks is not able to handle the situation, the matter must be reported to the Immigration Department and the Police and Armed Forces. Besides the issue of national security, I am concerned of the danger to the wildlife" (Faezah, 1995).[21]

Table 3
Arrests related to harvesting of *gaharu* in Malaysia or by Malaysians (1992-2005)

Year	Peninsular Malaysia	Sabah	Sarawak/border
1992	10		
1996	14		1
1997			1
1999			5
2000	8	7	
2001	27		14
2002	13	5	
2003	50		8
2004	11		
2005	11		12

Source: see **Appendix 5**.
Note: 'Arrests' includes seizures of illegal shipments.

In response to the concerns raised, the Department of Wildlife and National Parks (DWNP) and the Police were reported to have established "round-the-clock patrols" in areas surrounding Taman Negara and along the East-West highway (Anon., 1995). In 1996 the DWNP arrested a total of 14 people for illegally cutting down trees in Taman Negara. This included two people "from the neighbouring country" and 12 Orang Asli (Anon., 1997b: 14). In 1999, the Perak State Government announced an informant reward system to curb *gaharu* smuggling (Anon., 1999). In 2001, the Terengganu State Government requested that Armed Forces intervene to curb Thai agarwood collectors (Anon., 2001b). In 2002, a dedicated Tiger/Rhino Protection Unit (TRPU) was formed to protect Taman Negara, however the Thai poachers were said to "have represented very serious threats, as they were in greater numbers than TRPU members and were equipped with firearms" (Anon., 2002a).

In 2002, DWNP launched joint operations with the armed forces. From 2001 to 2006, DWNP reported a total of 70 foreign *gaharu* collectors (67 Thai, 3 Cambodian) were apprehended and sentenced up to five years in jail (see **Appendix 8**). Kawanishi (2002) noted that this increased effort by DWNP had

[21] Indeed, when organised 'gangs' of gaharu collectors are in the forest, there are some indications that they hunt and trap birds and mammals for protein (meat) as well as collect surplus for trade (Compton and Bennet, 2005). The Wildlife Conservation Society has evidence that gaharu collectors from Indonesia hunt orang-utans in Lanjak Entimau National Park, Sarawak, while adults are eaten, babies are taken for the pet trade (J.M. Rubis, pers. comm., September 2006). Thai collectors were reported to have poached tigers, clouded leopards and argus pheasants in Endau Rompin National Park, Johor (Sittamparam, 2004). However, a study of more than 30 campsites in Taman Negara by Kawanishi (2002) suggested that Thai gaharu collectors were not hunting large mammals inside the National Park.

contributed to the reduction in illegal activities. However, Kawanishi noted that the presence of Thai nationals in the park was "still worrying", adding that "continuous efforts in law enforcement were needed to ensure the resilience of this large park to absorb the negative human impacts exerted by legal activities in selected areas". In particular, it was noted that patrolling efforts needed to be increased at Merapoh as this area was prone to illegal activities "due to the proximity to the main road, absence of aborigines, and abundant wildlife" (Kawanishi, 2002).

In 2004, the Johor State Government launched *Ops Cendana*, an inter-agency operation to crack-down on Thai *gaharu* collectors in Endau Rompin National Park. Johor National Parks Corporation (JNPC) only had a staff of 50, spread out over the State's five national parks. Furthermore, the enforcement powers of JNPC staff were limited and they engaged the assistance of the Police in this operation. One problem encountered was the difficulty in monitoring the thick jungle between Endau Rompin National Park's eastern gateway at Peta, Mersing and the western gateway at Selai, Segamat (Sittamparam, 2004).

The Federal Police Department was reported to have been monitoring the situation and stated that it was prepared to extend the Endau Rompin operation to cover other National Parks if the need arose (Anon., 2004a). However, despite these many efforts, reports of illegal *gaharu* collection continued and concerns continued to be expressed that the authorities had not done enough to prevent the illegal collection of forest produce including *gaharu* (Intan, 2004). Indeed, a report by Bernama, the national news agency (Anon., 2004k) suggested that there were "at least 1000 Thai poachers in Malaysia", with the number of poachers and the pace of extraction escalating.

Trade and use

Grading systems

During the colonial period there appears to have been a standard grading system in use in the Federated Malay States (Anon., 1914). However, at present there are many grading systems in use in Malaysia, however none appears to be standard. Indeed, there does not appear to be any standard grading system for *gaharu* throughout the range states. The simplest appears to be the ABC Agarwood Grading System: with Grade A being brown/black wood[22]; B: yellow wood with flecks of brown/black; C: white wood with some flecks of yellow/brown. ABC grading is usually determined solely on physical appearance; however, the commercial value of agarwood depends on many factors including scent, shape, weight and colour. A low grade does not always equate a low price, since low resin content could be made up for by an attractive shape. Conversely, a high grade may actually be sold very cheaply if its colour or texture is masked by low-grade wood that has yet to be scraped off. Indicative prices reported for *gaharu* sold in Malaysia are presented in **Table 4a** (below).

22 The darkness of the wood is correlated with resin content; agarwood sinks at approximately 25% oleoresin content when density of the wood reaches 1 kg per cubic metre.

Table 4a
Prices for gaharu wood chips sold in Malaysia (MYR/kg)

Grade	Year					
	1914[a]	1992[b]	1999[c]	2003[d]	2004[e]	2005[f]
Double super	11.19					12 000
Super						10 000
A high	4.66	790	4000	5000	8000	8000
A low		530	3200	3000		4000
B high	2	530	2500	2000	6000	4000
B low		400	1800	1500	5000	3000
C1 high	1.02	260	800	1000	5000	2000
C1 low			400	500		
C2 high	0.51		80	100		1000
C2 low			40	50		
D high	0.24		30	40		250
D low	0.12		8	4		60

Source: a – Federated Malay States (Anon., 1914); b – Peninsular Malaysia (Lim, 1992); c – Terengganu (Lim *et al.*, 2003); d – Hulu Perak (Lim *et al.*, 2003); e – Johor (Anon., 2004l); f – Kelantan (Dahlan, 2005).
Note: The grades presented here have not been standardised.

Grading usually becomes more sophisticated moving down the supply chain, with first-level collectors having the simplest system. In general, the higher grades are burnt as incense wood or are used in the manufacture of high-end traditional medicines, while the lower grades are used for making oil; however, Bland (1886) noted that the better varieties are used in the manufacture of oils. Increased oil production in Malaysia and other countries has led to increased demand for the lower grades in recent years.

Forms of gaharu

Agarwood-producing taxa are traded in a variety of forms ranging from whole plants (seedlings) and huge logs to parts and derivatives of various stages of processing[23]. The terms 'agarwood' and '*gaharu*' are usually taken to refer only to resin-impregnated pieces of wood (Grade C and above) that have been at least partially shaved of non-impregnated wood. The standard CITES terminology for these pieces when recorded in trade is wood 'chips' (**Table 4b**), however, this term may be misleading as some large pieces of *gaharu* can be more than a metre in length. Nevertheless, most forms of semi-processed or raw *gaharu* in trade only reach about 10 cm in length and can be accurately referred to as chips, fragments, shavings and splinters, even breaking down to tiny particles of powder and dust.

[23] The Standard Malaysian Name for the timber of *Aquilaria* spp. is 'Karas'; it is said to be suitable for packing crates, plywood, disposable chopsticks, ladies shoe heels and handles of the kris (a Malay ceremonial knife) (Wong, 1982; Farish and Khoo, 2003).

Table 4b
Codes used for specimens in CITES annual reports of relevance to agarwood

Description	Code	Preferred unit	Alternative unit	Explanation
chips	CHP	kg		chips of timber, especially *Aquilaria malaccensis* and *Pterocarpus santalinus* International Nomenclature for Cosmetic Ingredients (INCI) terminology: LIGNUM RESINATUM
derivatives	DER	kg/*l*		derivates (not elsewhere specified)
live	LIV	no.	kg	live plants
logs	LOG	m3		all wood in the rough, whether or not stripped of bark or sapwood, or roughly squared, for processing notably into sawn wood, pulpwood or veneer sheets. NB: trade in logs of special purpose timbers traded by weight (e.g. *lignum vitae* , *Guaiacum* spp.) should be recorded in kg
medicine	MED	kg/*l*		medicine
oil	OIL	kg	*l*	oil; INCI term: OLEUM
powder	POW	kg		powder
sawn wood	SAW	m3		wood simply sawn lengthwise or produced by a profile-chipping process; normally exceeds 6mm in thickness. NB: trade in sawn wood of special purpose timbers traded by weight (e.g. *lignum vitae, Guaiacum* spp.) should be recorded in kg

Source: Wijnstekers (2005)

Historical uses of gaharu in Malaysia

Historically, *gaharu* has been put to many uses in Malaysia, including the following: (1) Aromatic: perfumery, fragrance; (2) Pharmaceutical: medicine, aromatherapy; (3) Religious: burnt offerings, idols, rosary; and (4) Ornamental: decorative carvings. The use to which a piece of agarwood is put depends largely on its grade and the ethnicity of the user.

The Orang Asli have been observed to use *gaharu* for spiritual purposes (Dentan, 2001; Antares, 1996)[24]. The native shamans or *bobohizan* of Sabah are also said to use *gaharu* for ceremonial purposes (R. Goh, pers. comm., April 2006). In Sarawak, the Penan are reported to use *gaharu* for stomach aches, fevers and as an insect repellent (Hansen, 2000).

In Peninsular Malaysia, Skeat (1900) noted the use of *gaharu* in traditional Malay rituals. Malays were reported to use incense before prayers and to take it to Mecca (Bland, 1886), smoke as medicine (Burkhill, 1935), ground as a libation poured at the grave-side (Skeats, 1900), as '*gaharu merupa*' (shaped pieces prized as talismans; they roughly resemble some living creature, e.g. a bird, perhaps, or a man) for

24 The Orang Asli also use the bark of *Aquilaria malaccensis* for ceremonial purposes (Dentan, 1968)

spiritual purposes (Skeats, 1900; Wilkinson, 1955), numerous medicinal uses[25] (Gimlette and Thomson, 1939; Burkhill, 1935) and as a soporific (Gimlette, 1915).

Gaharu was said to be used for "every sort of ritual and private purpose" and thus of "enormous" importance in medieval China (Schafer, 1963). In Peninsular Malaysia, the Chinese were reported to use *gaharu* joss sticks as incense (Bland, 1886; Burkhill, 1935). While Indians were thought to have introduced the term '*gaharu*' to Malaysia, there does not appear to have been any historical use of *gaharu* by the Indian community in Malaysia.

Processing

Raw *gaharu* is processed to produce a wide variety of products. Pieces of *gaharu* can be further processed into a number of forms including prayer beads (rosary, *tasbih*, etc.), original sculptures (*gaharu merupa*), as well as mass-produced sculptures. Woods of all grades are also used as ingredients in medicated oils, medicated liquor, pills, tablets and medicated powder.

Gaharu of all grades can be used to produce oil via a process known as steam distillation, a common technique for obtaining aromatic compounds from plants. The raw material (wood) is chipped, sun-dried, crushed and then placed in a distillation still with water and heated until the *gaharu* compounds are driven from the wood and re-collected through condensation of the distilled vapour (Mazalan, 2005).

The water used in distillation, which retains some of the fragrant compounds and oils from the raw material is called hydrosol. The wood that remains is in the form of a powdery pulp which can be dried to be used for the manufacture of incense such as joss sticks or coils. Pure agarwood oil is used neat or diluted in other oils, fats or waxes. Agarwood oil can also be used in aqueous solutions or in alcohol[26].

In the late 1990s, the technology for *gaharu* distillation introduced to Peninsular Malaysia from Thailand and Cambodia (Dr Chang.Yu Shyun, Medicinal Plants Division, FRIM, *in litt*. to TRAFFIC International, 2000; Mazalan, 2005). There were also reported of Singapore-owned distilleries in Malaysia (Heuveling van Beek and Phillips, 1999). Recent features by a national newspaper indicate that *gaharu* distillation in the State of Kelantan traces its technology and equipment to Thailand and Cambodia (Chiew, 2005a; Chiew 2005b; Chiew 2005c).

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[25] Gimlette and Thomson (1939) note numerous applications, including the following: "*Minyak kayu gaharu* is used by Kelantan Malays for relief of *sakit meradak-radak*, shooting pains in the stomach; *gaharu* for medicinal use should be odoriferous and oily, a little astringent, bitter and aromatic to the taste it is much used medicinally by the Malays and is generally regarded in the East as a cordial; *Kalambak* is given in hot water with salt as a tonic in sexual neurasthenia; in warm water with cumin seeds, cloves, *jintan hitam* seeds and a little camphor to relieve abdominal pains during pregnancy; for *sakit senggugut bangkai*, speticaemia following an abortion; in hot water for stomach pains; in an electuary for sexual weakness; with the young leaves of *lakom* for suppressed fever; in a prescription for violent chest pains; for leucorrhoea in an infusion with cynips oak galls, tumeric and camphor; for amenorrhoea with *api-api* pith and tamarind root; *g. tandok* for heart palpitations; decocted bark for dysentery; general dropsy infusion by rubbing root into thick paste; kalambak paste for leucorrhoea; small pox; griping pains."

[26] European fragrances dilute pure perfume essence with alcohol roughly as follows:- "Perfume Extract" (15-40% concentration) (typically lasting up to six hours); "Parfum de Toilette" (10-20%); "Eau de Parfum" (EDP) (8-30%); "Eau de Toilette" (EDT) (4-20%); "Eau de Cologne" (EDC) or "Aftershave" (2-5%) (typically lasting up to two hours) (Groom, 1997).

Historical trade chains

Dunn (1975) notes that "Malayan exports of small quantities of exotic woods began in very ancient times". Chin (1985) suggests that *gaharu* was exported from Sarawak "probably since the beginning of the Christian era, when outside traders first arrived at Borneo". Etymological evidence suggests that the first international trade in *gaharu* from what is now Malaysia was carried out by traders from India – this is because the word "agaru", from which *gaharu* is thought to derive, is a Sanskrit word.

Exports to East Asia took place via the entrepôt of Funan (geographically related to modern-day Cambodia) in the 2nd Century AD (Shaffer, 1996) and direct to China starting in the 4th Century AD (Tarling, 1992)[27]. Wang (1958) listed agarwood as one of the products presumed to have been carried to South China from Tan-tan (tentatively identified as Kelantan) in the Fifth and Sixth Centuries AD. Wheatley (1959) listed agarwood as one of China's imports "definitely derived from the Malay Peninsula" between 960-1126 AD, as well as exported from Pahang in the early 17th century (Wheatley 1961). Chinese demand for *gaharu* increased in the 8th Century AD when its medicinal properties were officially recognised by entry into the *Pen Tshao Shi I*, the Imperial pharmacopoeia (Needham *et al.*, 1959). By the 10th Century AD *gaharu* was reported to be one of the most sought-after fragrant substances in China – second only to camphor (Donkin, 1999). The upper east coast of the Malay Peninsula was said to provide some of the best *gaharu* at this time (Tarling, 1992). Various forms of *gaharu* are recorded as tributes from Southeast Asia to China in the 12th Century (Wade, 2005); Burkhill (1935) suggested that some of this *gaharu* came from Kedah, Langat, Ligor and Kuantan in Peninsular Malaysia. In the 1420s, Chinese Admiral Zheng He reportedly sent men into the mountains of Pulau Sembilan (Perak) to collect *gaharu* (Anon., 2006b). Since these early exports, Malaysia (including Sabah and Sarawak[28]) has remained an important source of *gaharu* for Chinese use as incense and medicine[29].

In addition to China, the Arab nations of the Middle East have also been important destinations for Malaysian *gaharu* for hundreds of years. Direct exports of Malaysian *gaharu* to the Middle East began in the Ninth Century AD. Tibbets (1956) listed *gaharu* as one of the products that Arab traders obtained from Pulau Tioman and Kalah (Kelang) between 850-1000 AD. Much of the trade in Malaysian *gaharu* to the consumer markets in the Middle East took place through entrepôts including Singapore, Goa (formerly under Portuguese control, now part of modern India), Mumbai and Dubai.

Various authors (Wheatley 1961, Wang 1964) have noted *gaharu* as one of the products being exported through Malacca in the 15th Century. Supplies of Malacca were drawn from Cambodia, Cochin-China, Pahang and Sumatra in addition to local supplies from the West Coast of the Peninsula (Burkhill, 1935). Following the decline of Malacca as a trading port, the primary hub for *gaharu* trade shifted to Singapore.

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27 Shaffer (1996) noted that Malay traders in Funan in the 2nd Century AD succeeded in introducing gaharu to the Chinese as a substitute for frankincense and bdellium myrrh from East Africa and Arabia.

28 Following two years of research in Sarawak, Yamada (1995) noted the importance of Borneo as a source of supply of gaharu for China.

29 An authorized university medical textbook published at the end of the Cultural Revolution listed chenxiang from Malaysia and India as one of six ingredients which had to be imported from specific destinations (Deng, n.d.).

In the 19th Century, the Chinese *sampan-pukat* (large row-boats) exported significant quantities of *gaharu* from the Malay Peninsula to Singapore[30] (Newbold, 1839; Wong, 1961). The historical chains of trade in *gaharu* generally survive to the present day, with Singapore remaining the focus of trade in Malaysian *gaharu.* However, increasing volumes of *gaharu* are being traded direct to the end consumers (see Results section).

CITES and Agarwood (gaharu)

History of CITES and Agarwood-producing Taxa

In November 1994, at the Ninth Meeting of the Conference of the Parties to CITES (CoP9), India proposed that *Aquilaria malaccensis* be included in Appendix II of the Convention because it felt that international demand was threatening the survival of the species in India. CITES permits specimens of taxa on Appendix II to be exported only if they are from a legal and sustainable source (CITES Article IV 2). The Indian proposal specified that all trade in *A. malaccensis* between Parties would be subject to the CITES permit system.

The delegation of Malaysia was one of the most vocal of the 13 Parties who opposed the Indian proposal. The official report of the meeting noted that the Malaysians "strongly opposed the proposal" on a number of grounds, including the risk that the listing would "cause hardship" for Orang Asli collectors in Malaysia. Indeed, at that time the CITES Secretariat noted that "there is an enforcement problem, because much of the international trade may either be as chips or as oil, which are difficult to identify", and recommended that the listing proposal be rejected "unless adequate means for identification of the specimens in trade are available" (Anon., 1994). However, despite the objections, the proposal passed with a majority of 43 votes (*CITES Com.I 9.14 (Rev.)*).

In April 2000, the 11th Meeting of the Conference of Parties (CoP11) noted difficulties with the implementation of CITES for *A. malaccensis* and decided to carry out a review to examine options to improve the situation (*CITES Decisions 11.112* and *11.113*). In November 2002, CoP12 extended its review of *Aquilaria* species to look at all agarwood-producing taxa (*CITES Decisions 12.66* to *12.71*).

In October 2004, at the 13th Meeting of the Conference of the Parties to CITES (CoP13) Indonesia proposed the inclusion of the entire genera of *Aquilaria* and *Gyrinops* in CITES Appendix II with the annotation '#1'[31], effectively covering all parts and derivatives. The United Arab Emirates (UAE) opposed the proposal on the grounds that such a listing would be "very difficult to enforce due to the nature of the commodity that can be used and traded in various forms (wood, chips, powder, oil or as an ingredient in perfumes or medicines)" (*CITES CoP13 Inf. 54*). However, Malaysia supported the proposal and it was adopted by vote with 72 in favour, 9 against and 23 abstentions (Anon., 2004n). UAE

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30 During the year ending 30 April 1836, Singapore imported 295 kg of gaharu from the Malay Peninsula, 118 kg from the east coast and 177 kg from the west coast, this made up 2.5% of Singapore's total gaharu imports for that year (11.8 t), the bulk of which came from what is now Indonesia (Newbold, 1839).

31 #1 Designates all parts and derivatives, except: a) seeds, spores and pollen (including pollinia); b) seedling or tissue cultures obtained in vitro, in solid or liquid media, transported in sterile containers; and c) cut flowers of artificially propagated plants. This Annotation was revised at CITES CoP13, with the addition of d)

and three other Middle East nations[32] later entered specific reservations on *Aquilaria* spp. and *Gyrinops* spp. (*CITES Notifications No. 2005/009, No.2005/025*). At CoP13 Indonesia also proposed the inclusion of *Gonystylus* spp. (another genus in the Thymeleaceae family known to produce agarwood) in Appendix II – this was passed without going to a vote. As a result, since January 2005, three of the seven genera reported to have species that produce agarwood are now included in CITES Appendix II.

CITES CoP13 also made several decisions pertaining to agarwood-producing taxa, repeating the call for more research into various aspects of the implementation of the convention for these taxa (*CITES*

Decisions 13.61 to 13.65 – see **Appendix 6**). Progress against these decisions was reviewed by the CITES Secretariat and CITES Plants Committee representatives, along with the outputs from the CITES Agarwood Experts Group Meeting, held in Kuala Lumpur in November 2006, which led to CITES *Decisions 14.137* to *14.144* on agarwood-producing taxa (see **Appendix 7**).

Malaysian legislation governing trade

Legislation governing international trade in gaharu

During the Malacca Sultanate (Fifth Century AD), traders had to pay duties on the export of *gaharu*. The duty for merchants from China and Japan was fixed at 5%, while traders from elsewhere (including India, Sri Lanka, Arabia and Thailand) had to pay 6% (Yussof, 1989). During the colonial period, gaharu continued to be included on the list of dutiable items. The British administration of the Federated Malay States levied export duties on seven grades of gaharu ("Gharu" No. 1 to No. 5 and "Gharu lempong" No.1 and No. 2) (Anon., 1914).

At the time of this study, the main piece of legislation governing the international trade in *gaharu* has been the *Customs Act 1967* which regulates the export of a number of agarwood-producing species and some of the parts and derivatives thereof (these various forms are listed in **Table 6** and **Figure 4**. In particular, the *Customs Duties Order 1996* imposed a 10% Export Duty on "*gaharu* wood chips" (HS Code "1211.90 200"). However, in 2003 the *Customs Duties (Amendment) (No. 5) Order 2003* removed this Export Duty. The *Customs (Export Prohibition) Order 1998* and the *Customs (Import Prohibition) Order 1998* both require that all exporters and importers of logs (HS Code 44.03 which includes logs of agarwood-producing species) obtain a licence from the Malaysian Timber Industry Board (MTIB). In addition, the *Customs (Prohibition of Imports) (Amendment) (No. 4) Order 2006*[33], which came into operation on 1 June 2006, requires that all imports of Ramin *Gonystylus* spp. into Malaysia require "an import permit required under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) issued by or on behalf of the Director General of the Malaysian Timber Industry Board" (Sch 4, 51 (5) (b); 52 (5) (b)).

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32 Parties with specific reservations against Aquilaria spp. and Gyrinops spp. include Kuwait, Syrian Arab Republic, United Arab Emirates and Qatar.

33 P.U. (A) 200/2006.

Table 5
List of designated CITES Authorities in Malaysia of relevance to agarwood/*gaharu*

Responsibilities and competence	Agency
Management Authorities	
Central Authority	Ministry of Natural Resources & Environment
Policy Matters	Department of Forestry, Peninsular Malaysia
For the issue of export and import permits	
(a) For Peninsular Malaysia and Sabah :	
For timber and timber products (including *gaharu*)*	Malaysian Timber Industry Board
(b) For Sarawak	
For timber and timber products (including *gaharu*)*	Sarawak Forestry Corporation
Field Enforcement Authorities	
(Other MAs that indirectly relate to *gaharu* in term of enforcement)	
For National Parks & Protected Areas [Peninsular]	Department of Wildlife and National Parks
For Forested Areas	Department of Forestry Peninsular Malaysia
For Sabah	Sabah Wildlife Department
	Sabah Forest Department
Scientific Authority	[Federal] Ministry of Natural Resources and Environment
Other Enforcement Authorities	
For Peninsular Malaysia [and Federal Territories]	[Peninsular] Department of Wildlife and National Parks
	Department of Agriculture
	Forestry Department Peninsular Malaysia
	Royal Malaysia Police, NCB Interpol Malaysia
For Peninsular Malaysia & Sabah [and F.T.]	Malaysian Timber Industry Board
For Sabah	Sabah Wildlife Department
For Sarawak	Sarawak Forestry Corporation
For border control	Royal Malaysian Customs

*Malaysia's National CITES Committee has assigned responsibility for *gaharu* to MTIB (for Peninsular Malaysia and Sabah) and to Sarawak Forestry Corporation (for Sarawak).
Source: Ministry of Natural Resources and Environment, *in litt.* February, 2007; CITES website <www.cites.org> "Malaysia / Malasia / Malaisie" updated in June 2007.

Furthermore, the *Malaysian Timber Industry Board (Incorporation) Act 1973* provides controls for the export of beads and sculptures (HS Code 44.20) which may be of *gaharu*. On 28 December 2004, MTIB issued *Timber Export Bulletin 19/87* (Mohd Nazuri, 2004) which details the procedures for the trade in timber from *Gonystylus* and *Aquilaria* from Malaysia. In particular, MTIB requires each application for a CITES Export Permit to be accompanied by a document, such as a Removal Pass issued by the Forestry Department under the *National Forestry Act 1984*, which will ascertain the source from which the

specimen is derived in Malaysia[34]. The MTIB procedures cover "specimens or products such as logs, sawntimber, plywood, veneer and include 'parts and derivatives' i.e. mouldings, furniture components and finished furniture". Issues related to the implementation of these MTIB procedures is discussed in the 'Trade' section of 'Results', below.

Malaysia's Parliament passed in 2007 the *International Trade in Endangered Species Act 2007*, a federal piece of legislation governing trade in CITES-listed specimens, but the implementation of this Act relative to the agarwood trade was not able to be assessed given the time period of this study.

Table 6
Terminology used for forms of agarwood products in Malaysia

Description	Malay (and Arabic)	HS Code
beads	*Tasbih*	44.2
carvings	*gaharu merupa*	97.03
chips	*kayu* (Arabic: *al oudh*)	12.11
live	*Pokok*	6
logs	*kayu balak*	44.03
medicine	*ubat*	30
oil	*minyak attar* (Arabic: *dihn al oudh*)	33
powder	*serbuk* (Arabic: *bakhoor*)	12.11
sawn wood	*kayu papan*	44.07

Source: Antonopoulou (2005); *Customs Duties Order 1996*; Wijnstekers (2005)
Note: HS Codes 44.01 and 44.21 are sometimes misapplied to agarwood products.

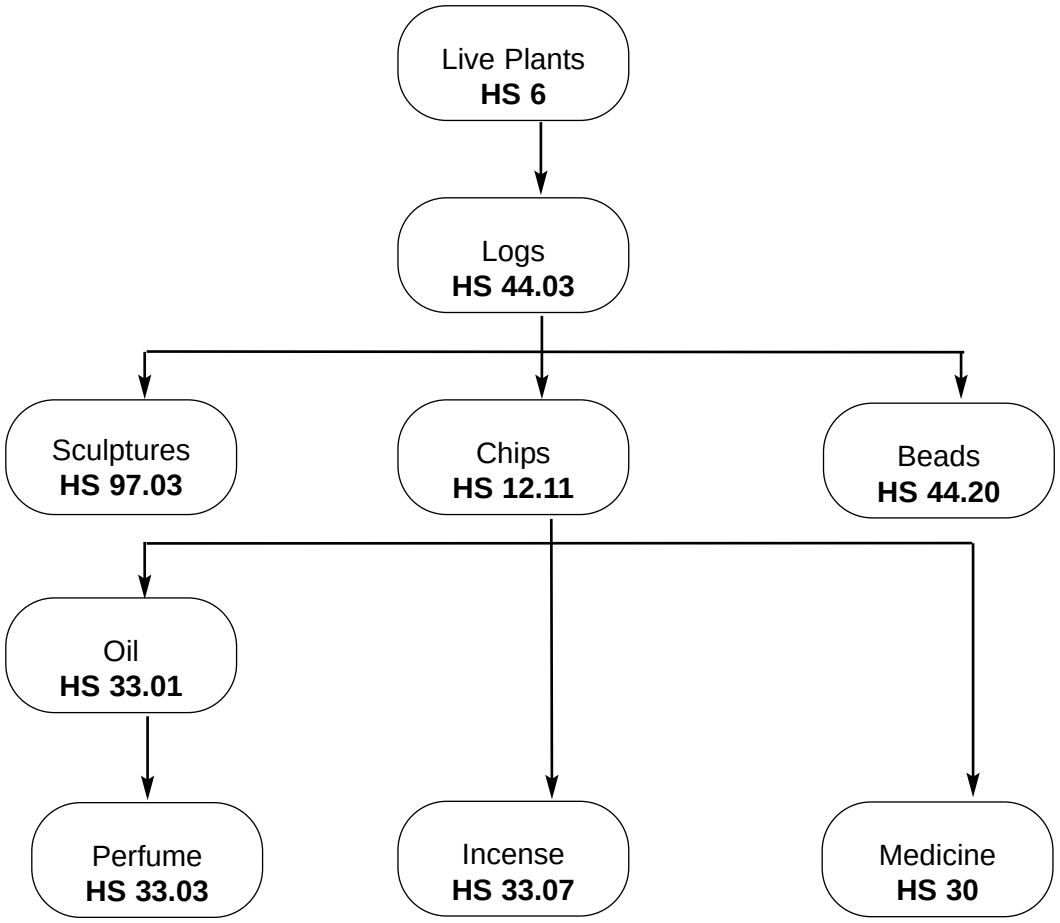
Legislation governing domestic trade in gaharu

There are a number of agencies with responsibility for regulating the trade in *gaharu* in Malaysia (see **Table 5**). These agencies derive their authority from legislation enacted by the Federal Parliament as well as the various State Legislative Assemblies. Most of the legislation mentioned in the section 'Legislation governing harvest' (see above) also has provisions related to domestic trade. In addition to this, there are a number of laws related to domestic trade that are particularly relevant to *gaharu*.

Of primary importance are the *Customs Act 1967* and the *Sales Tax Act 1972* which regulates the sale of *gaharu* in Malaysia by imposing a 5% Sales Tax on "*gaharu* wood chips" (*Customs Duties Order 1996*, HS Code[35] "1211.90 200"). Of secondary importance is the *Sale of Drugs Act 1952* which regulates the

[34] The MTIB application form "Borang permohonan PERMIT/SIJILCITES" specifies the "Pas Bagi Memindahan Hasil Hutan (Hutan 08/86 - Pin. 1/89)" (Removal Pass) as well as the "Resit Pembayaran (Kew. 38 - Pin. 2/86)" (Royalty Receipt) from the State Forestry Department.
[35] Harmonized Commodity Description and Coding System (see Appendix 7).

Figure 4
Customs HS Codes of relevance to agarwood-producing taxa



Source: HS Codes from *Customs Duties Order 1996.*

sale of *gaharu* oil, perfume and medicine; the *Control of Drugs and Cosmetics Regulations 1984* made under this Act requires that these products be registered with the Drug Control Authority and that all manufacturers, importers and wholesalers be licensed. Also of some relevance is the *Local Government Act 1976* which has provisions for the licensing of the public sales of goods (retail).

Economics

Price trends

The *gaharu* trade is driven primarily by economic factors that have a dramatic effect on patterns of consumption and collection. Comparison of prices and identifying trends is frustrated by the absence of a standard grading system. However, it is possible to make broad assessments of the prices of "top grade", the average prices and the range of prices from year to year. It is clear that prices of *gaharu* have fluctuated rather dramatically in response to global economic factors.

The *gaharu* market in Malaysia has experienced a number of booms and crashes over the years. In 1880, top grade agarwood was sold for up to four Straits Dollars (substantively equivalent to MYR4 or USD1)

per kg. By 1907, prices doubled to MYR8.20, eased to MYR6.50 in 1920[36] and then crashed to MYR1.30 in 1925 due largely to competition from the Netherlands Indies (which is now Indonesia). Pahang was reported to be very badly hit and was unable to arrest the general downturn in revenues accrued from the trade in *gaharu* and other forest produce (Bland, 1886; Foxworthy, 1922; Kathirithamby-Wells, 2005). No account has been made of general inflation, but prices of *gaharu* had risen to MYR83 per kg by 1950 (Chiew, 2005). In the 1970s "best quality" reached around MYR170 in the Baram, Sarawak (Chin, 1985; Hansen, 1988). In early 1980 the same quality reached MYR413 in the Baram and MYR1300 for similar quality ex-village in Peninsula Malaysia (Chin, 1985; Gianno, 1986). Prices then rose sharply into the 1990s, reaching MYR2000 by 1995 (Anon., 1995); MYR3000 by 1996 (Albela, 1996) and MYR4000 by 1999. The first half of the 2000s have seen the upward trend continue with prices per kg increasing to MYR5000 by 2003 (Lim *et al.*, 2003); MYR8000 by 2004 (Chiew, 2004); and as high as MYR10 000 by 2005 (Chiew, 2005).

The value chain

The economics of the *gaharu* trade are largely influenced by the market. However, profitability varies widely between different points along the source-to-market chain. The collectors are at the lowest rung in the ladder and are reported to suffer exploitation by middlemen traders. In Peninsular Malaysia, this is said to be particularly true with the Orang Asli. Kathirithamby-Wells (2005) highlighted the case of Orang Asli *gaharu* collectors in 19th Century Johor, where the aboriginal tribes became "virtual serfs" to the Malay Sultans:

> "The Orang Sabimba (Orang Senimba – a forest people from Batam Island, resettled in Johor by the Malay Sultans) were advanced salt, cloth and rice for the delivery of agarwood and other forest products. Due partly to the slow process of forest produce extraction, they remained in permanent bondage. Their plight was aggravated by the fraudulence of traders who tampered with the scales and adopted unfair prices. Reputedly, traders in Johor made a profit of anything up to 400 per cent on food and manufactures advanced to forest dwellers and a further 100 per cent on the resale of forest produce in Singapore" (Kathirithamby-Wells, 2005).

However, when prices are high, collecting can be a highly lucrative activity. For example, in Sarawak at the end of the 1970s Chin (1985) noted that "a party sold [MYR]12 000 worth collected on a week-long expedition". Collecting *gaharu* became such an obsession that swiddening was temporarily neglected; "…at present, for most families in Long Selatong it is as important or more important than rubber as a cash earner". For the year 1977, 61% of respondents (n=13) respondents earned more than MYR300 from sales of *gaharu* in 1977, while mean rubber tapping income was only MYR225 (Chin, 1985). A very similar pattern was seen in four villages in Terengganu State between 1998 and 1999 where the proportion of the workforce involved in *gaharu* harvesting increased from 10% (n=269) to 58% (n=60) and up to 68% of total household income came from *gaharu* collecting (**Table 7** and **Table 8**) (Mohd Parid and Lim, 2003).

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36 1920 Singapore exported 370 piculs (22.2 t) for [MYR]142 751 giving an average price of MYR6.5 per kg (Foxworthy, 1922).

Table 7
Average household income (MYR/month) derived from gaharu in Terengganu

Village (Year)	No. households surveyed	Household income		
		Total	Gaharu	%
K. Jengai (1998)	34	1009	148	14.70%
K. Jengai (1999)	10	1529	1040	68.00%
Pasir Raja (1998)	34	935	154	16.50%
Pasir Raja (1999)	18	1178	686	58.20%
Besul/Bkt Besi	61	976	10	1.00%
Lubuk Periuk	17	859	32	3.70%

Source: Mohd Parid and Lim (2003); Lim *et al.* (2005)

There are some that see the *gaharu* industry as exploitative of the Orang Asli (Anon., 1991). Despite their pivotal role in the trade chain, it appears that Orang Asli are said to be "price takers", selling to the trader willing to pay the highest price. Orang Asli are employed by a wide variety of middlemen, even occasionally being employed by traders from Thailand (C. Nicholas, pers. comm. September 2005). Although many Orang Asli communities no longer collect as much gaharu as they did 10 years ago (C. Nicholas, pers. comm. September 2005), prohibition on unlicensed collection would have a significant effect on the income of certain groups. In particular, enforcement of the licensing requirements of the *National Forestry Act 1984* could have a "devastating" effect on the income of the two villages in the study, possibly exacerbating poverty (with present levels of poverty being 4/28 (1/10, 3/18) households in the two villages) (Lim *et al.*, 2003).

In effect, most sources indicate that this diversification approach is what traditional collectors already practice, with most reports stating that, due to the risks and uncertainties associated with its yields, *gaharu* harvesting is seldom a full-time activity. Studies have found that *gaharu* collecting provides employment mainly during slack periods of the agricultural cycle (Mohd Parid and Lim, 2003); villagers spend alternate weeks on agriculture and *gaharu* collecting/fishing (Lim *et al.*, 2005). Sociologists working closely with the Orang Asli have found that collection is usually only a supplementary activity to hunting, fishing and agriculture; collection is often spurred by macro-economic factors such as a bumper fruit harvest making the fruit trade unprofitable (C. Nicholas, pers. comm. September 2005).

Despite the general indications that *gaharu* collection is usually a peripheral activity, there are indications that *gaharu* plays a more central role in the economy of some groups. Lye (2005) observed the following patterns of collection and trade among the Batek of Taman Negara, Pahang:

> The main source of cash income is commercial extraction of forest products: primarily rattan and eaglewood or *gaharu*. ... Rattan and *gaharu* traders have come to mark the passage of calendar-time. Every three weeks the current trader drives into the forest to pick up his shipments from a collecting group. On another day, he may rendezvous with a different group living elsewhere. Whenever he's expected to appear, someone from the group will walk out to a logging road to meet him and guide him to their latest location. They might have moved camp since his last visit. The collectors scramble onto the back of his truck and he drives them to the various wayside points where they've stashed their products. They load up the products until the shipments are fully on board. The trader

pays them off, maybe chauffeurs them to the nearest shop where they will stock up on supplies, drives them back to the forest, makes an appointment for the next collection day, and goes off.

Similar arrangements seem to be made in Sabah, where collection by locals appears to have been taking place for quite a number of years. Goh (2006) recorded in a newspaper report that in Sabah brokers would come up with the money for collectors to buy our supplies and provide for their families back home:

> A 60-year-old Murut from Nabawan, who wanted to be identified only as Saring, said finding gaharu was a family tradition and he started doing it when he was a teenager. "My first trip was before I got married. I needed the money to pay my dowry," said Saring, who was caught last year [2005] in Munggis, Ranau. He was with five others deep in the Kinabalu Park when caught by rangers, who had received word from villagers living at the edge of the reserve about strangers walking in the forest. "We had about 10 kg at the time and had chopped down 12 trees. We were there for nearly two months. I know it is wrong and I don't think I will be doing it any more after spending two weeks in the lock-up."

However, even at very high prices, it is unlikely that collection of *gaharu* from the wild can be an economically sustainable activity on its own. LaFrankie (1994), estimated that natural densities of *gaharu* in the wild (2-3 stems per hectare over 1 cm d.b.h.) preclude sustained economic exploitation in the long term (annualised sale values were only about USD0.11 per hectare per year). However, it was noted to be possible that by combining multiple forest products under a 'High Diversity Forestry' scheme, one could increase the density of harvestable products, reduce the unit cost of labour and improve the profitability of wild harvest.

Table 8
Economics of harvesting gaharu in Peninsular Malaysia

Year	1998	2002	2003
State, locality	Terengganu: Kg. Pasir Raja, Kg. Kuala Jengai, Dungun	Pahang: Hutan Simpan Tekam, Jengka	Perak: Kg. Sungai Banun, Gerik
Ethnic group	Malay	Orang Asli	Orang Asli
Size of party	2-6 (avg. 4)		2-10 (avg. 5)
Composition (man/woman/child)	Mainly men <40 yrs	Group 1: 6m, 4w, 8c; Group 2: 1m, 2w, 1c	Men 15-60 yrs
Trip frequency (x per month)	50% 1 x; 50% 2-3 x	1 x	20-30 x
Trip duration	3-14 days (avg. 8)	7-21 days	1 day
Yield per trip	0.15-8.5 (avg. 1.8) kg*	5 kg (group 1)	0-3 (avg. 0.5) kg
Grades	All grades		Mainly C & D
Trading location	Village "ex farm"	Forest edge	Village, jetty, town

*This yield translated into a trip income of MYR300-9500 (avg. MYR2461) or MYR638 per person for a 9-day, 4 person trip.
Source: Lim *et al.* (2003)

METHODS

TRAFFIC Southeast Asia initiated work on *gaharu* trade dynamics in Malaysia in September 2005, with the objectives of documenting the structure, significance and trade dynamics of Malaysia's harvest, trade and local consumption of this unique non-timber forest product, and making recommendations towards a CITES Non-Detriment Finding (NDF) methodology[37]. Initial work centred on a review of all available literature, including botanical, economic as well as cultural sources. This was supplemented by field research centred on three States in the Federation of Malaysia, Kelantan (in Peninsular Malaysia), Sabah and Sarawak (both in Malaysian Borneo). The field research aimed to trace trade chains from the point of collection until the point of export. In addition, an assessment was made of the domestic market for agarwood in Malaysia. This involved market research including surveys of and semi-structured interviews with retailers of agarwood products (e.g. traditional medicine retailers, prayer article retailers, dedicated agarwood retailers/wholesalers, shopping centres and traders in open-air markets). Retail outlets were visited in the Klang Valley (Kuala Lumpur and surrounds), Ipoh, Seremban and Penang in Peninsular Malaysia as well as Kota Kinabalu and Sandakan in Sabah and Kuching in Sarawak.

To present and review the findings of the initial research, TRAFFIC Southeast Asia convened a National Workshop on 1-2 March 2006 in collaboration with the Forest Research Institute Malaysia (FRIM) and the Ministry of Natural Resources and Environment (the CITES Scientific Authority of Malaysia). This workshop included representatives from industry, regulatory agencies and non-governmental organisations from all three regions of Malaysia, as well as resource persons from the CITES Plants Committee, the IUCN-SSC Global Trees Specialist Group and the IUCN-SSC Medicinal Plants Specialist Group. In addition, Malaysia hosted a CITES Agarwood Experts Group Meeting involving government, scientific and industry representatives from key agarwood-trading countries in Kuala Lumpur from 14-17 November 2006. This international workshop addressed a wide range of issues related to the sustainability of the international agarwood industry, including the methodology for conducting CITES NDFs. TRAFFIC's research on *gaharu* in Malaysia was conducted in a transparent manner, and has allowed for creation of valuable links with the both the Malaysian Government and *gaharu* industry participants.

RESULTS

Harvest

Legal harvest

The extensive literature review and consultations carried out under this study revealed that no specific statistics recording the legal harvest of *gaharu* produced by *A. malaccensis* have been published by Malaysian authorities[38]. The lack of official records does not necessarily mean that no legal harvest took place, however, it does frustrate the quantification of any legal harvest.

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37 The recommendations for the NDF methodology were presented to the 17th Meeting of the CITES Plants Committee as PC 17 InfDoc 4 (see www.cites.org/common/com/PC/17/X-PC17-Inf-04.pdf).

38 The annual reports of the forestry departments of the Federated Malay States makes passing mention of gaharu collection in the 1910s, however the product was included in the 'Miscellaneous' category of production records and gaharu-specific statistics are not available.

As a non-timber forest product classed as "minor forest produce" *gaharu* appears to have been subject to somewhat less stringent rules governing harvest licences. The actual legal procedure for the harvest of *gaharu* in the various States of Malaysia over the years is somewhat obscure. Prior to enactment of the *National Forestry Act 1984*, forestry legislation in Peninsular Malaysia differed from State to State, but it appears that the taking of minor forest produce, including *gaharu* from reserved forests were processed through what was known as a *Form II Licence*. Under this arrangement, the *gaharu* collectors were required to bring the produce to the nearest Forestry Department checking station for assessment of royalty. All monies due to the State would be collected and the *Form II Licence* would then be issued. The outturn of non-timber forest produce was classified under a 'Miscellaneous' category therefore products such as *gaharu* cannot be identified in the Annual Reports.

James Compton/TRAFFIC

One of the Agarwood shops, Bukit Bintang, Kuala Lumpur

While the *National Forestry Act 1984* no longer provided for the issuance of *Form II Licences*, some State Forestry Departments in Peninsular Malaysia (such as those in Kelantan and Terengganu) continued the previous practice by substituting the *Form II Licence* with the *Removal Pass* (a document specified under s 70(2) of the *National Forestry Act 1984*) for specimens of *gaharu* upon the receipt of royalty payments from traders. However, this issuance of Removal Passes without reference to a licence or permit for collection is not sanctioned by the *National Forestry Act 1984*[39]. In this regard it was noted that not all State Forestry Departments carried out this practice, and indeed the practice was usually not officially sanctioned – it appeared to be a semi-formal practice carried out by Forest Rangers upon request by traders.

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39 This practice is said to stem from provisions that existed in earlier State forestry enactments (Z. Mukshar, pers. comm. March 2006).

From the fact that there were no reported licences issued for the collection of *gaharu*, it can be concluded that a substantial volume of *gaharu* collected in Peninsular Malaysia since the early 1990s may have been 'legalised' via the application of the Removal Pass system to facilitate the harvest of such produce which was deemed to be appropriate as a temporary measure to overcome practical constraints related to the nature of *gaharu* collection (which differed considerably from the nature of industrial logging which the *National Forestry Act 1984* appears to have been drafted to cater for primarily). This arrangement took into consideration factors such as the uncertainty of *Aquilaria* trees containing *gaharu*, the sporadic distribution of the species as well as humanitarian concerns regarding the welfare of rural communities involved in collection (especially Orang Asli whose livelihood was dependent on collecting activities). Despite the full formality of this system, it appeared that *gaharu* collection resulted in at least a nominal income for the State Governments via royalty payments. However, royalty from *gaharu* was not reported under a discrete category (being listed under the 'Other Minor Forest Produce' category), so statistics on this State revenue from *gaharu* are not clear.

Following rising *gaharu* prices, the Malaysian government began to recognise the value the industry and began to take a number of steps to support its development. The Malaysian Timber Council (MTC) produced publicity material that noted "Malaysia has been a leading supplier of gaharu wood to Saudi Arabia, with exports worth more than MYR50 million over the last five years" (Anon., 1998b). By the early 2000s, the State Governments and FDPM began to investigate ways in which to regulate the *gaharu* industry in a more co-ordinated manner. The Malaysian Delegation to the 15th meeting of the CITES Plants Committee (Anon., 2005d) reported that a special committee comprising of all State Directors of Forestry was set up in June 2004 at Forestry Department Headquarters, Kuala Lumpur to come up with Standard Operating Procedures for the harvest of *gaharu*. In 2005, these procedures were adopted for use by all the States in Peninsular Malaysia to control the harvest, trade and processing of *Aquilaria* spp. (Anon., 2005d; Anon., 2005e). The salient points of the Gua Musang Guidelines included the following regarding the issuance of licences for the harvesting of *gaharu*:

> i) A deposit of MYR10 000 (approximately USD2632 at 2005 rates) is imposed on each licence approved;
> ii). Harvest quota is set at 500 kg of wood-chips per month per licence;
> iii). A royalty rate of 10% *ad valorem* per kilogram is charged;
> iv). Licensee is required to supply 3,000 *Aquilaria* seedlings per year to the State Forestry Department;
> v). *Aquilaria* trees with diameters less than 20 cm are not allowed to be harvested;
> vi). *Aquilaria* trees which bear flowers and fruits are not allowed to be harvested; and
> vii). Licensee is required to submit a shuttle return to the State Forestry Department on a monthly basis in respect of the amount of *gaharu* harvested (Anon., 2005d).

The Guidelines also detailed suggested requirements for the issuance of licences to trade in *gaharu*, including the following:

> i). All *gaharu* traders are only allowed to purchase *Aquilaria* products from the contractors /licensees registered with the State Forestry Department;;
> ii). All *gaharu* traders are required to maintain a log book showing the amount of gaharu purchased from the contractor and sold to the manufacturer; and

iii). All *gaharu* traders are required to submit a shuttle return to the State Forestry Department on a monthly basis in respect of the amount of gaharu purchased and sold (Anon., 2005d).

Furthermore, the Guidelines also detailed requirements for the issuance of licences to process *gaharu* (primarily in respect to distilleries). The requirements for manufacturers of *gaharu* oil included the following:

i). A manufacturer is required to apply for a valid licence from the State Forestry Department;
ii). A manufacturer is required to maintain a log book showing the amount of *gaharu* purchased and processed;
iii). A manufacturer is required to submit a shuttle return to the State Forestry Department on the monthly basis in respect of the amount of raw *gaharu* purchased and the amount of processed *gaharu* oil sold; and
iv). A manufacturer is required to obtain a CITES permit from MTIB for any exports of *gaharu* oil (Anon., 2005d).

Despite the adoption of these procedures, field observations in September 2005 did not reveal that the State Forestry Departments had begun to implement the various provisions (see below). However, it was noted that at the time of the National Workshop in March 2006, the Kelantan State Forestry Department was reported to be in the process of issuing a licence for the collection of *gaharu*. All the other States were reported to be taking action to implement the Standard Operating Procedure (SOP) and looking into possibilities of strengthening and improving the procedure.

Prior to independence in 1963, the North Borneo Forest Department Annual Reports (i.e. covering the modern territory of Sabah) detailed the outturn of Minor Forest Produce (Standard Form VIII) that included "incense and perfume woods". Furthermore, prior to 1956, these reports included details of the export of *gaharu*[40]. However, since Merdeka neither the Sabah Forestry Department nor the Sabah Wildlife Department reported the issuance of any licence for the collection of *gaharu*. Nevertheless, the Sabah Forestry Department has published statistics on the harvest and export of timber from *Aquilaria* species (see **Table 9**). These statistics show that nearly 16 000 m^3 of *Aquilaria* logs (< 16 000 000 kg, if wood density < 1 kg m^{-3}) had been harvested between 1982 and 2004, with nearly a quarter of that volume being exported. It is not clear whether these logs contained any *gaharu.*

The Forest Department Sarawak reported issuing licences and receiving royalty for the collection of *gaharu* prior to 1933. Since 1933, no *gaharu* collection licences have been issued, however the Forest Department has issued collection permits upon payment of a fixed fee and has licensed the domestic and international trade in *gaharu* (see **Table 10**). Dawend *et al.* (2005) noted only one valid permit for the collection of *gaharu* in Sarawak (see **Table 11**). This permit was reported to have been issued to an individual of Iban ethnicity based in the Serian District (Dawend *et al.*, 2005). However, copies of permits to collect *gaharu* that were presented at the Malaysia National Workshop on *gaharu* trade in March 2006 indicated that in addition to the Serian permit, collection permits had also been issued in the Belaga

[40] From year to year, exports of gaharu were reported under various headings:- "Kayu Laka, Kayu Gaharu, etc."; "Kayu Gaharu"; "Kayu Gaharu (*Aquilaria malaccensis* Lam.)"; "Kayu Chendana"; and "Kayu gharu, barks and roots".

Table 9
Production and exports of *Aquilaria* spp. logs (in cubic metres) from Sabah

Year	Production	Exports
1982	127.48	
1983	629.38	566.35
1984	421.81	303.35
1985	65.3	61.33
1986	448.12	254.41
1987	3392.91	1300.57
1988	424.96	281.12
1989		33.69
1990	280.24	137.3
1991	494.94	266.53
1992	1336.84	497.54
1993	1020.61	63.25
1994	0	
1995	0	
1996	2084	
1997	2181.43	
1998	720.28	18.88
1999	402.84	
2000	574	
2001	388	
2002	567.67	
2003		
2004	373.64	

Source: Sabah Forestry Department Annual Reports

District[41]. In 2004, the Sarawak Forestry Corporation took over the processing of licences for the collection, trade, import and export of *gaharu*; the licenses continue to be approved and issued by the Controller of Wild Life.

41 The representative of the Sarawak Forestry Corporation made reference to two gaharu collection permits, viz.: Permit No. 04052 issued on 24 June 2004 to an individual from Uma Badang Asap, Belaga, for the "collection of protected plant"; as well as Permit No. 04054 (which had recorded the collection of a total of 108 kg between July 2004 and April 2005).

Table 10

Revenue from *gaharu* reported by the Sarawak State Government in 2002 (in Malaysian Ringgit – MYR) (MYR3.80/USD at 2002 rates)

Month	Volume (kg.)		Levy (10%)		Licence Fee		Other	Total
	Import	Export	Import	Export	Collect	Trading	Revenue	Revenue
Jan	0	69 500	0	6950	0	410	20	7380
Feb	0	15 000	0	1500	0	200	100	1800
Mar	10 000	0	1000	0	0	0	0	1000
Apr	10 000	0	1000	0	600	320	0	1920
May	10 000	0	1000	0	0	0	0	1000
Jun	0	0	0	0	0	0	0	0
Jul	0	12 000	0	1200	0	0	0	1200
Aug	0	0	0	0	0	515	250	765
Sep	0	0	0	0	0	0	0	0
Oct	0	0	0	0	0	0	0	0
Nov	0	0	0	0	0	0	0	0
Dec	0	0	0	0	0	0	0	0
Total	**30 000**	**96 500**	**3000**	**9650**	**600**	**1445**	**370**	**15 065**
USD	**7895**	**25 394**	**790**	**2539**	**158**	**380**	**97**	**3964**

Source: Dawend *et al.* (2005)

None of the *Aquilaria* plantations that had been established in Malaysia (see 'Development of the *gaharu* industry in Malaysia', below) had yet to report the production of any *gaharu*. Therefore, the only known legal harvest of *gaharu* in Malaysia was from Sarawak – the taxonomic status of which, as noted above, has been claimed to be predominantly of *Aetoxylon sympetalum* (Browne, 1955; Anderson, 1959; Anderson, 1980).

Illegal harvest

Overview of illegal harvest

Widespread illegal harvest of *gaharu* was continuing to take place throughout Peninsular Malaysia, Sabah and Sarawak during the 2005-06 period that TRAFFIC's research was being compiled. Evidence of illegal harvest collected in the focal areas of Gua Musang, Kelantan and Maliau Basin, Sabah suggested that this harvest was being carried out by locals as well as foreign nationals. Newspaper reports also indicated that Malaysians were continuing to enter Brunei from Sarawak to harvest of *gaharu* illegally and then smuggle it back into Malaysia for re-export.

Illegal harvest in protected areas

Illegal harvest was taking place in all types of forest, including protected areas. There appeared to be a particularly significant amount of collection taking place inside areas that are totally protected by law. This

Table 11

Number of *gaharu* collectors and traders registered with the Forest Department Sarawak (2004)

	Permit/License Type						
	Total	**Collect**	**Trade**	**Export**	**Import**	**Im/Ex**	**App.**
Ethnicity							
Iban	3	1	1				1
Bidayuh	1		1				
Chinese	42		33	5	2	2	
Malay	6		3	2	1		
Orang Ulu	4		1	1	1		1
Bumiputera	3						3
Total	**59**	**1**	**39**	**8**	**4**	**2**	**5**
District							
Lundu	1						1
Kuching	25		15	5	4		1
Serian	8	1	6	1			
Lachau	3		3				
Lubok Antu	1		1				
Sibu	1						1
Belaga	1		1				
Baram	6		4	1			1
Miri	9		7	1		1	
Limbang	2		2				
Lawas	2					1	1
Total	**59**	**1**	**39**	**8**	**4**	**2**	**5**

Source: Dawend *et al*. (2005); *Note*: 'App.' = Application, 'Im/Ex' = Import/Export

is probably because the forest in these areas is usually more intact than elsewhere and also the inaccessibility of most of these areas means that the level of enforcement personnel is generally low. Collection of *gaharu* is prohibited in protected forests such as national parks and conservation areas. Field research and newspaper reports indicated that widespread illegal collection of agarwood was taking place in important protected areas such as Taman Negara National Park, Endau Rompin National Park, Kinabalu Park, Maliau Basin Conservation Area, Crocker Range Park, Lanjak Entimau Wildlife Sanctuary, Mulu National Park, Royal Belum Park and Selangor Heritage Park (see **Table 2**, **Appendix 5**). However, the federal authorities state that many of these reports have not been substantiated and are therefore questionable (Ministry of Natural Resources and Environment, *in litt*. to TRAFFIC, 2007).

Illegal harvest methods

Illegal harvest was found to be mostly of the sub-lethal nature. Indeed, as noted, there are indications that the Orang Asli (indigenous forest people of Peninsular Malaysia) and Penan (indigenous forest people of

Sarawak) routinely practice a sub-lethal harvest method (Yamada, 1995). Furthermore, an interview with Thai collectors indicated that foreign collectors were also practising a semi-sustainable harvest method whereby trees would only be felled if there were good indications that the trees contained high grade *gaharu*. One distinction in harvesting methods between locals and foreigners was that foreigners were generally not interested in harvesting low-grade *gaharu* for use in distilling oil.

Trans-national gaharu poaching

A 2004 report by Bernama, Malaysia's national news agency, noted that the bulk of trans-national gaharu poaching in Malaysia was organised by syndicates. "The syndicate makes all the preparation like arranging transportation, lodging along the way and the immigration and custom clearance". The syndicates were particularly interested in carrying out harvesting operations in National Parks in Malaysia as it was "almost risk-free to operate in Malaysian protected areas as patrols were minimal and there were hardly any arrests" (Anon., 2004k).

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Foreigners found encroaching on protected areas in Malaysia are often found in possession of the implements of illegal gaharu harvest, including axes for chopping the tree trunk and awls for carving out pieces of gaharu

Enforcement

Effectiveness of enforcement efforts

In response to the increase in illegal harvest of *gaharu* in the 1990s, Malaysian authorities were noted to have increased enforcement efforts. However, it was difficult to assess the effectiveness of these efforts. Between 1992 and 2005 at least 197 *gaharu*-related arrests were reported (see **Table 3**). However, there appeared to have been no decline in the prevalence of illegal collection. While illegal *gaharu* collectors often possessed firearms, while forest rangers were usually unarmed. However, DWNP teams were reported to regularly include at least one or two people equipped with firearms.

Additional law enforcement efforts

Newspaper reports suggested that Kelantan was the only State in Peninsular Malaysia which had posts to register people collecting *gaharu* from the forests and to conduct checks when they enter and leave the forest (Oorjitham, 2005). Indeed, it was reported that in 2005 the Kelantan State Forestry Department had seized a substantial amount of *gaharu* wood chips at the Pos Kawalan Bio-Diversity Check Point in Loging, Kelantan. Incentives for informants included 10% of the compound sum, and 1% of the value of product seized.

The Forest Department Sarawak had also made a number of efforts to control the unlicensed collection of *gaharu* in Sarawak. Signs in local languages such as Malay and Iban had been produced that warned of the consequences of unlicensed collection: up to one year imprisonment and a fine of MYR10 000. One striking example was reproduced by Victor and Rambli (1998: 122): A stop-sign encircling a photograph of a man carrying a two-metre long piece of *gaharu*, the caption (in the Iban language[42]) warned of the consequences of unlicensed *gaharu* collection.

In response to repeated incursions by Malaysian *gaharu* collectors, the Brunei Government set up a Special Task Force comprising of Forestry Rangers, the Royal Brunei Police Force, the Royal Brunei Armed Forces and several other relevant Government agencies (Malai, 2000).

Trade and use

Processing

The study recorded a number of *gaharu* processing facilities in Malaysia. Three gas-fired oil distilleries were seen in operation in Kelantan. These included one in Rantau Panjang owned by a Malaysian but managed by a Thai national. One in Tanah Merah was owned and operated by a Malaysian of Cambodian descent. One in Gua Musang was owned and operated by a Malaysian. Other distilleries were reported to be in operation in other States, including one in Pekan, Pahang, owned and operated by Cambodians[43]; as

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42 "Ditagang nebang tauka bejual-beli utai tumbuh ti di jaga perintah enda belisin di Sarawak. Ditagang bejual-beli Kayu Gaharu enda belisin! Ukum: 1 taun jil enggau ukum mata duit RM10,000.00". (Trade in protected plants requires a licence in Sarawak. It is prohibited to trade in gaharu without a licence. Penalty: one year imprisonment or MYR10 000 fine).

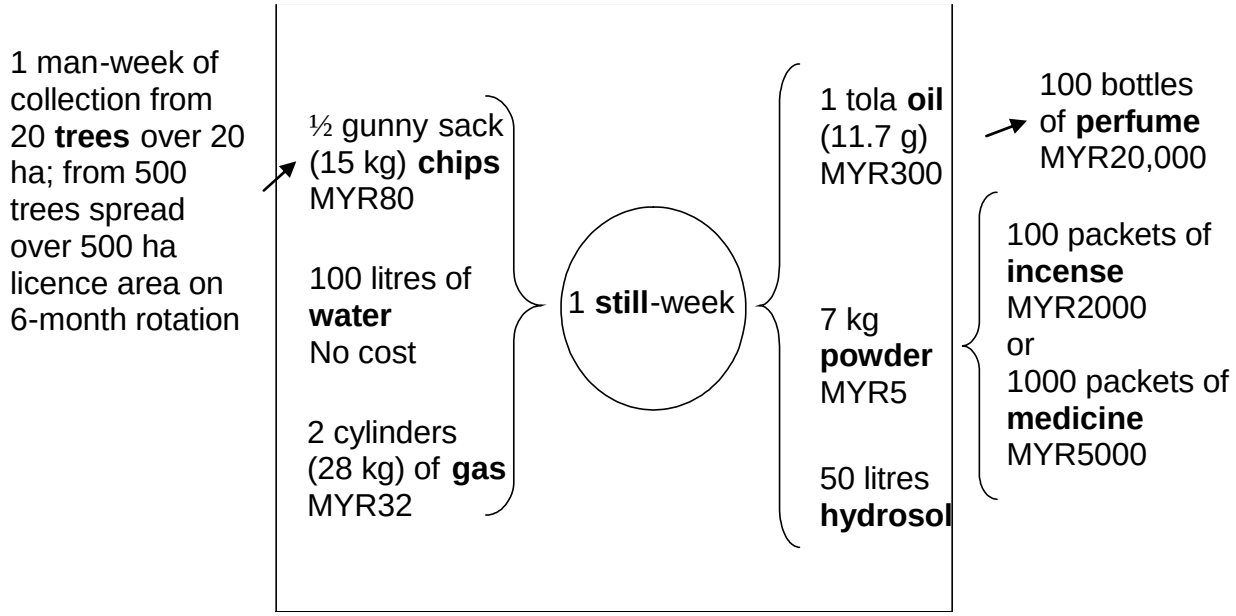
43 A settlement near Pekan was established by Cambodian refugees in the 1970s, some of these people have since become Malaysian citizens.

well as one in Setiu, Terengganu, owned and operated by a Malaysian. These distilleries were reported to have had difficulty obtaining a licensed supply of *gaharu* and were reported to have been closed down following enforcement operations by the Peninsular Malaysia Forestry Department (T. Marina, pers. comm., 2006). There are also believed to be distilleries in Perak (including one wood-fired still), Johor, Sabah and Sarawak.

The yield from these distilleries was in the order of 0.1%, i.e. roughly 1 kg of wood chips yields 1 g of oil. However, distillation was considered a profitable enterprise as MYR1 (USD0.26) of chips could be converted into MYR3 (USD0.79) of oil (**Figure 5**).

In addition to distilleries, a number of secondary-processing industries were noted. The *gaharu* powder by-product was used by number of incense factories. These ranged from Chinese-style joss-stick factories in Penang and Kuala Lipis, Pahang, to Arab-style incense factories in Kajang, Selangor. In addition, there were a number of traditional medicine factories in Malaysia that claimed to use *gaharu* as ingredients.

Figure 5
Schematic diagram of the economics of *gaharu* distillation in Malaysia



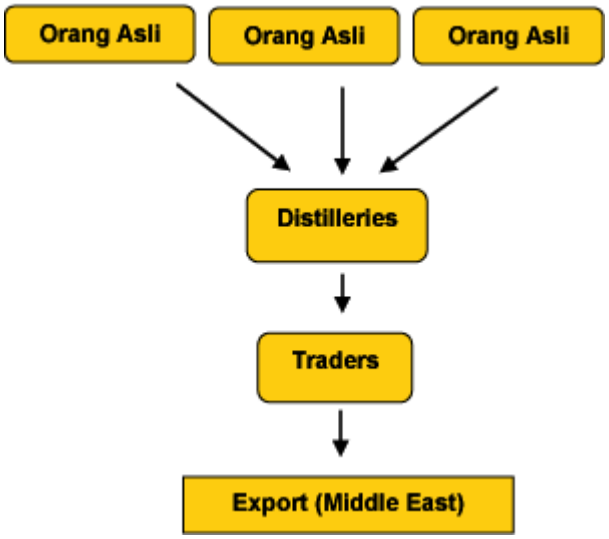
MYR – Ringgit Malaysia (MYR3.8 = USD1 at 2005 rates)
Source: TRAFFIC research, Kelantan, 2005.

Trade chains

Kelantan

The trade chains in the three Malaysian case studies exhibited similar, yet distinct patterns. In the case of Kelantan, collectors/primary traders were locals (primarily Orang Asli; but some Malays) who sold direct to a distillery. The distilleries were owned by Malays – however, these were usually Malays of Cambodian descent. The distillery acted as a primary processing unit for both wood chips and oil – at the distillery, the higher grade wood was processed by further cleaning and carving; the lower grade wood was processed for oil. The distillery sold both wood and oil directly to traders in Kuala Lumpur who then reportedly exported the products to markets in the Middle East.

Figure 5a
Kelantan trade chain example



Source: TRAFFIC research, 2005-6.
Note: In this case, the distillery functioned as a central point for the trade in *gaharu* wood chips as well as oil

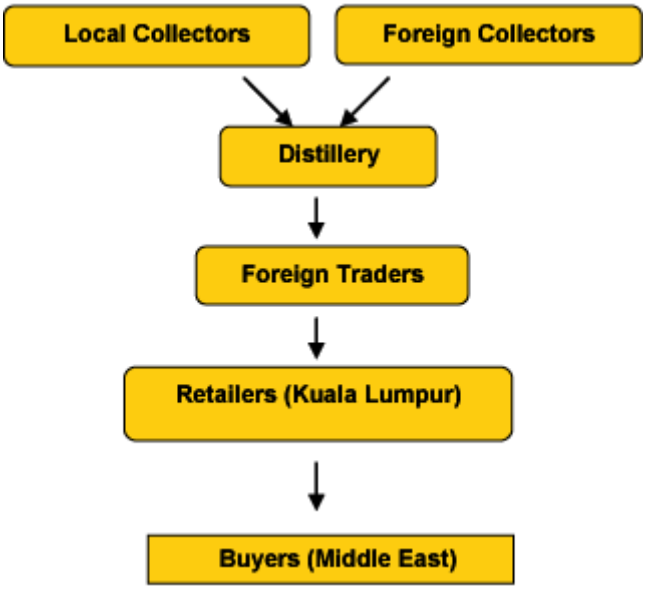
Sabah

The Sabah trade chain was more speculative, with a number of assumptions having to be made. What was clear was the fact that there were both local and foreign collectors involved in harvest/primary trade. These collectors often sold to ethnic Chinese traders based in Keningau or Kota Kinabalu. Goh (2006) notes that buyers in the Pensiangan District in the south of Sabah sold to traders from Indonesia (the Pensiangan Basin is upstream of East Kalimantan). Goh (2006) also notes that there were buyers who flew into Sabah from Peninsular Malaysia, Sarawak and even Hong Kong. The bulk of this trade appears to be in agarwood chips, however, there also was at least one distillery reported to be operating in Tawau, and that distillery was reportedly linked with a foreign-based trader who also operated a retail outlet in Bukit Bintang, Kuala Lumpur.

Sarawak

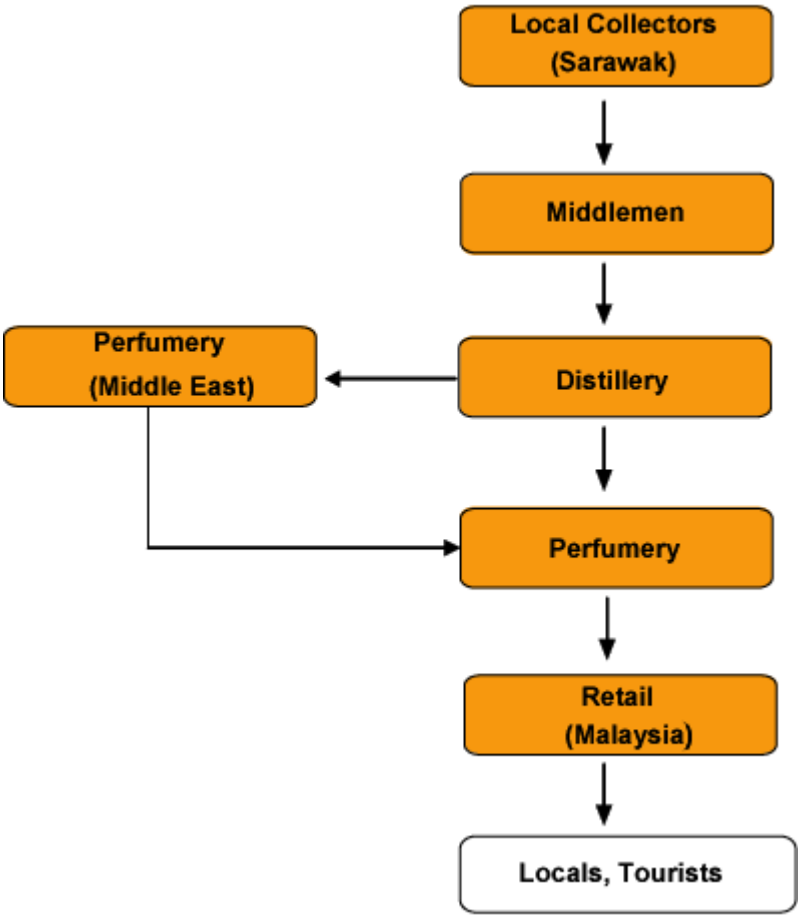
One case in Sarawak involved sales through middlemen as well as further processing of the oil in a perfumery located in the Middle East prior to re-import for domestic sales of perfume (Botes, 2004). Statistics from the Forest Department Sarawak indicated that the vast majority (71%, n=59) of *gaharu* traders in Sarawak were ethnic Chinese; the majority of these based in the urban centres of Kuching and Serian Districts (Dawend *et al.*, 2005).

Figure 5b
Sabah trade chain example



Source: TRAFFIC research, 2005-6.

Figure 5c
Sarawak trade chain example



Domestic market

Very little local consumption of *gaharu* chips or oil for incense or perfumery was recorded in Malaysia during the survey period. However, the domestic retailing of agarwood products catering to tourists from the Middle East was growing[44] with more than a dozen agarwood shops being established in Bukit Bintang, the centre for Middle Eastern tourism in Kuala Lumpur (see **Box 1**). The price of one kilogramme of top-grade agarwood on sale had risen from MYR3000 (USD790) in 1996 to MYR15 000 (USD3900) in 2006, with some traders quoting retail prices of above MYR20 000/kg verbally for 'limited stocks' of their highest grade. These prices are among the highest prices ever recorded for Malaysia (see **Figure 6**). However, as has been noted, analysis of pricing is hampered by a lack of a standard grading system. Such a system would also be an essential pre-requisite for effective regulation and revenue collection[45].

Although most *gaharu* chips and oil are believed to be exported, there appeared to be a considerable domestic market in Malaysia for *gaharu* incense and medicine, particularly among the ethnic Chinese. Incense had been reported as being the "primary" use of agarwood in Malaysia (Barden *et al.*, 2000). Current research findings supported this, with manufactured *gaharu* incense on sale in Malaysian-Chinese prayer-article shops including many product ranges of sticks, cones, coils (both raised coils and flat coils) and powder. These items were sold at a premium, with agarwood joss sticks roughly five times the price of normal joss sticks (MYR20 (USD5.2) per packet, compared with MYR4 (USD1) per packet).

There was no evidence of *gaharu* use among the community of ethnic Indians in Malaysia. A survey of five shops selling incense and oil at the Batu Caves Hindu Temple Complex, Selangor, (November 2005) revealed a wide variety of "agarbatti" incense sticks manufactured both locally and in India, however none of these products claimed to contain *gaharu*. LaFrankie (1994) observed that '*Aquilaria agallocha*' was sold in Indian spice shops throughout Malaysia for a MYR2.50 per 100 gm (USD10 per kg) – however this finding could not be confirmed in the 2005-6 survey period.

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44 In 2000, visitors from Middle East countries (predominantly Saudi Arabia, but also including visitors from Kuwait, UAE and other Gulf States) numbered 21,000, doubling to 53,000 in 2001, and again to 114,000 the following year (Hong, 2005).

45 Malaysian Government agencies have already developed a number of grading systems for forest produce including logs (e.g. Sabah's Log Grading Rules 1965 and Sarawak Log Grading Rules 1987) as well as rules for the grading of processed products (e.g. Malaysian Grading Rules for sawn timber).

Box 1
Agarwood Retail in Bukit Bintang, Kuala Lumpur

A survey of four agarwood retail outlets in Bukit Bintang was carried out between September - October 2006. Following a standard questionnaire, the proprietors of these outlets were interviewed regarding five aspects of their business: sources of supply; prices; legal compliance; methods of trade; and the profile of consumers.

All four respondents were sourcing from within Malaysia, with two respondents also sourcing from overseas (supply countries included Indonesia, Singapore, Viet Nam, Lao PDR and Papua New Guinea). All respondents stated that supplies were becoming increasingly difficult to obtain. Prices ranged from MYR100 per kg for the lowest quality wood chips to MYR68 000 per kg for the highest quality gaharu oil (oil was sold by the tola, with prices of up to MYR800 per 11.7 g tola). It was reported that these prices had more than doubled in the last five years in the face of a combination of increased demand and dwindling supplies.

All stores had business trading licenses issued by the Kuala Lumpur City Hall, however none of the respondents issued CITES permits for their customers, many of whom were foreign nationals visiting Malaysia. Only one respondent knew that MTIB issued CITES permits for agarwood[46] . All respondents stated that they obtained their supplies through middlemen, with two mentioning ethnic Chinese middlemen. Two respondents also stated that they obtained some of their supply directly from Orang Asli collectors.

All respondents stated that their customers were mostly Middle Eastern tourists who visited Malaysia during the northern hemisphere summer months (the so-called 'Arab Season'). Buyers included men and women, who spent on average between MYR1000-2000 per transaction. Women were reported to be buying smaller quantities and showed a preference for 'mukholat' (gaharu oil mixed with other essential oils). In addition to the tourist trade, two respondents also stated that they also operated wholesale exports to the Middle East with shipments valued between MYR10 000 to MYR50 000 per shipment. These exports were reported to be made using courier postal services.

As noted by Ng and Burgess (2004), while the wildlife authorities do not oversee the sale of processed medicines, such preparations are afforded some attention by the Ministry of Health. Indeed, there were found to be more than 200 products that claimed to contain *Aquilaria* currently registered with the Ministry of Health[47]. Of these products, 84 (41%) were a form of cough medicine known as '*Su Her* Pills', with 33 companies having registered such pills with the Ministry. In addition, there were 16 brands of medi cated liquor and 13 brands of stomach-ache medicine containing *Aquilaria* that had been registered (Database of Drugs Registered Since 1985, Drug Control Authority (DCA), Ministry of Health Malaysia, <www.bpfk.gov.my>, accessed on 9 December 2005). Furthermore, a number of designer fragrances registered with the Ministry of Health had published promotional material that contained claims to contain *gaharu* but did not print such claims on their packaging[48].

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46 MTIB has noted about 30 traders in the area and stated that it plans to advise traders of CITES procedures as well as hold a capacity building workshop to increase the understanding of enforcement issues related to agarwood (MTIB in litt. to TRAFFIC, 2007)·

47 The Ministry of Health officially prohibits the use of endangered species in medicines (Che Mohd Zin, 2003).

48 In this regard, many claims to contain gaharu probably refer to synthetic rather than natural ingredients. Burr (2002) notes that real gaharu is too expensive to use in mainstream perfumery: "Big fragrance firms redraw the formula [for well-known perfumes] to take out the expensive ingredients and substitute cheap ones." Synthetic gaharu was noted to cost 1/18th the price of the original.

Figure 6
Trends in the price of top grade *gaharu* wood chips on sale in Malaysia (1880-2000)

Source: Literature review (see 'Background' section) and field notes, 2005-6.

There did not appear to be significant use of *gaharu* by the ethnic Malay community apart from a very limited use of oil as *minyak attar* (alcohol-free perfume that is popular among some sections of the Muslim community). A recent study found that some Malays continue to use the services of traditional healers such as *bomoh, dukun* and *pawang* (Norana *et al.*, 2001); however the extent of *gaharu* use by these healers was not determined.

Trade between Peninsular Malaysia, Sabah and Sarawak

Although domestic trade is not controlled by CITES, the wildlife legislation of Sabah and Sarawak requires that the export of any CITES-listed species from these States (whether to Peninsular Malaysia or to each other) be accompanied by an export licence issued by the Management Authorities of the respective States. Export of any CITES-listed species from Sarawak to Peninsular Malaysia or Sabah does not require any CITES Export permit under the State Legislation but it does require an export license as provided under the *Wild Life Protection Ordinance 1998*. In practice, neither Sabah nor Sarawak have reported any intra-Malaysian trade of *gaharu* to the Peninsula. The amount of *gaharu* observed on sale in Kuala Lumpur that was claimed to have originated in Malaysian Borneo appeared to have been shipped out of Sabah and Sarawak in violation of State laws applicable to CITES-listed species.

International trade

Sources

Statistics on the international trade in *gaharu* to and from Malaysia were compiled from a number of sources. These sources included the Department of Statistics Malaysia (DSM) (who derived their statistics from the Malaysian Customs Department). The data from the DSM and Customs focused on trade under HS Code HS 121190200, "Gaharu Wood Chips". This code includes all forms of *gaharu* – not just CITES-listed species. The DSM statistics were compared with the statistics provided by the annual reports of the various Malaysian CITES Management Authorities, including the Department of Wildlife and National Parks (DWNP), the Malaysian Timber Industry Board (MTIB), the Sabah Wild Life Department and the Forest Department Sarawak. These statistics were also cross-referenced with CITES trade statistics derived from the *CITES Trade Database*, maintained by the UNEP-World Conservation Monitoring Centre, Cambridge, UK (last updated on November 13, 2006)[49]. This UNEP-WCMC database was also used to obtain statistics on the re-export of Malaysian *gaharu* to third countries.

Exports from Malaysia

Malaysian Customs reports that over 6 000 000 kg (6000 t) of *gaharu* were exported from Malaysia between 1995-2005 (see **Table 12a**). In comparison, permits for the export of only around 3 000 000 kg (3000 t) of *gaharu* were issued by Malaysian CITES Management Authorities during the same period (see **Table 12b**). The statistical discrepancies suggest that in particular, between 1995 and 2002 only 42% of total *gaharu* exports had CITES permits. However in 2003 and 2004 the volume of CITES permits issued actually exceeded the volume of exports reported by Customs by a factor of seven. This dramatic shift was most probably due to the fact that MTIB was issuing CITES permits for the export of *gaharu* under HS Chapter 44 (which includes wood chips for general purposes not including perfumery). From 2003 onwards, the majority of *gaharu* exporters appear to have stopped declaring exports of *gaharu* under HS Chapter 12 (which includes all wood chips for perfumery, including *gaharu* wood chips), switching their declarations to HS Chapter 44, which is technically in violation of Section 133 of the *Customs Act 1967*[50] (see **Figure 7**). The mis-declaration as *gaharu* under HS Chapter 44 is most clearly seen by examining the export statistics for 2002 and 2003 (see **Table 12c**). It is clear that while reports of CITES permits for the export of *gaharu* more than doubled, the declared exports of *gaharu* wood chips under HS 12 declined dramatically – however this decline was more than off-set by declared exports of generic wood chips under HS 44.

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49 A number of possible errors were identified and corrected: the 2001 record of imports of 283 587kg Aquilaria sp. "sawn wood" from Malaysia reported by Germany was probably reported as "283,587" with the comma to be interpreted as a decimal point; the 2003 record of imports of 20 000 kg Aquilaria malaccensis chips from Malaysia (origin "US") reported by Singapore was probably an error for origin Malaysia; the 2003 record of imports of 300 kg Aquilaria malaccensis chips from Singapore (origin "ML") reported by Saudi Arabia was probably an error for origin Malaysia ("MY").

50 The penalty for making incorrect declarations is a fine of up to MYR500 000 or imprisonment for up to five years or both (Customs Act 1967, s 133).

Table 12a

Exports of Gaharu Wood Chips from Malaysia (kg) and CITES Permits Issued

Year	CITES Permits	Customs Records	CITES exports as a % of Customs export data
1995	106 478	796 120	13%
1996	171 107	1 093 550	16%
1997	87 230	1 173 515	7%
1998	559 851	844 532	66%
1999	528 190	484 236	109%
2000	887 600	1 184 290	75%
2001	32 900	260 492	13%
2002	134 842	179 044	75%
2003	337 670	46 765	722%
2004	221 541	29 480	751%

Source: UNEP-WCMC *CITES Trade Database* (updated on 13 November 2006); Department of Statistics Malaysia (HS Code 121190200)

Table 12b

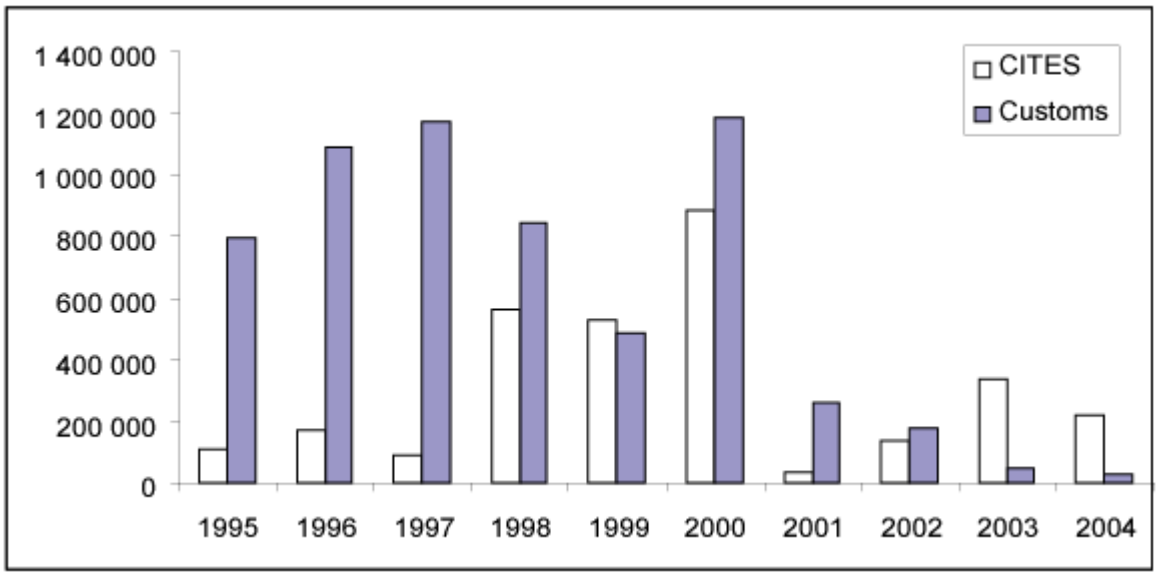
CITES permits issued by regional Malaysian Management Authorities for the export of *Aquilaria* chips (kg) (1995-2005)

Year	Peninsula	Sarawak	Sabah	Malaysia
1995	90 478	16 000	n/a	106 478
1996	163 107	8000	n/a	171 107
1997	87 230	n/a	0	87 230
1998	31 870	527 981	0	559 851
1999	43 530	484 660	0	528 190
2000	17 900	869 700	0	887 600
2001	32 900	0	0	32 900
2002	124 842	10 000	0	134 842
2003	357 450	n/a	0	337 670
2004	221 541	n/a	0	221 541
2005	244 227	n/a	n/a	239 184
Total	1 390 252	1 916 341	0	3 306 593

Source: Malaysian CITES Management Authorities

Note: In 2005 11 litres of oil were exported from the Peninsula

Figure 7
Exports of *gaharu* wood chips from Malaysia (kg) – CITES permits vs Customs records (HS12)



Source: Department of Statistics Malaysia (HS Code 121190200); CITES Management Authority Annual Reports (DWNP, MTIB, Forest Department Sarawak and Sarawak Forestry Corporation)

Table 12c
Exports of Malaysian wood chips to Singapore (kg)

Year	CITES (*Aquilaria*)	Customs Codes	
		HS 12	HS 44
2002	181 312	155 921	8000
2003	422 128	22 000	296 000

Sources: UNEP-WCMC CITES Trade Database (Aquilaria spp.) Exports Reported; Department of Statistics Malaysia: 'HS 44' = Wood in Chips/Particles, Non-Coniferous (HS 440122000); 'HS 12' = Gaharu Wood Chips (HS 121190200).

MTIB has stated that it is aware of the current lack of controls over exports under HS Chapter 12 and has suggested that action be taken by the end of 2007 for the relevant codes[51] to be included in the *Export Prohibition Order* of the *Customs Act 1967*. In the meantime, MTIB has pledged to cooperate with Customs to controls exports under HS 12 on an administrative basis to ensure that the requirements of CITES are met (MTIB *in litt.* to TRAFFIC, 2007).

Between 1995-2005 the bulk of *gaharu* exports from Malaysia reported to CITES were destined for Singapore. Over this period 93% of exports were destined for Singapore. Direct exports to other countries remained relatively insignificant (see **Table 13**). However, there does appear to be a trend for increasing volumes of trade to be taking place directly out of Malaysia (see 'Re-exports' section below). In 2005, destinations other than Singapore accounted for 27% of all exports.

[51] These include the following eight-digit codes (for ASEAN countries):- HS 1211.90.95, HS 1211.90.99, HS 3301.90.90; as well as the following nine-digit codes (for non-ASEAN countries):- HS 1211.90.200, HS 1211.90.900, HS 3301.90.100.

Table 13

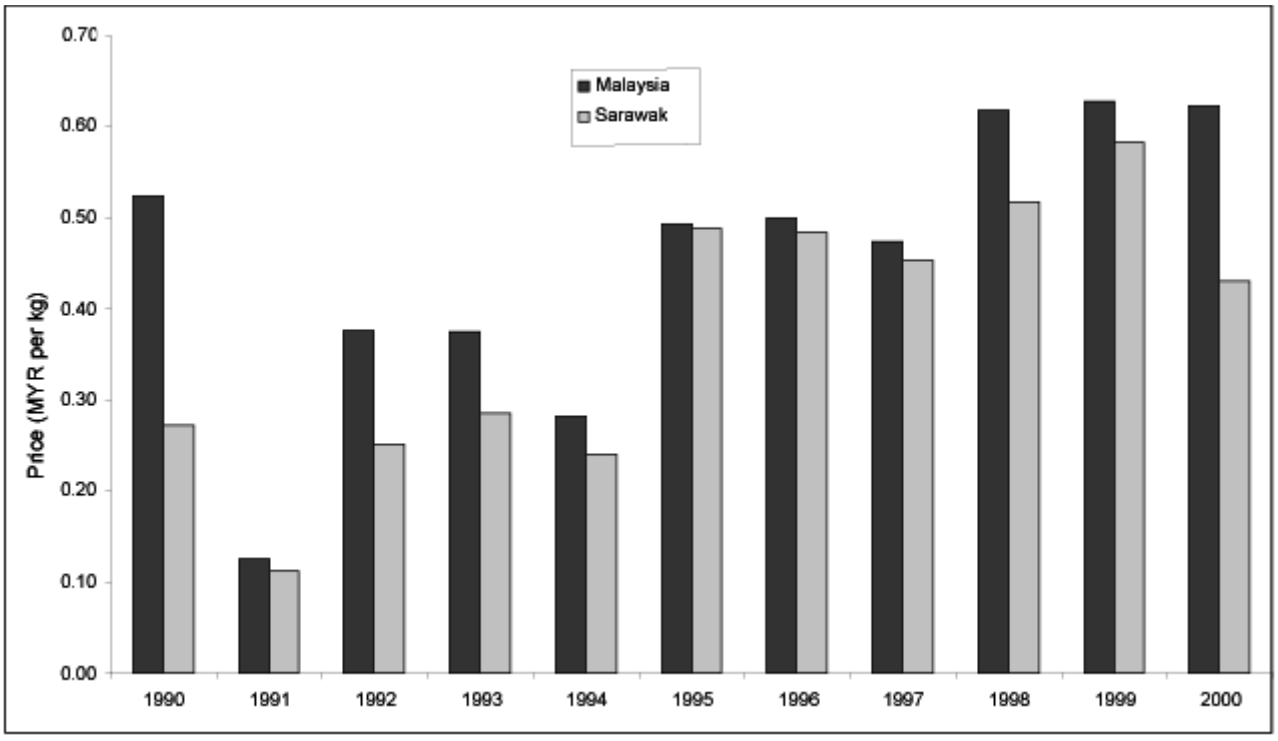
Direct exports of *Aquilaria* chips from Malaysia reported to CITES 1995-2005 (kg)

	Importer's Reports	Malaysia's Reports	Discrepancy
United Arab Emirates	32 260	19 139	69%
China		60	100%
Germany	284		100%
Egypt		34 000	100%
Hong Kong	56 920	56 920	0%
India	4200	4200	0%
Cambodia		200	100%
Netherlands		2	100%
Saudi Arabia	145	25 342	99%
Singapore	1 107 219	2 957 786	63%
Thailand	7550	8550	12%
Taiwan, Province of China		17 100	100%
Viet Nam		27 660	100%
Total	**1 208 577**	**3 150 959**	**62%**

Source: CITES trade statistics derived from the *CITES Trade Database*, UNEP World Conservation Monitoring Centre, Cambridge, UK (updated on 13 November 2006).

Figure 8

Average export value (price) of *gaharu* wood chips from Sarawak compared with that of all states in Malaysia (1990-2000) (MYR f.o.b.)



Source: Department of Statistics Malaysia

Average prices of exports of *gaharu* wood chips reported to Customs are very low (less than MYR1 per kg). These derived values for average prices indicate that either very low grade *gaharu* make up the bulk of exports and/or that values of exports are under-declared. The absence of a standard grading system, combined with the existence of value-based sales taxes and export duties could be considered to provide an incentive for traders to under-declare the value of exports. It is also apparent that the price of *gaharu* exported from Sarawak is consistently below that of the average price of all *gaharu* exported from Malaysia as a whole (see **Figure 9**). This price differential is probably mainly due to the additional transport cost involved in bringing *gaharu* to the main trading centres; however, it may also be due to *gaharu* from Sarawak being mostly of an inferior grade or perhaps an inferior species to those of the Peninsula (e.g. *Aetoxylon sympetalum* and *Aquilaria beccariana* could perhaps be considered inferior to *Aquliaria malaccensis*).

MTIB notes that the value declared for exports of agarwood sawdust/powder averages around MYR5 per kg, whilst, agarwood chips range from MYR200-700 per kg and oil averaged around MYR1600 per litre (MTIB *in litt*. to TRAFFIC, 2007).

As noted (previously in section 'Legislation governing harvest'), there is no specific category for *gaharu* in the State *Forest Rules* in Peninsular Malaysia[52], with royalties collected presumably being reported in the open category ("other"). However, there does not appear to be any correlation between volume of exports of *gaharu* and the collection of royalties in the "other" category between 1990-1994 (see **Table 14**).

Table 14
Value of Miscellaneous Forest Produce Compared with Value of Exports of *Gaharu* Wood Chips from Peninsular Malaysia (MYR)

Year	Royalties	Exports
1990	1 090 558	45 385
1991	1 044 364	748 570
1992	1 103 715	243 287
1993	1 268 693	145 672
1994	3 314 971	284 712

Source: Gan and Weinland (1996); Department of Statistics Malaysia.
Note: 'Royalties' refers to royalties collected for the "other" forest produce category; 'Exports' refers to exports of *gaharu* wood chips from Peninsular Malaysia.

Exports from Sabah

The Forest Department of British North Borneo recorded the important position of *gaharu* prior to Merdeka. Exports of gaharu from Sabah boomed in the early 1930s, with more than 7000 t being exported in 1931 alone (see **Table 15a**). The quantity of exports of *gaharu* from Sabah may have been

52 For example in Pahang, the Forest Rules 1987 would include gaharu under an open clause of the Royalty Rate List: Sch II (ii) 2.11 (d) "Minor Forest Produce: Miscellaneous - Forest produce not mentioned above".

Table 15a
Exports of *gaharu* and lakkawood from Sabah (1930-1938)

Year	Quantity (kg)		Value (MYR)	
	Gaharu	Laka	Gaharu	Laka
1930	5 915 067	-	38 063	-
1931	7 106 577	-	27 756	-
1932	6 446 350	-	24 010	-
1933	259	35 251	665	880
1934	197	203 112	466	5077
1935	264	158 542	658	4408
1936	148	56 741	469	945
1937	73	76 485	51	1274
1938	87	91 358	183	1523

Source: Sabah Forest Department Annual Reports

affected by over-harvesting or perhaps by the liberalisation of the non-timber forest product trade in neighbouring Sarawak in 1933. Whatever the cause, the exports of *gaharu* collapsed in that year. The collapse in exports took place in the face of prices rising from MYR0.004 to MYR2.57 per kg between 1932 and 1933, suggesting that over-harvesting was the cause. To a large extent, *gaharu* appeared to have been substituted by lakkawood (*Dalbergia parviflora*), another incense wood.

Not all of the historical exports of gaharu from Sabah originated from the territory itself, much of them being re-exports. Sabah was an important centre for the transhipment of agarwood during the British North Borneo era. In 1949 at least MYR196 526 worth of minor forest produce passed through Tawau from Dutch Borneo (now East Kalimantan) and consisted of numerous commodities including “garu wood” (Forest Department 1949 Annual Report, p. 17).

Although nowhere near the level of the 1930s, a significant *gaharu* trade continued from Sabah after the war. Between 1948 and 1963, the Forest Department reported the outturn of 12 294 pikul (737 640 kg) of “incense and perfume woods” worth MYR349 646 (Forest Department Annual Reports). Between 1951 and 1955, 336 583 lbs. (152 992 kg) of these incense woods were exported as “Kayu Laka, Kayu Gaharu, etc.” with a declared value of MYR365 654.

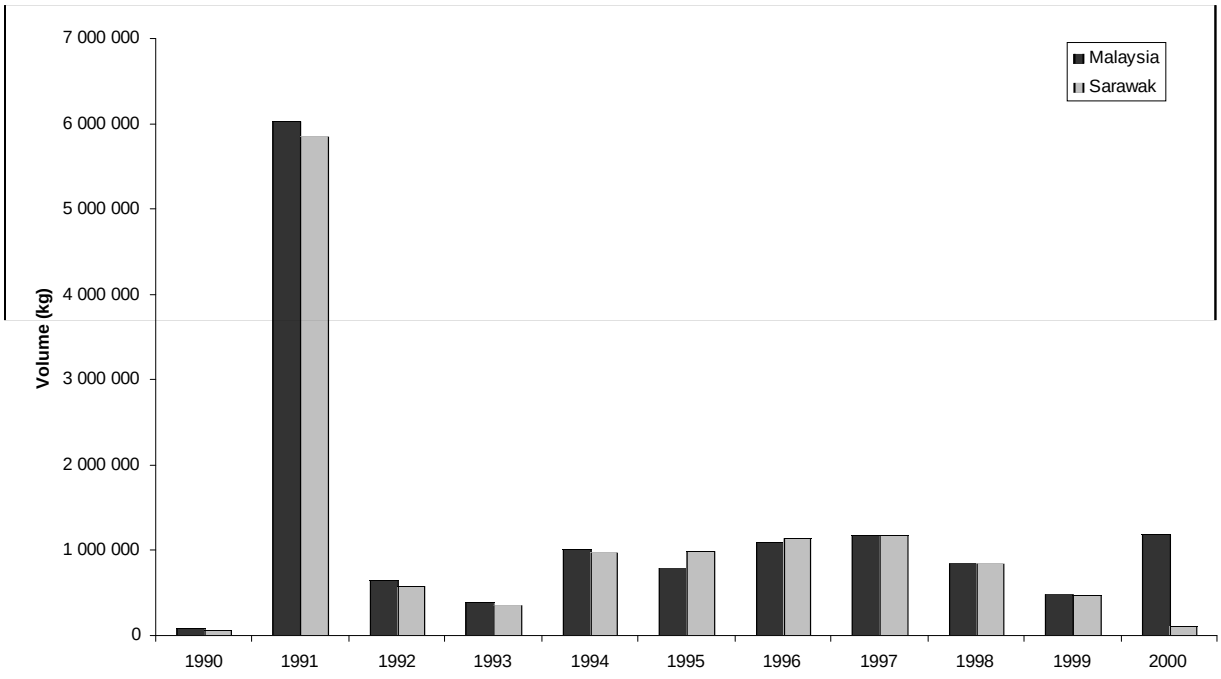
From 1956 onwards, details of the export of incense woods were not differentiated from “other minor forest produce” in the Forest Department annual reports. However, gaharu-specific export statistics[53] were published by the Sabah Branch of the Department of Statistics Malaysia (DSM) until the late 1980s. Between 1973 and 1987 around 10 000 kg of gaharu were exported from Sabah. The destination of these shipments was split fairly evenly between Singapore and Hong Kong, with a few kilogrammes destined for Peninsular Malaysia. Over the same period, imports of around 3 500 kg were reported, mainly from

53 These statistics were reported under SITC (Rev 2) 292.402.00 (CCCN 12.07.200) "Garroo Wood Chips".

Indonesia, but also one or two shipments from India, Hong Kong and Australia. From around 1988 onwards the export statistics for *gaharu* appear to have been grouped under a generic code rather than specifically mentioned as in earlier years.

Since 1995, the Sabah Forestry Department reported exports of 18.88 m³ of *Aquilaria* logs from Sabah (see **Table 9**). These logs appeared to have been exported without a CITES export permit as none of the CITES Management Authorities have reported any CITES permits issued for the export of *Aquilaria* species from Sabah.

Figure 9
Exports of *gaharu* wood chips from the whole of Malaysia (all states, including Sarawak) compared with exports from Sarawak alone (1990-2000) (kg)



Source: Malaysian Customs Export Statistics reported by the Department of Statistics Malaysia (for total Malaysian exports) and; Forest Department Sarawak Annual Reports (for exports from Sarawak alone).

Exports from Sarawak

Customs statistics suggest that almost all *gaharu* exported from Malaysia between 1990 and 2000 originated in Sarawak (see **Figure 9**). Indeed, Customs reported that *gaharu* exports from Sarawak reached nearly 1 000 000 m³ annually (see **Table 15b**). Dawend *et al.* (2005) reported that in the year 2000, a total of 1 296 500 kg of *gaharu* was exported from Sarawak, yielding MYR129 650 in levies for the State: this income from *gaharu* was reported to have made up 46.8% of the total wildlife licensing collection for that year. However, this volume of harvest did not appear to have been sustained, with *gaharu*-related income in Sarawak declining to a mere MYR15 065 by 2002 (Dawend *et al.*, 2005).

Despite the large volume of exports of *gaharu* from Sarawak, it is not clear what proportion of these exports was from *Aquilaria* and what proportion was from *Aetoxylon* or other *gaharu*-producing taxa. The apparent predominance of *Aetoxylon* in Sarawak has implications for the effective enforcement of CITES since the Sarawak CITES Management Authorities (the Forest Department and the Sarawak Forestry

Table 15b
Exports of *gaharu* from Sarawak 1995-2002 (kg)

Year	CITES Sarawak	Customs Sarawak	FD Records Sarawak
1995	16 000	990 000	n/a
1996	8 000	1 130 000	n/a
1997	n/a	1 165 003	n/a
1998	527 981	838 129	530 000
1999	484 660	466 278	n/a
2000	869 700	114 000	1 296 500
2001	0	0	158 170
2002	10 000	53 800	62 852

Source: Forest Department Sarawak CITES Annual Reports; Department of Statistics Malaysia (Customs data); Dawend *et al.* (2005)

Corporation[54]) have claimed (particularly since 2004) that the State's *gaharu* exports are derived mostly from *Aetoxylon sympetalum* – which is not a CITES-listed species. In its CITES Annual Report for these years (1998, 1999 and 2000), the Sarawak Forest Department noted that:

> "Kayu *Gaharu* refers to woodchips of the following species *Aquilaria malaccensis*, *Aetoxylon sympetalum*, *Aquilaria becariana* and *Aquilaria microcarpa*. It is very difficult to distinguish the difference between these species once in the form of wood chips, thus all wood chips from the above species require CITES permits."

The Forest Department Sarawak reported issuing CITES permits for the export of more than 1,800 t of agarwood in the three-year period 1998-2000: with annual volumes of 527,981 kg, 484,660 kg (31 permits), and 869,700 kg (50 permits) respectively. In 2002, only one permit for the export of 10,000 kg was reported. There have been no reports of CITES permits issued since 2002 for agarwood (neither have Customs reported any exports of *gaharu* since this date). The CITES Annual Reports (1998-2000) record that permits for the export of agarwood were issued to seven companies. Representatives from three of these companies that were reached successfully all responded that they were no longer dealing in agarwood. The reason given was a lack of supply. Trade surveys in Sarawak in 2005 and 2006 revealed five agarwood-trading companies in addition to those listed previously. The Forest Department reports that one new licence to trade *gaharu* was issued in 2005 and 2006. One further company had an agarwood-related name, however it was not confirmed whether this company actually dealt in agarwood. Three of these companies claimed to have agarwood in stock when contacted. The others stated that there were difficulties in obtaining agarwood for the following reasons:

(1) The supply was controlled by "gangsters";
(2) The Indonesian authorities had restricted the export of agarwood; and
(3) Suppliers tried to cheat on the grade/quality of agarwood.

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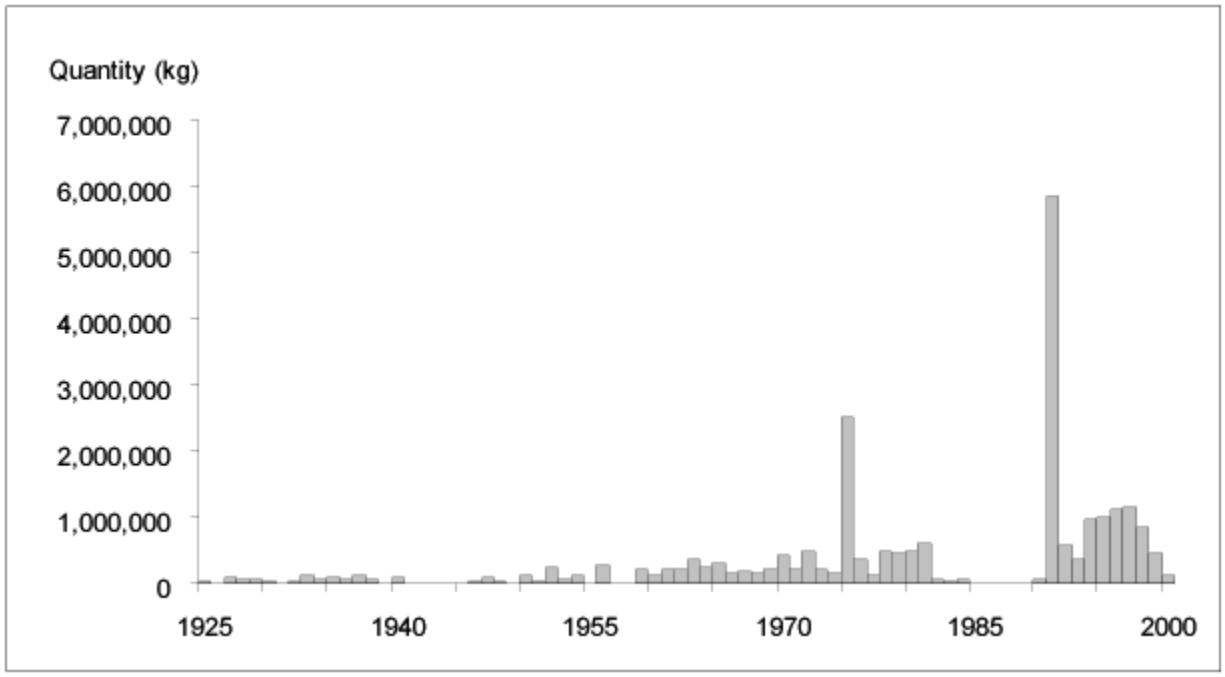
54 In particular, the Security and Asset Protection Unit of the Sarawak Forestry Corporation.

Figure 10
Exports of *gaharu* wood chips from Sarawak 1925-2000



Source: Forest Department Sarawak Annual Reports 1925-2000.
Note: Forest Department Sarawak's last available annual report was that for the year 2000.

Numerous sources (Chin, 1985; Dawend *et al.*, 2005) suggest that the key reason for the difficulty in obtaining agarwood was that most readily-accessible agarwood trees in Sarawak had already been harvested.

However, a number of companies based outside of Sarawak claim to be dealing in Sarawakian agarwood. For example, a KL-based company stated that it regularly imports agarwood from Sarawak. In addition, a Singapore-based company claimed on its website to be a supplier of "superior grade aloeswood from Sarawak, East Malaysia. Small in size, therefore can easily put them to censers to perfume your house". However, it noted that "Malaysia Jinko MLSJK-41 Price: $19.50 (4gms) Jinko[55] (sinking type) from Sarawak, East Malaysia. Very nice fragrance." (viewed on 15 October 2006).

Re-exports of Malaysian gaharu

According to the UNEP-WCMC Database (13 November 2006), the vast majority (93%) of international trade in CITES-permitted Malaysian-origin agarwood passes through Singapore. From Singapore, agarwood is re-exported to other entrepôts as well as directly to a number of end-markets in East Asia and the Middle East. The key secondary entrepôts are India (where Mumbai is a key trading location for consumer markets in the Middle East); Hong Kong (which re-exports to Japan and perhaps mainland China); as well as the United Arab Emirates, with Dubai being a key entrepôt for the entire Persian Gulf region. Singapore reports re-exporting Malaysian gaharu to a total of 14 countries (and even re-exports a certain volume back to Malaysia) (see **Table 16**).

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55 Jinko, or jin-koh, is the Japanese term for agarwood or gaharu.

Table 16
Re-exports of Malaysian *Aquilaria* chips reported to CITES 1995-2005 (kg)

Exporter	Importer	Importer's Reports	Exporter's Reports	Discrepancy
United Arab Emirates	Saudi Arabia	6387		100%
Hong Kong	India		4000	100%
Hong Kong	Japan	4799	50 017	90%
India	United Arab Emirates	3889	25 439	85%
India	Saudi Arabia	3983	5277	25%
India	Singapore		7683	100%
Japan	Germany	200		100%
Saudi Arabia	Singapore	74		100%
Singapore	United Arab Emirates	16 070	81 870	80%
Singapore	Bangladesh		1704	100%
Singapore	Bahrain		52	100%
Singapore	China		240	100%
Singapore	Hong Kong	140 188	160 205	12%
Singapore	India	115 320	269 664	57%
Singapore	Japan	13 278	14 766	10%
Singapore	Kuwait		925	100%
Singapore	Morocco		551	100%
Singapore	Malaysia		2500	100%
Singapore	Oman		2989	100%
Singapore	Qatar		993	100%
Singapore	Saudi Arabia	73 551	150 785	51%
Singapore	Thailand		338	100%
Singapore	Taiwan, Prov. of China		101 407	100%

Source: UNEP-WCMC *CITES Trade Database* (as at 13 November 2006)

Imports into Malaysia

The Department of Statistics Malaysia reported imports of over 200 000 kg (200 t) of agarwood chips in the period 1995-2004 (see **Table 17**). The main sources of these imports were Indonesia and Viet Nam. However, Malaysian CITES Management Authorities have reported no imports of agarwood. However Singaporean CITES Management Authorities report exports of 2976 kg of agarwood to Malaysia (during the same period). Of a much lesser significance are imports of agarwood from China to Malaysia, with Chinese CITES Management Authorities reporting 7 kg being exported to Malaysia. In addition, there were informal reports of gaharu and profits from the gaharu trade being imported from Papua New Guinea to Malaysia (Gunn *et al.*, 2003; Gerber and Hill, 2005).

Table 17
Value (MYR) and volume (kg) of Malaysia's international trade in gaharu wood chips

Year	Exports (f.o.b.)			Imports (c.i.f.)		
	Value	Volume	Ave. Price/kg	Value	Volume	Ave. Price/kg
1990	45 385	86 750	0.52	7 273	16 100	0.45
1991	748 570	6 025 060	0.12	15 315	15 360	1
1992	243 287	646 050	0.38	2 200	7 000	0.31
1993	145 672	388 580	0.37	16 700	87 290	0.19
1994	284 712	1 009 620	0.28	2 999	39 990	0.07
1995	393 065	796 120	0.49	12 126	1 000	12.13
1996	546 289	1 093 550	0.5	25 320	20 520	1.23
1997	556 291	1 173 515	0.47	38 720	36 240	1.07
1998	522 388	844 532	0.62	5 638	45	125.29
1999	304 067	484 236	0.63	0	0	n/a
2000	737 542	1 184 290	0.62	28 577	31 029	0.92
2001	238 080	260 492	0.91	14 293	8 111	1.76
2002	273 333	179 044	1.53	41 881	9 500	4.41
2003	65 859	46 765	1.41	12 000	6 000	2
2004	38 145	29 480	1.29	23 210	1 731	13.41
Total	**5 142 685**	**14 248 084**	**0.36**	**246 252**	**279 916**	**0.88**

Source: Department of Statistics Malaysia (HS Code 121190200)

No imports of agarwood into Sarawak have been reported to CITES. However there was evidence of agarwood being imported by unofficial channels (i.e. smuggled) into Sarawak from Indonesia and Brunei: several individuals from Sarawak had been arrested for illegal agarwood collection in these two neighbouring countries. Indeed, 34 Malaysian agarwood collectors had been arrested in Brunei between 1999 and 2006, with one collector being shot dead by the Brunei authorities (see **Appendix 5**; Liza, 2001; Malai, 2003; Rol, 2003; Rol, 2005; Rol, 2006).

The majority of agarwood collected illegally in Brunei was reported to be sold to middle-men in the town of Limbang, Sarawak. Indeed, the Sarawak Timber Industries Corporation (STIDC) reported that one Limbang trader was engaged in a flourishing agarwood business in 2003 (Botes, 2004). This trader was reported to be distilling agarwood oil in Limbang that was exported to the Middle East for perfume.

International trade in gaharu derivatives

The statistics in this section focused on *gaharu* wood chips, this category accounted for 96% of all trade (for all trading Parties) reported to CITES (the other terms reported in the UNEP-WCMC CITES trade database included the following: derivatives, dried plants, extract, live, logs, oil, powder, roots, sawn wood, specimens, stems, timber, timber pieces). Of increasing importance in terms of production in, and export from, Malaysia was *gaharu* oil. Exports of *gaharu* oil from Malaysia appear to have taken place without CITES permits being issued prior to 2005. Furthermore, the fact that the present Customs code does not

have a specific category for *gaharu* oil makes understanding and controlling trade in this commodity more difficult. Issuance of CITES permits for derivative products such as oil require a much more involved chain-of-custody to ensure that the product came from a legal and sustainable source.

Development of the *gaharu* industry in Malaysia

Trial planting of Aquilaria

The Malaysian government has taken a number of steps to investigate the potential of establishing *Aquilaria* plantations in the country. One of the first attempts to cultivate *Aquilaria* in was undertaken by what was then the Forest Research Institute (FRI) in 1928 (Lok and Zuhaidi, 1996). However, natural mortality caused the original population density of this stock of 833/ha to decrease to 31/ha by 1995 (Lok *et al.*, 1999). Today the FRI is the Forest Research Institute Malaysia (FRIM), which has long recommended the establishment of commercial *Aquilaria* plantations (Ng *et al.*, 1985). The Director-General of FRIM was reported to have said that the herbal industry in Malaysia cannot continue to rely on natural forests for supply and must turn to plantations (Oorjitham, 2005). Beginning in the late 1990s, FRIM collaborated with a New Zealand research company, Industrial Research Limited, and established trial planting plots with 2000 seedlings being offered for sale in 2006.

Following FRIM's initiative, the Forestry Department Peninsular Malaysia (FDPM) established numerous trial plantings of *Aquilaria* throughout the Peninsula (see **Table 18**). The Sabah Forestry Department has brought experts from the University of Minnesota who had previously successfully initiated cultivation projects in Viet Nam, Thailand, Bhutan and Papua New Guinea[56]. Furthermore, the Forest Department Sarawak was also reported to have established a number of *Aquilaria* trial plots both *in situ* and *ex situ* (Dawend *et al.*, 2005).

Table 18
Artificial propagation of *Aquilaria* in Malaysia

State	Location	Notes (extent, age, planting density, etc.)
Johor	Gunung Arong FR, Compt 1	10 ha, p. 2005, FD trial enrichment (3x3 m)
Kelantan	Lebir FR, Compt 1	5 ha, p. 2003, FD trial plantation (3x4 m); 10 ha p. 2004, enrichment (5x5 m); 100 ha p. 2006
	Ulu Sat FR	10 ha, p. 2005, FD trial enrichment (3x10 m)
	Tehi Quarters	1.5 ha, p. 2005, FD trial enrichment (4x4 m)
Melaka	Batang Melaka FR	35 ha, p. 2004, FD trial plantation (3x10 m)
Negeri Sembilan	Gemencheh Quarters	0.6 ha, FD trial plantation (3x3 m)
	Lenggeng FR	6 ha, FD trial enrichment (3x10 m)
	Kg Sg Dua Reserve	20.2 ha, p.2004, FD trial plantation (3x3 m)
	Serting FR, Compt 18	25.5 ha, p. 2005, FD trial enrichment (3x3 m)
	Mantin, Kolej Tuanku Ja'afar	*A. malaccensis* , 'herbal farm'

56 A workshop was convened entitled "Growing Aquilaria Trees and Producing Cultivated Gaharu (Agarwood): Prospects for a new Economy in Sabah", 15 May 2006, Sepilok Forestry Centre, Sandakan.

Table 18 (continued)
Artificial propagation of *Aquilaria* in Malaysia

State	Location	Notes (extent, age, planting density, etc.)
Pahang	Kuala Lipis	16 ha, Hj Abdul Wahab Dollah; 30 ha, p. 1995
Perlis	Bukit Bintang FR, Compt 9	12 ha, p. 2005, FD, 'herb garden' (1x1 m)
Perak	Bubu FR, Compt 56	10 ha, p. 2004, FD trial enrichment (3x3 m)
	Piah FR, Compt 45	10 ha, p. 2005, FD trial enrichment (3x3 m)
	Chikus FR	10 ha
Sabah	Yayasan Sabah Concession	Trials p. 2005: Luasong, Maliau, Danum
	Sabah Forestry Department	Trial p. 1993 – 2000: Sook and Gum-Gum (2x4m), (3x3m) and (3x4m)(Jaffirin *et.al* . 2007)
Sarawak	Sabal, UPMKB, Bario	0.5 ha p. 2005: FD trial
	Belaga-Baram	FD *in-situ* trial planting (Dawend *et al.* , 2005)
Selangor	Dengkil, MINT	MINT (*A. malaccensis* and *A. hirta*)
	Kepong, FRIM	Trials p. 1928 833/ha (down to 31/ha in 1995)
Terengganu	Merchang, Marang	44 ha (3x3 m)

Source: Mohd Paiz (2006) unless specified otherwise; 'FR' = Forest Reserve, ''FD' = Forestry Department, 'p.' = year planted, 'Compt' = Compartment

In addition to government initiatives, the private sector has also begun to invest in trial plantings in Malaysia. Existing businesses recognised the need for the gaharu industry in Malaysia to develop and diversify (Shukry, 2006) and at least one company had started planting *Aquilaria* by the year 2000 (Mohd Haikal, 2006). Two businesses were reported to have teamed up to supply seeds for commercial farming of the trees. In 2006 the joint venture was reported to have about 1.2 million saplings of between six and eight months and hundreds more plants aged six years and above at a 313-acre plantation in Pahang. Furthermore, Yayasan Sabah (the Sabah Foundation managed by the Sabah State Government) has established nurseries and numerous trail plantings in a number of locations in Sabah (D. Alloysius, Yayasan Sabah, pers. comm. 21 February 2006). It was also reported that one Sabah company established a trial plantation of *Aquilaria* inter-cropped with oil palm (*Elaeis guineensis*) on a purely experimental basis. There appears to be much interest in the possibility of planting *Aquilaria for* medicinal purposes as well – China's leading producer of traditional Chinese medicine (which has formed a joint-venture with a Malaysian company) has said it will invest heavily in setting up planting centres "to protect endangered plants" (Anon., 2001a).

Plant nursery companies have been quick to prepare themselves to meet the demand for increased planting of *Aquilaria.* In addition to the seedlings being offered for sale by FRIM, a nursery in Penang was noted to be offering 10 000 poly-bags of seedlings at MYR5 per bag. Furthermore, a businessman was noted to be offering tissue-cultured saplings at MYR250 per plantlet with the vegetative material originating from Viet Nam.

Research into inoculation treatments, or inducement of gaharu resin formation

In conjunction with the establishment of plantations, the Malaysian government has encouraged research into the inoculation or inducement of the formation of *gaharu.* FRIM's collaboration with Industrial Research Limited made an unsuccessful attempt to develop the technology to produce known grades of *gaharu* in a sustainable manner (Chang, 2000). In 2005, the Malaysian Institute for Nuclear Technology Research (MINT) began a wide range of studies on various aspects of *gaharu* plantation and inoculation. In April 2006 MINT hosted a seminar on the modernisation of the Malaysian *gaharu* industry in collaboration with the Ministry of Science Technology and Innovation of Malaysia (MOSTI) and SIRIM Berhad (the privatised Malaysian standards institute). The seminar noted that inducement technology in Malaysia had yet to prove effective[57].

Nevertheless, the Malaysian government remains particularly interested in biodiversity / biotechnology, and the Malaysian Ministry of Natural Resources and Environment has publicly recognised the potential of *gaharu* for as a valuable medicine and perfume (Koh, 2005). In this regard, the Malaysian Government, through SIRIM Berhad's "Incubator Center", is providing grants and technical support to develop the gaharu processing industry (Anon., 2006f).

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[57] A number of methods of inducement have been claimed to be successful (Jensen, 2004). Perhaps the most prominent method is that developed by researchers from the University of Minnesota. Trials in Viet Nam have apparently resulted in a commercially viable method to produce resin in plantation grown trees. This technique consists of boring holes in the trunk, inserting a PVC tube and applying a solution of salts to accelerate the natural defence response of the tree. The University website claims that the technique allows a sustainable yield of resin to be produced in relatively young trees (Blanchette, 2006). The technique was first described at the International Agarwood Conference held in Ho Chi Minh City, Viet Nam from 10 to 15 November, 2003. While full details of the technique have not been published, a US patent for Cultivated Agarwood was registered on February 1, 2005 (see http://www.patentstorm.us/patents/6848211.html).

DISCUSSION AND CONCLUSIONS

Indicators of the research

The research carried out by TRAFFIC to date indicates that Malaysia is a particularly important producer and trading country for all forms of agarwood, including chips, oil as well as processed derivatives such as incense sticks and medicine. Products originating in Malaysia made up about 50% of the total reported volume of agarwood declared in CITES trade internationally in 2005. This positions Malaysia as the most important producer of agarwood in terms of CITES-recorded trade. The current development of downstream industries, such as oil distillation, further strengthen Malaysia's position in this regard.

Natural forests in all three regions of Malaysia (Peninsular Malaysia, Sabah and Sarawak) remain important sources of agarwood in international trade. The results of forest inventories provide encouraging assurance that a substantial stocking of *Aquilaria* trees remains. However, it is clear that, with the exception of Sarawak, the State Governments have yet to formalise the collection management, the vast majority of which remains illegal.

Sustainability of the *gaharu* trade in Malaysia

Malaysia, with its diversity of agarwood (*gaharu*)-producing taxa, and extant forest habitat, provides a unique opportunity to promote the establishment of a sustainable *gaharu* industry. Further understanding of trade dynamics and the development of an appropriate regulatory framework at local community, State and national levels may enable the sustainable management and conservation of viable *in-situ* populations and the establishment of *ex-situ* plantations. However, it is important to appreciate that the sustainability of the *gaharu* trade in Malaysia rests on three major pillars of sustainable development agreed in the Rio Summit in 1992: social sustainability, environmental sustainability and economic sustainability. There are numerous issues relating to the stability of each of these pillars. CITES focuses primarily on environmental sustainability – the survival of agarwood-producing taxa in the wild.

It was found that indigenous people continued to collect *gaharu* from natural forests throughout the country in what appeared to be a sustainable non-lethal extraction system whereby low-grade *gaharu* was extracted from a tree by chipping away a bit at a time, giving the tree a chance to produce more *gaharu* in the intervening period of up to six months. In terms of the Malaysian national focus on managing its agarwood resource, the importance of social sustainability of the *gaharu* trade should not be overlooked, since questions of national security, national prestige, safety of workers, safety of users and the welfare of rural communities come into play. In addition to the ecology of the trees, other environmental issues include the survival of other dependent wild flora and fauna species; harvesting of protected animals and plants by illegal *gaharu* collectors; the protection of *gaharu* habitat; and on the processing side issues such as contribution to global warming and emissions control are of some relevance. From an economic perspective, the maximisation of income to the State needs to be considered; employment; industrial development; and the management of raw material supply are all causes for concern.

The numbers of foreign collectors entering (both legally and illegally) Peninsular Malaysia through its northern border with Thailand gives rise to numerous concerns. Conversely, illegal *gaharu* collectors entering Brunei from Malaysia does not help international relations, with Brunei newspapers alleging that

illegal agarwood collection "is worse than the illegal logging activities. The plunderers sneak into the jungles and bore holes in the trees to get the resin, which is a valuable commodity in the market. Their illegal activities are killing our trees slowly" (Malai, 2000).

Development of a CITES Non Detriment Finding (NDF) methodology

The CITES Scientific Authority for Malaysia (the Ministry of Natural Resources and Environment) is nominally responsible for carrying out independent CITES Non-Detriment Findings for the export of any CITES-listed specimen. While this Federal role has not yet been comprehensively activated for agarwood, the Sarawak Forestry Corporation, a CITES Management Authority at State level, reported in March 2006 that it had made its own preliminary assessment of the sustainability of *gaharu* exports from Sarawak to derive an annual export quota of 50 t – however, neither the Sarawak Forestry Corporation or Customs had reported any exports of *gaharu* from the State at all since that assessment was made. Subsequently, in December 2006, a non-detriment finding for *Aquilaria malaccensis* was prepared for Sarawak.

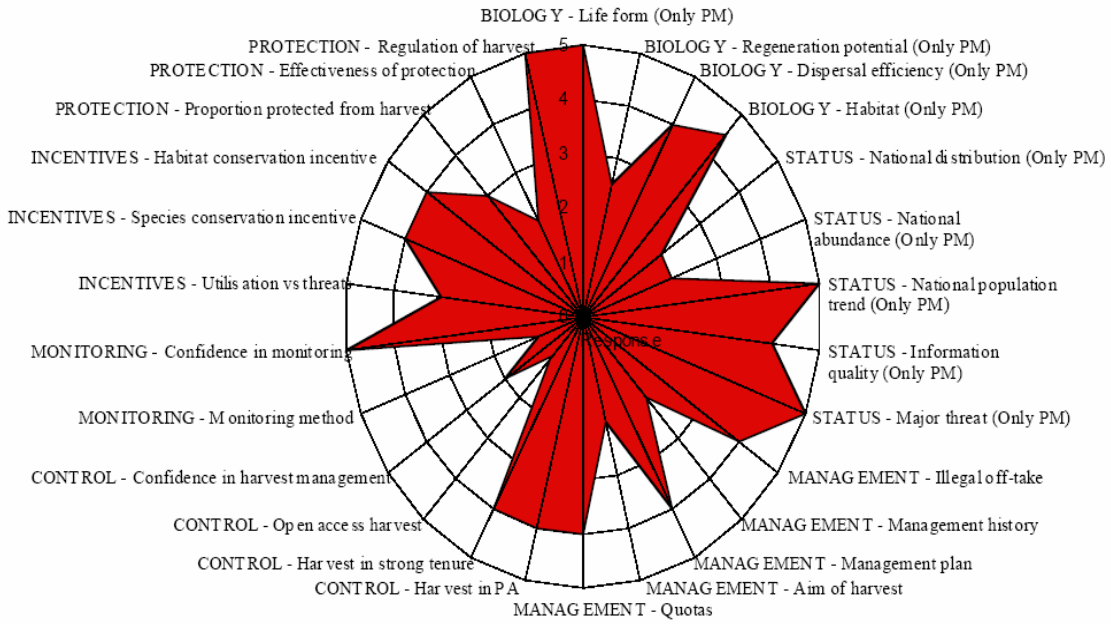
Working groups at a Malaysian national workshop in March 2006 assessed the management of *Aquilaria malaccensis* in Malaysia using the generic risk assessment checklist developed by IUCN to assist CITES Scientific Authorities in making non-detriment findings (NDFs). The results of this assessment are displayed in the radar plot below (**Figure 11**). In summary, the point of most confidence lies in control of harvest management, i.e., there is a perception that legal harvest is well managed. The positions of least certainty point to protection, biology, national population trend, status of major threat, and confidence in monitoring – indicating that the consensus among the experts gathered at the workshop was that these sectors required additional research to plug information gaps and thereby reduce the level of risk in taking management decision. However, the working groups felt that the checklist terms needed greater clarity for their application to the particular characteristics of *gaharu*-producing species, and to the Malaysian national context (Anon., 2006a).

A number of basic steps need to be considered in order to make a CITES NDF. These steps include assessing the degree to which the international trade in a specimen affected the biological conservation status of particular populations of that species; with an appropriate NDF step-wise process then leading also to deriving an annual harvest limit accordingly, which would then inform the setting of an annual export quota[58]. The 14th meeting of the CITES Plants Committee categorised *Aquilaria malaccensis* from Malaysia as of "urgent concern". The Secretariat proposed that, unless an NDF was carried out, the 54th meeting of the CITES Standing Committee should recommend that all Parties suspend trade in all specimens of *Aquilaria malaccensis* from Malaysia with effect from 1 January 2007 (SC54 Doc. 42). In response to the requirement to set a 'cautious quota' Malaysia then presented an annual export quota of 200,000kg to the 54th Standing Committee – which provoked an additional request to clarify the scientific basis of this export quota before January 2007 in order to avoid the recommended trade suspension. The Secretariat subsequently accepted a clarification provided by the Malaysian CITES Scientific Authority, which distributed the total export quota for *Aquilaria malaccensis* (wood chips and

[58] See http://www.cites.org/common/com/PC/17/X-PC17-Inf-04.pdf for more detail on step-wise approaches to conducting a NDF for agarwood-producing taxa.

Figure 11

Outcome of *Gaharu* Workshop Working Groups, 2 March 2006 – Plot of responses to questions in related to *gaharu*-producing species



Source: Anon. (2006a)

powder) between Peninsular Malaysia and Sabah (190,000 kg) and Sarawak (10,000 kg). In 2008, Malaysia reduced its total export quota for *A. malaccensis* (wood chips and powder) to 180,000 kg, composed of 170,000 kg (Peninsular Malaysia and Sabah) and 10,000 kg for Sarawak – a reduction that indicates some level attention to monitoring of exports.

However, it is important to note that the calculation of these export quotas pertains to *Aquilaria malaccensis* only, and does not address any of the other agarwood-producing taxa native to Malaysia. In addition, the quota specifies wood chips and powder, and does not make any mention of agarwood oil, for which substantial distillation facilities have been established in Malaysia and supplies are readily available in the domestic retail market (e.g. Kuala Lumpur) for purchasing by foreign buyers. Conducting a more detailed CITES NDF for all CITES-listed agarwood-producing taxa in the immediate future would likely assist Malaysia in further assessment of management interventions towards a sustainable agarwood trade, building on the approaches presented to the 17th Meeting of the CITES Plants Committee as document *PC17 Inf.4* regarding an agarwood-specific non-detriment finding methodology.

Implementation and Enforcement of CITES

As noted, difficulties in implementation and enforcement of CITES for *gaharu* have been recognised as an issue since the time of the original *A. malaccensis* proposal in 1994. Indeed, *gaharu* oil and powder are certainly not readily identifiable as CITES-listed specimens. The CITES Plants Committee has considered a proposal that *gaharu* oil and powder be exempted from trade controls (*CITES PC12 Doc. 9.1*), however this proposal has yet to be taken forward.

Under CITES Article I(b)(i) "Specimen" means: any plant, whether alive or dead"; and (iii) "in the case of a plant: for species included in Appendices II and III, any readily recognizable part or derivative thereof specified in Appendices II and III in relation to the species".

Most parts and derivatives of CITES-listed agarwood-producing taxa in trade cannot be readily recognized. This is particularly the case with the derivatives oil and powder, but it would also take expert ability to differentiate agarwood chips or pieces derived from CITES-listed species from pieces of non-CITES species (such as *Aetoxylon sympetalum*). Thus it is safe to say that most parts and derivatives of agarwood in trade are not readily recognizable[59]. Nevertheless, all significant production of agarwood from Peninsular Malaysia and Sabah is from *Aquilaria* species, therefore in practice difficulties in distinguishing between CITES and non-CITES species should not arise in these regions of Malaysia.

Given the spirit of the Convention[60] and the precautionary principle[61], it would be prudent to decide whether or not to enforce CITES provisions on all agarwood specimens, even those not from CITES agarwood species – the key questions being whether (1) failing to do so would endanger species with extinction, and (2) doing so would be 'cost-effective'.

Although the Parties to CITES have yet to make such a decision, the Malaysian authorities (particularly Sarawak) applied the Precautionary Principle in the issue of CITES certificates for agarwood specimens prior to the listing of the genus. The application was made implicitly in Peninsular Malaysia and explicitly in Sarawak where the possibility that *gaharu* specimens could be non-CITES species (such as *Aetoxylon sympetalum*) did not prevent the specimens from being exempted from the CITES permitting system for exports. This difficulty has been somewhat addressed since all *Aquilaria* species are now on CITES Appendix II, however the question of *Aetoxylon* in Sarawak still remains.

This study considers agarwood from all known agarwood-producing taxa. This is in accordance with CITES Decision 13.62: "As the trade is in the readily-identifiable product of agarwood, studies should include all known agarwood-producing taxa, not only the CITES-listed species."

Furthermore, according to *CITES Res Conf.9.6*, "the term 'readily recognizable part or derivative', as used in the Convention, shall be interpreted to include any specimen which appears from an accompanying document, the packaging or a mark or label, or from any other circumstances, to be a part or derivative of an animal or plant of a species included in the Appendices". This provision is sometime referred to as the "claims-to-contain clause". This clause has a number of implications. In the first case, the existence of the

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59 This raises the technical question of how CITES should be applied to such agarwood specimens, and has led to specific projects on identification of agarwood-producing taxa (see Cannon et al., 2006).

60 Spirit of the Convention: the purpose of the Convention is "to ensure that no species of wild fauna or flora becomes or remains subject to unsustainable exploitation because of international trade" and "to ensure that international trade in wild fauna and flora is increasingly and consistently conducted at sustainable levels" (CITES Notif. No. 1999/76).

61 The CITES Strategic Vision through 2007 (CITES Decision 13.1) states that "Where uncertainty remains as to whether trade is sustainable, the precautionary principle will prevail as the ultimate safeguard." The precautionary principle is also referred to in CITES Resolution Conf. 9.24 (Rev. CoP14), the Resolution recognizes that by virtue of the 'precautionary approach', in cases of uncertainty, the Parties shall act in the best interest of the conservation of species, it resolves that the Parties shall apply the precautionary approach so that scientific uncertainty should not be used as a reason for failing to act in the best interest of the conservation of species. The precautionary principle is also laid down in Principle 15 of the June 1992 Rio Declaration on Environment and Development.

clause suggests that one avenue to enable the application of CITES to agarwood would be to require that all agarwood specimens be labelled with sufficient taxonomic information to determine whether the specimen was of a CITES species (e.g. *gaharu* specimens from Malaysia should be labelled either *Aquilaria* spp. or *Aetoxylon*). Alternatively, a precautionary approach could be taken and all specimens labelled 'agarwood' could be considered to be referring to CITES-listed species.

By the process of deduction, information on the provenance of a specimen should in most instances be considered to provide the "circumstance" whereby a specimen can "appear" to be of a CITES species, even though the specimen may not be *prima facie* "readily recognizable". For example, an agarwood specimen originating in a country from which all native agarwood-producing species were CITES-listed species should be deduced to be a CITES agarwood specimen.

Many years of experience with CITES implementation show that the more parts and derivatives are subject to controls the more difficult thorough and consistent trade reporting for CITES species is becoming. It is therefore advisable to restrict CITES controls to those commodities that need to be monitored in order to regulate international trade efficiently.

At its 14th meeting, the Plants Committee recommended that two main principles be followed as standard guidance when drafting future # - annotations for medicinal plants in CITES:

> a) Controls should concentrate on those commodities that first appear in international trade as exports from range States. Those commodities may range from crude to processed material; and
>
> b) Controls should include only those commodities that dominate the trade and the demand for the wild resource.

Bearing this in mind, controls for agarwood should concentrate on logs (HS 44.03), chips (HS 12.11) and oil (HS 33.01) as these are the forms of agarwood which first appear in international trade as exports from Malaysia and other range States. This was specifically discussed at the CITES Agarwood Experts Group Meeting in Kuala Lumpur in November 2006, leading to workshop outputs in the following detail:

> a) All raw agarwood products (currently reported under a variety of classifications – wood chips, pieces, logs, timber) should be covered by CITES controls.
> b) Finished products, such as incense, perfume, should be exempted from CITES controls.
> c) CITES coverage of partially processed agarwood products such as dust/powder and oil was debated, but no conclusion was reached. It was pointed out that while these products are not always reported in trade, that they represent a major segment of overall agarwood trade volume.
> d) A similar lack of consensus characterised the discussions of medicinal products containing agarwood.
> e) It was also suggested that how CITES deals with fake/adulterated agarwood, and the so-called 'black magic wood', should be further considered (TRAFFIC Southeast Asia (Eds), 2007).

The outputs of the Kuala Lumpur meeting resulted in *CITES Decision 14.138*, directed to Parties involved in the Agarwood trade and to the CITES Secretariat:

14.138 Parties concerned should identify and agree on which agarwood products and quantities should be exempted from CITES controls. Once agreed, Parties concerned should agree which range State

will prepare and submit a proposal for amendment of the current annotation for agarwood-producing species to be considered at the 15th meeting of the Conference of the Parties.

Enforcement of State Enactments by Customs

Customs is a Federal agency in Malaysia governed by the *Customs Act 1967*. While State Enactments may contain provisions related to international trade, these provisions are not automatically enforceable by Customs. For the State Enactments to be enforced by Customs, an amendment needs to be made to the Customs Orders. In Malaysia, legislative competence for imports and exports rests with the Federal Parliament[62]. As noted, most of the legislation mentioned in the section 'Legislation governing harvest' have some provisions related to trade – however, most of the enactments regarding forestry, wildlife and parks have been enacted by the various State legislatures and not the Federal Parliament. Therefore, the provisions of these enactments regarding trade carry no weight outside the individual States and the provisions cannot be enforced by MTIB or Customs officers. In particular, the wildlife enactments of both Sabah and Sarawak make reference to restricting the export of CITES species – but they can only be enforced by the wildlife officers of these States inside the boundaries of the States. For example, a Federal Customs Officer operating in Kuala Lumpur International Airport (KLIA) has no powers to control the import or export of *gaharu* because the Customs Orders[63] do not classify *gaharu* chips or oil as controlled items. In early 2008, Malaysia enacted the *International Trade in Endangered Species Act 2007*, which in its definitions of an enforcement officers includes "any officer of Customs as defined in Section 2 of the Customs Act 1967" – but it is not clear whether this will address what is not specified under the Customs Act as controlled items.

Despite the provisions of the *Wild Life Protection Ordinance 1998*, there are no restrictions on the international export of agarwood from Sarawak. This is because the *Wild Life Protection Ordinance 1998* is only a State enactment and restrictions on international trade require Federal legislation. In particular, the provisions of the *Wildlife Protection Ordinance 1998* have yet to be ratified by the *Customs Act 1967* (via inclusion in the *Customs (Export Prohibition) Order 1998*). Such ratification would be required should the authorities wish to enable the enforcement of the provisions restricting the export of agarwood from Sarawak. Presently, the provisions of the *Wildlife Protection Ordinance 1998* restricting the international export of agarwood are beyond the powers of, or *ultra vires,* the Federal Constitution. It is worth noting that the provisions of the *Forests Ordinance 1958* relating to the export of logs and sawn timber have already been ratified by the *Customs (Export Prohibition) Order 1998* (Schedule 4).

Given the fact that *Aquilaria* and *Gonystylus* are both CITES-listed tree species, the responsibility for the issuance of CITES export permits for these taxa was assigned to MTIB in Peninsular Malaysia and Sabah, the CITES Management Authority listed as the competent authority for timber and timber products in those administrative jurisdictions (see **Table 5**). However, though *Gonystylus* is indeed traded mostly for its timber, most of the trade in *Aquilaria* and *Gyrinops* is in *gaharu* – which is generally considered to be a non-timber forest product. Indeed the Malaysian Customs regulations do not include *gaharu* as a timber product.

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62 While the Federal Constitution lists competence for legislation related to forestry on the State List (Sch 9, List II, 3(b)), imports and exports are on the Federal List (Sch 9, List I, 8(b)).

63 Customs Duties Order 1996; Customs (Export Prohibition) Order 1998; and Customs (Import Prohibition) Order 1998.

This discrepancy has led to a number of complications. In particular, MTIB is constrained in its ability to regulate the trade in agarwood products, because these commodities are largely outside its legislative mandate. While the *Malaysian Timber Industries Board (Incorporation) Act 1973* also covers a number of non-timber forest products such as rattan and bamboo, there is no provision in the Act covering agarwood. This means that MTIB would normally have no powers to enforce CITES for agarwood chips or oil.

While the Customs legislation classifies *gaharu* as a non-timber forest product, the Malaysian CITES committee has designated responsibility for agarwood taxa to MTIB, the Management Authority with responsibility for timber species. This arrangement has led to some difficulties, since MTIB's enforcement powers only cover Customs Codes for HS Chapters 14, 44 and 94 while *gaharu* products come predominantly under HS Codes 12, 30 and 33. Despite the fact that MTIB has no powers to enforce CITES requirements for agarwood, it has been issuing CITES permits to exporters upon request. This appears to have led to exporters declaring exports of *gaharu* wood chips under HS Chapter 44 instead of HS Chapter 12.

In conclusion, it appears that CITES implementation for *gaharu* in Malaysia would benefit from increased attention by the responsible CITES Managmenent and Scientific Authorities. The bulk of collection appears to be illegal and some exports appear to be taking place without CITES export permits. Indeed, there are significant gaps in the present legislative framework regarding the enforcement of CITES for *gaharu* in Malaysia. However, the Malaysian government has recognised the importance of *gaharu* and is also taking steps to close the gaps in the law to ensure the full implementation of CITES. In particular, Peninsular Malaysia has developed a three-tiered Standard Operating Procedure (SOP) to control the harvest, trade and export of *Aquilari*a spp. Given Malaysia's central position as an important producer State, the recent initiatives of the Government of Malaysia to encourage the development of a sustainable *gaharu* industry should be viewed positively. However, establishment of more extensive monitoring frameworks for harvest and trade, particularly regarding compliance with national and State regulations (including the SOP described above) will be critical to balancing levels of export trade with the precautionary management of the remaining wild populations of agarwood-producing taxa in Malaysia.

RECOMMENDATIONS

To the Federal Government of Malaysia:

1). The Federal Government of Malaysia should amend the Customs legislation to ensure (i) that all exports of agarwood chips, oil and powder require the prior issuance of a CITES export permit from the relevant CITES Management Authority; and (ii) that all relevant wildlife trade legislation from Sabah and Sarawak is adequately incorporated.

2). The Malaysian CITES Authorities should monitor the trade in agarwood to ensure that all trade is carried out in compliance with the requirements of CITES, specifically with relation to the design and implementation of robust Non-Detriment Finding assessments and adaptive management approaches. This needs to be carried out not only for Aquilaria malaccensis, but for all agarwood-producing taxa native to Malaysia.

3). Malaysia has already derived a basic formula to calculate a 'cautious quota' for *A. malaccensis* in 2007. Because the information considered for carrying out a CITES NDF, as well as the setting of any harvest or export quotas, is dependent upon updated information, establishment of a monitoring and verification system that can guide adaptive responses to changing harvest and trade dynamics is essential. This could be based upon all relevant Malaysian jurisdictions implementing the so-called Standard Operating Procedure (SOP) for agarwood/gaharu.

4). The Malaysian CITES Scientific Authority should liaise with the State forestry authorities in Sabah and Sarawak to carry out an inventory of the present standing stock of agarwood trees in those States. This would build upon the information available in the 4th National Forest Inventory (NFI 4) collected in the States of Peninsular Malaysia.

5). The Malaysian CITES Scientific Authority should coordinate a national-level assessment of the conservation status of all agarwood-producing tree species in Malaysia.

6). The relevant Malaysian CITES Management Authorities should conduct a study, in collaboration with Malaysian Customs, of the trade in agarwood/*gaharu* products (specifically wood chips and agarwood oil) for personal effects, especially by tourists from the Middle East in order to consider a value- or volume-based threshold for personal effects exemptions. Efforts in this regard will complement CITES *Decision 14.138*, and prepare Malaysia to make substantive inputs to any proposed amendment to the current Annotation #1 applicable to CITES-listed agarwood-producing taxa.

7). The relevant Malaysian CITES Management Authorities should institute systematic cooperation activities with Police and Customs in Malaysia as well as bilateral discussions with counterpart agencies in neighbouring trading countries with the objective of reducing the illegal trade in agarwood and supporting the development of a legal and sustainable industry. Such activities will enhance Malaysia's already active engagement with its immediate regional neighbours under the ASEAN Wildlife Enforcement Nework (ASEAN-WEN), as well as its commitments under the *ASEAN Regional Action Plan on Trade in Wild Fauna and Flora*. In addition, Malaysia's trade with the United Arab Emirates and Saudi Arabia, both direct as well as re-exports of Malaysian country-of-origin agarwood from Singapore, should be given special attention in terms of further developing producer-consumer co-operation.

8). The relevant Malaysian CITES Management Authorities should liaise with Local Government Authorities to inventory commercial enterprises selling agarwood/*gaharu* products in Malaysia and create awareness among these traders of the requirements of CITES and relevant national and State legislation in Malaysia.

9). Malaysia should consider a national register of agarwood industry participants in an effort to formalise the agarwood trade structure, and assist with more comprehensive monitoring of the trade. Such a register could also be referenced to licensing systems for harvesters, collectors, processors, vendors and exporters, depending on the regulations of at State level.

10).The Ministry of Plantation Industries and Commodities and other Federal bodies should continue to support initiatives for the establishment of agarwood plantations, but bear in mind the need to strictly protect representative wild populations as seed sources to preserve genetic diversity. Clear definitions need to be set for 'cultivated agarwood' or plantation-sourced materials, as this is a rapidly emerging component

of future potential supply in Malaysia that would need to be separated from, but informed by, wild harvest regulations. Such plantations or cultivated production systems should be registered with relevant Federal and State agencies in order to monitor (eventual) production output and enable the distinction of cultivated or non-wild sources from wild-harvested agarwood.

To the State Governments of Malaysia:

11). All States of Malaysia should be encouraged to follow the examples by the States of Sarawak and Kelantan and begin to regulate the gaharu industry by issuing licences and permits for the collection of agarwood/*gaharu* on a sustained-yield basis.

12). The relevant Malaysian CITES Management Authorities should verify Removal Passes to ensure that only specimens obtained by licensed or permitted collectors be issued with export permits. Implementation of the Standard Operating Procedure by all States would strengthen the chain of custody from forest (point-of-harvest) to point(s) of processing and/or export, and would enable the distinction between legally and illegally harvested agarwood.

13). At State level, a verification system for harvesting and supply chain management from production areas (whether sourced from wild harvest or cultivated stocks), should be carried out by the relevant CITES MA with the participation of the CITES SA, the State forestry authority and any licensed harvest/trade participants. Such a system will ensure State-level contributions towards monitoring national quotas and considerations of non-detriment findings.

14). The State Forestry Departments should continue to their initiatives for the establishment of agarwood plantations. In addition, such plantations or cultivations should be registered (including an inventory of trees and stocks) with relevant Federal and State agencies in order to monitor (eventual) production output and enable the distinction of cultivated or non-wild sources from wild-harvested agarwood. This should extend to oil distillation and other associated agarwood processing activities.

15). The State Forestry Departments should explore the possibility of setting up integrated agarwood complexes where one company can be involved in the licensed collection, manufacturing and trade in agarwood/*gaharu* products.

To the Parties to CITES:

16) The Parties to CITES should consider whether additional agarwood-producing species in trade, such as *Aetoxylon sympetalum* which has been stated to be an important source of agarwood/*gaharu* in Sarawak, should be included in CITES Appendix II in order to comprehensively harmonise international trade regulations;

17). The Parties to CITES should consider whether it would be more appropriate for agarwood-producing taxa to be included in CITES Appendices under an annotation that specifies chips, oil and powder as these are the forms of agarwood which dominate international trade – thus enabling the concentration of enforcement efforts on products where they would be most effective. This recommendation urges action under the current CITES *Decision 14.138*;

18). A glossary of terms should be developed that considers cultural aspects of the agarwood industry and trade in order to allow better understanding between producers, traders and consumers, including government regulators. Other definitions that need to be established are agarwood powder/dust, wood chips, logs, wood pieces, oil, non-timber forest product, incense (as this refers to raw agarwood in some cultures) and even 'agarwood' itself (separate from the tree). This recommendation urges action under the current CITES *Decision 14.140* and *Decision 14.142*.

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Note: Official CITES documents are available online at the CITES Website: http://www.cites.org/

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APPENDICES

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Appendix 1:
Agarwood-Producing Species Native to Malaysia

		Number of spp.					
Species	**Distribution in Malaysia**	**PM**	**Sb**	**Sw**	**HS†**	**IUCN Status**	**CITES Status**
Aetoxylon sympetalum Airy Shaw	Sarawak	0	0	**1**	1	NE (2005)	Not listed
Aquilaria beccariana Tiegh.	Johor, Sabah, Sarawak	1	1	1	19	VU A1d (Anon., 1997a)	App. II #1 (12/01/05)
Aquilaria hirta Ridl.	Terengganu, Pahang, Johor	1	0	0	4	VU A1d (Anon., 1997a)	App. II #1 (12/01/05)
Aquilaria malaccensis Lam.	Pen. Malaysia, Sabah, Sarawak	**1**	**1**	0	117	VU A1cd (ARWCSMT, 1996)	App. II #1 (16/02/95)
Aquilaria microcarpa Baill.	Sabah, Sarawak	0	1	1	7	VU A1d (Anon., 1997a)	App. II #1 (12/01/05)
Aquilaria rostrata Ridl.	Endemic to Gunung Tahan	1	0	0	0	DD (Anon., 1997a)*	App. II #1 (12/01/05)
Aquilaria sp. 1 Tawan (2004)	Sarawak	0	0	1	2	NE (2005)	App. II #1 (12/01/05)
Enkleia malaccensis Griff.	Pen. Malaysia, Sabah, Sarawak	1	1	1	12	NE (2005)	Not listed
Gonystylus affinis Radlk.	Pen. Malaysia, Sabah, Sarawak	1	1	1	0	NE (2005)	App. II #1 (12/01/05)**
Gonystylus bancanus (Miq.) Kurz	Pen. Malaysia, Sabah, Sarawak	1	1	1	9	VU A1cd (Anon., 1997a)	App. II #1 (12/01/05)**
Gonystylus brunnescens Airy Shaw	Pen. Malaysia, Sabah, Sarawak	1	1	1	5	NE (2005)	App. II #1 (12/01/05)**
Gonystylus confusus Airy Shaw	Peninsular Malaysia	1	0	0	7	NE (2005)	App. II #1 (12/01/05)**
Gonystylus macrophyllus (Miq.) Airy Shaw	Pen. Malaysia, Sabah, Sarawak	1	1	1	1	VU A1cd (Anon., 1997a)	App. II #1 (12/01/05)**
Gonystylus xylocarpus Airy Shaw	Sarawak	0	0	1	0	VU A1cd+2cd (Anon., 1997a)	App. II #1 (12/01/05)**
Wikstroemia androsaemifolia Decne.	Pahang, Sabah, Sarawak	1	1	1	6	NE (2005)	Not listed
Wikstroemia polyantha Merr.	Pen. Malaysia, Sabah, Sarawak	1	1	1	10	NE (2005)	Not listed
Wikstroemia ridleyi Gamble	Kelantan, Terengganu, Pahang	1	0	0	1	NE (2005)	Not listed
Wikstroemia tenuiramis Miq.	Sabah, Sarawak	0	1	1	36	NE (2005)	Not listed
Total		**13**	**11**	**14**	**237**		

Sources: botanical literature (Tawan, 2004; Turner 1995; Whitmore, 1973; Ding Hou, 1960; Airy Shaw, 1953; Burkill, 1935)

South East Asia Botanical Collection Information Network (SEABCIN) <herbaria.plants.ox.ac.uk> downloaded 4 September 2005

Kuching Herbarium, visited on 16 February 2006.

IUCN Status: www.redlist.org (viewed on 2 December 2005); claims to agarwood production: Ng *et al*. (1997)

Asian Regional Workshop on Conservation & Sustainable Management of Trees, Viet Nam, August 1996

†HS: Number of herbarium specimens from Malaysia recorded in SEABCIN

*Previously VU (Walter and Gillett, 1998); FRIM has also listed *A. rostrata* as "endangered" because of rarity and geographical restriction (Ng *et al*, 1990)

**Previously App. III #1[3] (6 Aug 2001)

Specimens of Agarwood-Producing Species from the States of Malaysia in SEABCIN Herbaria

Species	Joh	Ked	Kel	Kul	Mel	Neg	Phg	Png	Prk	Sab	Swk	Sel	Trg	Total
Aetoxylon sympetalum Airy Shaw											1			1
Aquilaria apiculata Merr.														
A. beccariana Tiegh.										12	7			19
A. hirta Ridl.							1						3	4
A. malaccensis Lam.	10	6	5	2	10	10	20	7	10	15		16	6	117
A. microcarpa Baill.	1									6				7
A. rostrata Ridl.														0
A. sp. 1 Tawan (2004)										1	1			2
Enkleia malaccensis Griff.						2				10				12
Gonystylus affinis Radlk.														0
G. bancanus (Miq.) Kurz										4	5			9
G. brunnescens Airy Shaw											5			5
G. confusus Airy Shaw			2				3		1			1		7
G. macrophyllus (Miq.) Airy Shaw										1				1
G. xylocarpus Airy Shaw														0
Wikstroemia androsaemifolia Decne.										2	4			6
W. polyantha Merr.		1					3		1	2	2		1	10
W. ridleyi Gamble													1	1
W. tenuiramis Miq.										32	4			36
Total	**11**	**7**	**7**	**2**	**10**	**12**	**27**	**7**	**12**	**85**	**29**	**17**	**11**	**237**

Note: 'Joh' = Johor, 'Ked' = Kedah, 'Kel' = Kelantan, 'Kul' = Kuala Lumpur, 'Mel' = Melaka, 'Neg' = Negeri Sembilan, 'Phg' = Pahang, 'Png' = Pulau Pinang, 'Prk' = Perak, 'Sab'= Sabah, 'Swk' = Sarawak, 'Sel' = Selangor, 'Trg'= Terengganu

Sources: South East Asia Botanical Collection Information Network (SEABCIN) <herbaria.plants.ox.ac.uk> downloaded 4 September 2005 (Leiden, Kepong and Singapore yielded results)

Appendix 2:
Vernacular names for agarwood and agarwood-producing species in Malaysia

Name & variants	*Language*	*Particular*	*Scientific Name*	*Remarks*
Gaharu	Malay	Resin	*Lignum resinatum aquilariae*	
gaharu anteru	Malay		*Gonystylus bancanus*	
gaharu buaya	Malay	Tree	*Gonystylus bancanus*	Lit. crocodile agarwood (Airy Shaw, 1953)
gaharu cempaka	Malay	Tree	*Gonystylus brunnescens*	
gaharu melitan			*Gonystylus xylocarpus;*	
			Amyxa spp.	
karu-karu	Malay		*Gonystylus confusus*	Anderson (1980)
gaharu sirsak			*Wikstroemia polyantha*	
gaharu cengkeh			*Wikstroemia tenuiramis*	
Karas	Malay	Tree	*Aquilaria* spp.	bengkaras, kekaras, mengkaras, tengkaras
Angkaras, engkaras	Iban	Tree	*Aquilaria beccariana*	
Kareh	Malay	Climber	*Enkleia malaccensis*	'akar kareh hitam'; cf. karek (Sumatra - CABI)
Kelembak	Malay	Resin		
kalambah, kalambak				Crawfurd (1856)
Klim	Semang	Resin		cf. khlem (Khmer) Skeat (1906)
Klin	Stieng	Resin		cf. alim, halim in Sumatra (CABI) Skeat (1906)
Bangkol (ba?kol)	Batek	Tree		Lye (2005)
Depu	Malay			also: tepu
Candan	Malay		*W. androsaemifolia*	
Chandan	Malay		*Gonystylus bancanus*	(Wilkinson, 1955)
Canëë	Kelantanese	Tree	*Aquilaria hirta*	
c?h[µ“cc”]?	Temiar	Tree	Not known	Roseman (1991)

Appendix 2(continued) :
Vernacular names for agarwood and agarwood-producing species in Malaysia

Name & variants	*Language*	*Particular*	*Scientific Name*	*Remarks*
Ramin	Malay	Wood	*Gonystylus* spp.	
Tabak	Asli/Malay		*Aquilaria* spp.	'long tabak: Bland (1886); Skeat (1900)
Melawis	Malay	Tree	*Gonystylus* spp.	
Alieng	Bahnar	Tree	*Aquilaria* spp.	Skeat (1906)
Galup	Tapah	Tree	*Aquilaria* spp.	Burkhill
Sikat				
Sekau	Penan			Donovan & Puri (2004)
Sekkau	Kenyah/Penan	Tree		Konradus (2003)
s. tengun	Kenyah			Konradus (2003)
s. baya	Kenyah		*A. beccariana* (?)	Donovan & Puri (2004)
s. nyibung	Kenyah		*A. malaccensis* (?)	Donovan & Puri (2004)
s. modung	Penan		*A. microcarpa* (?)	Donovan & Puri (2004)
Kemandangan	?			kemendangan? Skeat (1900)
Kepang	Temuan, Malay			Antares (2005)
Tangala	Berawan			Anderson (1980)
Lako	Punan Tutoh			Anderson (1980)
Kopoyoh	Kadazan-Dusun			Goh, R. *in litt.* 9 April 2006
Generic terminology				
Kayu	Malay	Wood	Lignum	e.g. kayu gaharu
Minyak	Malay	Oil		
Pokok	Malay	Plant		
Tì ras	Malay	Heart-wood		
Tanduk, tadak	Malay	Horn		
Nibong	Malay			

English terminology: This study uses the term “agarwood”, which is the English common name used by CITES.

Appendix 3: Laws

Laws for the Protection of Flora in Malaysia

Law	Aspect controlled	Specificity
FORESTRY		
Federal Constitution	Enabling legislation	State list:- except with respect to the Federal Territories of Kuala Lumpur, Labuan and Putrajaya, agriculture and forestry, including Forests.
National Forestry Act 1984	Collection, processing and conveyance	Trees and all parts or produce of trees; plants including climbers and all parts or produce of such plants
National Forestry (States of Malaysia) (Adoption) Enactments; State Forest Rules	Collection and conveyance	Minor forest produce; NB. A Circular specifically concerning agarwood was issued by Forestry Department Peninsular Malaysia Director General in 2005
Forest Enactment 1968 (Sabah) Forest Rules 1969; Forest (Constitution of Forest Reserves and Amendment) Enactment 1984	Collection and export	Any produce of trees. A Circular specifically concerning agarwood was issued by Forestry Department Director in 1999 (JPHTN/KSN 100-25/2(19) 5 October 1999, "Listing of agarwood species (*Aquilaria malaccensis*) on CITES Appendix II". *Aquilaria malaccensis* is a "prohibited species" in Forest Reserves (Schedule C of the Forest Rules 1969 - effective 2 January 2004). Gaharu is listed under Minor Forest Produce (Sched II (h))
Forests Ordinance 1958; Sarawak Forestry Corporation Ordinance 1995	Collection, sale and export	All parts and produce of trees
Environmental Quality Act 1974: Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987	"Logging"	Plants
State Environmental Enactments (Sabah Environment Protection Enactment 2002; Natural Resources and Environment Ordinance (Sarawak Cap. 84, 1958 Ed.))		
PARKS		
Federal Constitution	Enabling legislation	Concurrent list:- **National Parks**
National Parks Act 1980 ('West Malaysia')	Collection	Plant life in national parks
National Parks and Nature Reserves Ordinance 1998 (Sarawak)	Collection	Recognisable parts and derivatives of any plant in national parks and nature reserves
Parks Enactment 1984 (Sabah)		
Taman Negara National Park Enactments (Pahang, Kelantan and Terengganu; 1938-1939)		Indigenous flora of Malaysia; any tree or plant or any part of any tree or plant

Appendix 3: Laws (continued)
Laws for the Protection of Flora in Malaysia

Law	Aspect controlled	Specificity
National Parks Enactment 1989 (Johor)		
State Park Corporation Enactments (Perak, Selangor; 2003, 2005)		Any plant
Local Government Act 1976: Parks (Municipal Councils) By-Laws		Any tree or plant
Wildlife Act 1972	Collection within Wild Life Sanctuaries	Vegetation within wild life sanctuaries
Wildlife Conservation Enactment 1997 (Sabah)	Collection, sale, import and export	Any part of any species of plant but does not include any plant product that has undergone a process of heat and drying treatment; a plant of a species specified in Appendix I or II of the Convention
Wildlife Protection Ordinance 1998 (Sarawak)	Collection, sale, import and export	*Aetoxylon sympetalum* (kayu gaharu, gaharu buaya), *Aquilaria beccariana* (gaharu, engkaras), *A. malaccensis*, *A. microcarpa* (kayu gaharu, gaharu engkaras); all species of plants listed in Appendices I and II of CITES. (Natives who legitimately need to collect the forest produce of these plants for their own use, are granted the right to do so without obtaining a licence.)
Sarawak Biodiversity Centre Ordinance 1997		
Sabah Biodiversity Enactment 2000 (Sabah)		
Cultural Heritage (Conservation) Enactment 1997 (Sabah)		
National Heritage Act 2005		Tree or vegetation in heritage sites; flora of Malaysia

Malaysia Laws of Relevance to the International Trade of Agarwood

Law	Aspect controlled	Specificity
Federal Constitution	Enabling legislation	Federal list:- Trade, commerce and industry, including imports into, and exports from, the Federation.
Customs Act 1967	Sale and export	
Customs Duties Order 1996		HS 1211.90 200 "Gaharu wood chips", etc.
Customs Duties (Amendment) (No. 5) Order 2003		
Customs (Export Prohibition) Order 1998		HS 44.03, 44.20
Customs (Import Prohibition) Order 1998		HS 44.03
Customs Duties (Exemption) Order 1988		Logs and sawn timber
Malaysian Timber Industry Board (Incorporation) Act 1973	Export via Customs Act 1967	Export: HS 44.03, 44.20; Import: HS 44.03
Procedures for the Import/Transfer/Export of Timber and Timber Products dated 24 March 2002		HS 44.03, 44.20
Timber Export Bulletin 19/87 dated 28 December 2004 "Procedures for Trade of CITES Listing Species – Ramin (Gonystylus spp.) and Karas/Gaharu (Aquilaria spp./Gyrinops spp.)"		Trade procedures for agarwood-producing species
Timber Export/Import Procedures 24 March 2002		
Forests Ordinance 1958	Collection, sale and export [via Customs Duties (Exemption) Order 1988 - logs]	All parts and produce of trees
Wildlife Conservation Enactment 1997 (Sabah)	Collection, sale, import and export [not yet enabled by Customs]	Any part of any species of plant but does not include any plant product that has undergone a process of heat and drying treatment; a plant of a species specified in Appendix I or II of the Convention
Wildlife Protection Ordinance 1998 (Sarawak)	Collection, sale, import and export [not yet enabled by Customs]	*Aetoxylon sympetalum, Aquilaria beccariana, A. malaccensis, A. microcarpa* ; kayu gaharu, engkaras; all species of plants listed in Appendices I and II of CITES

OTHER LAWS (Applicable to the whole of Malaysia)		
Federal Constitution	Enabling legislation	Concurrent list for Sabah and Sarawak:- Agricultural and forestry research
Malaysian Forestry Research and Development Board Act 1985	Research	Gaharu wood
Sale of Drugs Act 1952: Control of Drugs and Cosmetics Regulations 1984	Manufacture, sale, supply and importation	Drugs and cosmetics (including [inter alia] any substance intended to be used on the external parts of the body for the purpose of perfuming them)
Factories and Machinery Act 1967 (Act 139)	Processing	Steam boilers, etc.
Environmental Quality Act 1974		
Environmental Quality (Sewage and Industrial Effluents) Regulations, 1979		

Appendix 4:
Places and people connected with the agarwood trade in Malaysia

State, locality	Ethnicity	Details
COLLECTORS		
Pahang: Kg. Putat, Tasek Bera	Semelai	1982-1985: traditional collection revived and prominent; lethal collection common (Gianno, 1986; Gianno, 1990; Kruspe, 2004)
Pahang: Kenong Rimba	Batek	2004: Collection for traders in Kuala Lipis started in the 19th century, present collection declining because supply is depleting (Anon., 2004m)
Pahang: Taman Negara	Batek	Late 1990s: "The main source of cash income is commercial extraction of forest products: primarily rattan and eaglewood or gaharu. ... Rattan and gaharu traders have come to mark the passage of calendar-time. Every three weeks the current trader drives into the forest to pick up his shipments from a collecting group" (Lye, 2005)
Pahang: Taman Negara (Kuala Yong)	Batek	1999: said to believe that some of the Park officers wished them to collect gaharu rather than work as tour guides (Nicholas, 2000)
Pahang: Taman Negara	Jakun	2005: Jakun from Rompin collecting in Belum and Taman Negara (Faezah, 2005)
Pahang: Kampung Kedaik, Rompin	Jakun	Badok Senikin, 42, when the fish harvest season ends, Badok diversifies into the ethno-botany business by collecting herbs, rattan and kayu gaharu. Badok travels some 30km down the winding stretch of the Rompin river to source for the natural produce. "There aren't that many people willing to get their hands dirty to do this job. But it keeps my family going and I prefer to live my life this way," he said. According to Badok, it is not an easy job collecting produce from the wilds as material is difficult to source. "That's why there are fewer people now at my kampung. Most have migrated to the cities where they can find less demanding jobs." Kampung Kedaik, said Badok, used to have more than 100 inhabitants - but there are only six families left now.
Pahang: Kg. Bantal, Sg. Tembeling, Taman Negara	Malay	1996: The younger men go into the jungle to seek out kayu gaharu (Albela, 1996)
Pahang: Temerloh & Jerantut	Jahut	c. 2000: "actively sought" (Almeida, 2002)
Pahang	Semai	c. 2000: "meaningful revenue" (Almeida, 2002)
Pahang: Rompin, Pekan, Kuantan	Jakun	c. 2000: "gather to supplement income" (Almeida, 2002)
Pahang: Rompin, Kg. Kedaik	Jakun	2006: Alias Kuwi, 32, "selalu mendengar suara [bigfoot] bersahut-sahutan di dalam hutan, tetapi ia sedikit pun tidak mematahkan semangat Orang Asli untuk memasuki hutan Endau-Rompin bagi mencari kayu gaharu" (Ali, 2006)
Pahang: Chini Forest Reserve	Orang Asli	2002: Linggi Ali, 50 yrs, and three others (Anon., 2002b)
Pahang: Krau Wildlife Reserve	Temuan	2005: Temuan (C.Nicholas, Centre for Orang Asli Concerns, pers. comm. 7 September 2005)

Appendix 4 (continued):
Places and people connected with the agarwood trade in Malaysia

State, locality	Ethnicity	Details
Johor	Senimba	>1800: collected agarwood for the Malay Sultans (Kathirithamby-Wells, 2005)
Johor: Endau-Rompin	Punan	2001: Kepayang Chantek or better known as Pak Sate has a reputation for gathering kayu gaharu or fragrant eagle wood. A good quality gaharu could soar up to RM600 per 100gm, but the common ones will only sell for about RM5 to RM10 per kilo (Aimi, 2001).
Sarawak: Tinjar	Kenyah	1970s: agarwood stocks depleted (Chine, 1985)
Sarawak: Baram	Penan	1970s: super grade A sold to longhouse middlemen for RM50-100 (Hansen, 1988; Ritchie, 1996)
Malaysia	Thai	2004: "at least 1000 Thai agarwood collectors in Malaysia" (Anon., 2004k)
Sabah: Sook	KDM	2000: 5/14 people interviewed collected agarwood (Judeth, 2000)
Sabah: Nabawan	KDM	2000: 0/38 people interviewed collected agarwood (Judeth, 2000)
Sabah: Kalabakan	KDM	2000: 2/28 people interviewed collected agarwood (Judeth, 2000)
MIDDLEMEN		
Pahang: Kuala Lipis	Chinese	>1898: trading centre for gaharu for joss-sticks (Takeshi, 2000)
Pahang: Kuala Lipis	Arab	c2000: buying agarwood directly from Orang Asli (Anon., 2004m)
Pahang: Taman Negara	Malay	1999: some Park officers acting as middlemen for Bateks (Nicholas, 2000)
Sarawak: 'Cerava' (Kuching)	Spanish	
RETAIL OUTLETS		
Chinese traditional medicine retailers	Chinese	Present in almost every town in the Peninsular, and all the main towns of Sabah, Sarawak; majority of which sell some products containing agarwood
Chinese incense retailers	Chinese	Present in almost every town in the Peninsular, and all the main towns of Sabah, Sarawak; majority of which sell some products containing agarwood
Arab specialist agarwood retailers/wholesalers	Arab	Present mainly in Bukit Bintang, Kuala Lumpur

Appendix 4 (continued):
Places and people connected with the agarwood trade in Malaysia

State, locality	Ethnicity	Details
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Sabah: Nabawan	KDM	2000: 0/38 people interviewed collected agarwood (Judeth, 2000)
Sabah: Kalabakan	KDM	2000: 2/28 people interviewed collected agarwood (Judeth, 2000)
MIDDLEMEN		
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Pahang: Kuala Lipis	Arab	c2000: buying agarwood directly from Orang Asli (Anon., 2004m)
Pahang: Taman Negara	Malay	1999: some Park officers acting as middlemen for Bateks (Nicholas, 2000)
Sarawak: 'Cerava' (Kuching)	Spanish	
RETAIL OUTLETS		
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Chinese incense retailers	Chinese	Present in almost every town in the Peninsular, and all the main towns of Sabah, Sarawak; majority of which sell some products containing agarwood
Arab specialist agarwood retailers/wholesalers	Arab	Present mainly in Bukit Bintang, Kuala Lumpur

Appendix 5:
Enforcement operations involving agarwood in Malaysia (or involving Malaysians abroad)

Date	Location	Case	Details
PENINSULAR MALAYSIA (NORTH)			
1989	Belum: G. Gebeng	Several Thais	Army patrol investigates report of agarwood poachers (none found) (Fathol, 1998)
1992	Taman Negara	10 Thais	Arrested, carrying snares (Wan Shahruddin, 1998)
1995	Taman Negara	50-100 Thais	Bateks alert DWNP that 50 to 100 Thai nationals armed with shotguns were roaming Taman Negara in search of agarwood. The intruders had warned a Batek to leave the area in which they were operating. The reports were passed on to police by the superintendent of the national forest. (Anon., 1995)
1995	Taman Negara	~12 Thais	DWNP officers raid a camp of about a dozen foreigners who fled into the jungle. This was the first case of agarwood theft involving foreigners according to Jasmi Abdul DWNP director of research and wildlife management. (Anon., 1995)
1996	Taman Negara	14 (Thais & locals)	DWNP officers effected arrest
1999-2001	Taman Negara: Merapoh, Kuala Terengan and Kuala Koh	Several Thais	Evidence of agarwood collectors was noted at all three sites studied, with a total of around 30 cases of collecting noted. Evidence of Thais (including etchings, campsites and agarwood harvesting activity) at all three sites, with at least half the evidence of human activity in Merapoh belonging to Thai nationals. (Kawanishi, 2002)

Appendix 5 (continued) :
Enforcement operations involving agarwood in Malaysia (or involving Malaysians abroad)

Date	Location	Case	Details
21-Oct-00	Kampung Sera in Baling, Gunung Inas near the Malaysia-Thai border ("rich with tepu (Aquilaria) trees")	10-15 Thais	"Kem Jubah Hitam" a mere temporary shelter used by Thai nationals intruding into the country, in search of kayu gaharu (eagle wood)". He said police learned of the existence of the "camp" near Kampung Sera in Baling following investigations late last month, after being informed by residents. "We found 40 items around the area, including Thai fragrant rice, belacan, ginger and dried chillies. Some of the packets had Thai words written on them. "We also found a nine-inch chisel believed to be used in checking for gaharu in the trees," Norian said. Based on investigations, Norian said, police have concluded the place was being used as a temporary shelter by 10 to 15 Thais. He said the presence of the agar wood seekers in the jungles of the Malaysia-Thai border has been known for a long time, and is not a threat to national security. "But we have laws against such intrusion into our forests and this comes under the jurisdiction of the Forestry Department." (Anon., 2000)
2001	Taman Negara, Tasik Kenyir, Terengganu	Several Thais	Cut down gaharu trees, poachers are using guns to kill protected animals. Their targets include elephants which have been relocated and Sumatra rhinoceros. MB requests Army assistance as DWNP and Police inadequate to face armed threat. (Anon., 2001d)
15-May-01	Perak: Sungai Lerik, Chenderiang	Six Thais	Police arrested six Thais for agarwood-related offences (Anon., 2001e)
23-May-01	Kedah	Four Thais	Police arrested 4 Thais as they tried to drive across the border in a taxi with smuggled agarwood (Anon., 2001e)
24-May-01	Perak: Batu 9, Jalan Kinjang, Sahom, Chenderiang, near Tapah	Five Thais	Five more Thais were arrested for stealing agarwood, bringing the total to 11. The men were picked up in the jungle (Anon., 2001e)
23-Apr-02	Taman Negara, Sg. Slim/Sg. Kemyam,	Six Thais, 33-53 yrs.	Arrested, carrying 4 steel wire snares, 1 net, 4 long knives, 13 knives for cleaning agarwood, 5 sharpeners, 9 saws. **1 year imprisonment for illegal hunting** (Anon., 2002a)
24-Oct-02	Kedah: Ulu Muda Forest Reserve	Several Thais	Patrolling Malaysian soldier shot by a group of agarwood collectors at about 2.30pm.The patrol returned fire causing the group to retreat into forests at the Thai border. (Anon., 2002c)
2002-2003	Taman Negara	50 Thais	In Taman Negara, 50 Thai poachers were caught in 2002 and 2003. They were jailed as they couldn't pay the fine. (Chiew, 2004)

Appendix 5 (continued) :
Enforcement operations involving agarwood in Malaysia (or involving Malaysians abroad)

Date	Location	Case	Details
2003	Perak	One Thai	Forestry patrol team makes arrest, court case 'pending' in Aug 2004 (Chiew, 2004)
2003	Pahang	One Thai	Forestry patrol team makes arrest, court case 'pending' in Aug 2004 (Chiew, 2004)
1-Aug-04	Belum: Sungai Salat	Two Thais	two Thai gaharu poachers caught - to be charged under NFA charged for taking forest produce without a licence. The maximum fine is RM50,000 or five years' jail or both. One hailed from the Prachantakham district in Prachinburi province in central Thailand - a place known for its notorious agarwood poachers. (Anon., 2004i)
Early 2004	Belum	Several Thais	"a few Thais" caught (Anon., 2004b)
Early 2005	Kelantan	Seven	Suspected poachers and gaharu harvesters arrested (Anon., 2005b)
14-Sep-05	Kelantan, Gua Musang	Two Thais (Sam Khem Kam, Akdhik Sak Suk Phu)	Two Thai gaharu poachers caught, convicted and **jailed 20 months**. (Clerk, Gua Musang Magistrate Court, pers. comm. 2005)
1-Mar-06	Kg. Padang Rambong, Baling, Kedah		Evidence of agarwood collectors was noted
PENINSULAR MALAYSIA (SOUTH)			
18-Jun-04	Gunung Ledang National Park	Several Thais	JNPC officers had stumbled on a group of Thais extracting sandalwood at the Gunung Ledang national park last week but could not arrest them. "Our officers, however, seized some tools." (Anon., 2004d)
23-Jun-04	Endau Rompin, Suluh Keris	Three Thais	JNPC ranger encountered a group of three foreigners in Suluh Keris in the interior of Endau Rompin. They told the ranger that they were part of a total of 50 who had split into ten groups of five to extract gaharu. Police report lodged. This was the first time JNPC had encountered Thai gaharu collectors in the Park. (Anon., 2004d)
30-Jun-04	Endau-Rompin National Park, Bukit Chegar	One Thai camp	One camp found (Harny, 2004)
1-Jul-04	Endau-Rompin National Park, Sungai Salat and Sungai Kisob	Two Thai camps	Two camps found about 5-km apart (Harny, 2004)
1-Jul-04	Endau Rompin	Five Thais	5 Thai men arrested on suspicion of stealing gaharu (Anon., 2004h)

Appendix 5 (continued) :

Enforcement operations involving agarwood in Malaysia (or involving Malaysians abroad)

Date	Location	Case	Details
2-Jul-04	Endau-Rompin National Park, Sungai Taku, near Kampung Peta	Seven Thais (detained: one male, 44, Thambokfai Phachandakrap, Pakinpuri, Thailand)	One arrest. One camp found, near Sungai Taku, some 15km away from the National Park's administration complex. They also found four axes and two plastic bags containing aloeswood worth RM3,000. Senoi-Praq (aborigines) team saw many more men running away as soon as they became aware of the police presence. their tents, clothes, food, four axes and wooden guns suggest they were planning for an extended stay in the forest believed to have split up into ten groups of five men each while in the park. Charged under NFA, 15 July 2004. (Harny, 2004)
4-Jul-04	Endau-Rompin National Park, Kuala Sungai Taku, 7 km from Park HQ	Six Thais (detained, one male, 42, Tambun Krong Jai Trak, Thailand)	One arrest. One camp found, 7 km from park HQ, the arrested Thai men claimed that were transported to each drop-off point in a van; and for this particular expedition, he and his group walked for three days and three nights into the jungle. The two will face a charge under Section 15(1)(a) Forestry Department 1984 (Amendment 1993) for stealing gaharu from national park or Government property. Under the Act, both face fine not more than RM500,000 or jail to a maximum of 20 years or both. They will also face an alternative charge under Section 81(1)(d) of the same Act for taking or transferring the wood without permission and can be fined up to RM10,000 or jailed a maximum of three years or both. The two poachers pleaded guilty to charges under forestry and immigration laws at the Mersing magistrate's court last week and will be sentenced on Thursday (12 August 2004). (Siti, 2004)
20-Jul-04	Gunung Ledang National Park, water plant junction	Two Thais, two Malaysians	JNPC officers arrest two Thai agarwood collectors along with two local men delivering food supplies to them. The two Thais escaped, the two locals were handed over to the Tangkak police. (Harny, 2004)
Nov 2005	Gunung Panti Forest Reserve, Kota Tinggi, Johor	Two Thais	Nature guide confronts two collectors chopping a gaharu tree with axes - they claimed to be locals, but were suspected to be from Thailand
14-Nov-06	Gunung Ledang National Park, Johor	Five Cambodians	One Cambodian was caught collecting gaharu while his four other colleagues escaped. (F. Cheong, Johor Parks Corporation, pers. comm. to TRAFFIC Southeast Asia).

Appendix 5 (continued) :
Enforcement operations involving agarwood in Malaysia (or involving Malaysians abroad)

Date	Location	Case	Details
SABAH			
1999	Forest in Tambuyukon, Sabah. Mount Kinabalu National Park	Several Thais	Prosecuted in Ranau district court for stealing gaharu. (Leong, undated; Chiew, 2004)
2000	Kinabalu Park, Sabah	7 Thais	Seven Thai gaharu collectors were reported to have been caught in Kinabalu Park in 2000 (Goh, 2006)
2000	Maliau Basin Conservation Area, Sabah	>50 Indonesians, mainly from Kg. Pagalungan, Kalimantan Timur	Maliau Basin staff discovered 11 camps, "approximately 52 persons, most of which are Indonesians (Kalimantan)" assisted by local middlemen. "Likely that the actual number of gaharu collectors entering MBCA is much higher". Cases reported as follows: April 2000 (7 collectors on trail from Rafflesia Camp to Bambangan Camp), July 2000 (group encountered near Ginseng Camp), 16 September 2000 (two collectors caught near Study Centre site), 28 September 2000 (13 persons from Kalabakan encountered at Mile 53.5 Sapulut Road), 28 October 2000 (Markus Mangasak and 4 ors. from Kg Sematalon, encountered near Agathis Camp), (Sidkan, 2001)
2001	Maliau Basin Conservation Area, Sabah		Indiscriminate felling of trees throughout the MBCA. Camp found 1.5 km west of Agathis Camp (Henrik, 2001)
2001-2006	Maliau Basin Conservation Area, Sabah	Indonesians (Kalimantan, Java, Lombok), Thais, Sabahans	Maliau Basin staff reported that many agarwood collectors continue to enter MBCA (Henry Baindang, MBCA, pers. comm. 19 February 2006).
2-Aug	Poring, Sabah	Five Sarawakians	Caught stealing gaharu near Poring **16 months jail** (Leong, undated; Chiew, 2004)
4-Aug-03	Sabah	n/a	"So far there has not been any detected case pertaining to illegal harvest or export of A. malaccensis." (D. K. S. Khiong, Director of Forestry, *in litt.* to TRAFFIC Southeast Asia, 4 August 2003)
2004-2006	Kinabalu Park and Crocker Range Park		Sabah Parks Manager (Enforcement) Ludi Apin said there were seven cases within the Kinabalu Park and Crocker Range Park between 2004 and 2006, and over 60kg of the resin was seized (Goh, 2006).
2005	Maliau Basin	Several Indonesians	Reported to be supplying a middle-man in Pensiangan from Maliau Basin (Colin Nicholas, pers. comm. 2005)

Appendix 5 (continued) :
Enforcement operations involving agarwood in Malaysia (or involving Malaysians abroad)

Date	Location	Case	Details
31-Jul-05	Timbun Mata Forest Reserve, Semporna, Sabah	Five Indonesians	Indonesian agarwood collectors in the forest reserve used a boat to transport the timber out from the island before loading them onto a waiting lorry at the mainland. They avoided detection by carrying out the illegal activities during the night or heavy rain. Recently, district police detained five men in a roadblock at Jalan Bugaya, who were found with gaharu, a protected species, on the Land Cruiser they were traveling in. The logs were estimated to worth around RM5,000. (Anon., 2005c)
9-Sep-05	Kg Malidan, Crocker Range National Park, Sabah	One Filipino (Ruben Tandi Letta, Philippines)	encroached into Crocker Range Park and illegally felled a tree 40.2 kg on 25 August **Fined RM2000 or 3 weeks jail** (Anon., 2005a)
2005	Kota Marudu; Kunak		5.7 kg - sold in Sunday market by locals: confiscated by Forestry Department, Police (Andurus, 2006)
2005	Sandakan Market		307 kg confiscated by Forestry Department (Sim, 2005)
26-Dec-05	Munggis		12 kg confiscated
SARAWAK / BORDER			
1991	Sarawak-East Kalimantan Border	Several Indonesians	Local collectors shifted to Malaysia after supplies were exhausted in the Apo Kayan region of East Kalimantan during 1991–1992. Van Valkenburg (1997)
7-Dec-96	Kuching	n/a	Seizure/unlicenced exporter compounded (Cheong, 1999)
18-Jul-97	Lundu, Kuching	n/a	Seizure/unlicenced exporter compounded and reminded (Cheong, 1999)
Aug-98	Sarawak-East Kalimantan Border	Several Indonesians	In August 1998, villagers on the upper Bahau River, East Kalimantan, reported that more young men were going to Malaysia to collect gaharu (a four-day walk away) (Wollenberg, 2001).
1-Nov-98	Taman Nasional Bentuang-Karimun, Kalimantan Barat, Indonesia	Several Sarawakians	Individuals found crossing international border to collect agarwood in the National Park (Anon., 1998a)
11-Nov-99	Brunei	Five Sarawakians (Ana Lasong, 42, Thomas Ahub, 21, Jeffrey bin Ampoh, 23, Loris Ahub, 19, and Stanley bin Akai, 21)	"entered Brunei illegally and started looking for a rare bark of a tree called "kayu gaharu" which is a main ingredient for making local perfume." (Ignatius and Alizawaty, 1999)

Appendix 5 (continued) :
Enforcement operations involving agarwood in Malaysia (or involving Malaysians abroad)

Date	Location	Case	Details
13-Mar-01	Labi, Kuala Belait forest reserve, Brunei	13 Sarawakians (one male arrested, age 17)	police had spotted 12 more people in the said area cutting down the gaharu tree. But they only managed to arrest the defendant.a shoot gun, two axes, one parang, a bag and a block of "Gaharu product", measuring 2ft 3.5 inches in length and 1ft 9 inches in diameter. **fined $800 or a month's imprisonment in default** (Liza, 2001)
1-May-01	Ulu Belait, Brunei	One Sarawakian (Daniel Lengang, 26)	In possession of "equipment believed to be used for the consumption of 'gaharu' wood", **three months imprisonment for immigration offence** (Anon., 2001c)
5-Mar-03	Ulu Belait, Brunei	Two Sarawakians ("Bari"; Mulan Anak Tipong, 20, Limbang, Sarawak)	Police seized two axes, two 'juli', an equipment used to collect 'kayu gaharu', a parang measuring 1 foot 2 inches (used by the deceased to attack the police) and two plastic bags containing 'kayu gaharu', **"Bari" killed during arrest; Mulan: 3 months in jail for entering the country illegally and another 3 months for collecting the forest produce after failing to pay the [BRD] 3,000 fine, which the in default sentence to run consecutively.** (Rol, 2003)
7-Apr-03	Kg Long Mayan in Ulu Tutong, Mukim Rambai, Brunei	One Sarawakian (Anos bin Labu, Lawas, Sarawak)	went to Limbang with 8 others where they met up with a Chinese man named Ah Leng. From there, they headed to Kg Medamit, Limbang intending to go to the forest to collect sandalwood as instructed by the man. Anos then proceeded to go into Brunei territory through a jungle trek without any passport or any valid travel documents on him. 310 grams and was estimated at around B$620 **10 months in jail** (Anon., 2003)
9-Apr-03	Ulu Sungai Medit, Tutong, Brunei	Five Sarawakians (Tinos bin Labu, Ande bin Baso, Liang bin Laboh, Persi bin Paul and Yulius bin Lalung, Lawas, Sarawak)	3.1 kilos of the forest produce which currently stands at a market value of $2,000 to $4,000 per kilo. Entered via kg Medamit, Limbang, left Lawas March 1, arrested on March 13, **10 months imprisonment** (Malai, 2003)
Jun-03	Miri	n/a	Seizure (Encik Zainal, Sarawak Forestry Corporation, pers. comm. 2005)

Appendix 5 (continued) :

Enforcement operations involving agarwood in Malaysia (or involving Malaysians abroad)

Date	Location	Case	Details
9-Mar-05	Batu Apoi Forest Reserve, Brunei	Ten Sarawakians (Walter Pengiran Kamoa, Richard bin Lalong, Mohd. Tajuddin bin Abdullah @ Anthony Chan, Roni bin Pala, Liwi bin Yasaya, Josiah bin Laban, Victor Pengiran, Agustin bin Udan, Francis bin Asai, Pada bin Uak and Palus bin Laban, originate from Lawas, Sarawak).	2.869 kg of Aquilaria Beccariana, or in Malay 'kayu gaharu', On February 19 this year, the defendants set off from Lawas in an unknown vehicle through the Batu Sagnol Forest, Lawas. After about an hour's drive, the defendants came across a river bordering Lawas and Brunei. From there, the defendants continued on foot into Brunei.Batu Apoi Forest Reserve.Amongst their belongings that were confiscated included ten axes, one 'parang', ten pieces of 'selabit' (all believed to be used for the collection of sandalwood) and one plastic box containing pieces of wood believed to be 'kayu gaharu'. **six months' imprisonment and three strokes of the cane** (Rol, 2005)
1-Jul-05	Ulu Sungai Belalong Forest Reserve, Temburong District, Brunei	Two Sarawakians (Usop Sinau, 64; and son, 17; from Lawas, Sarawak)	1.566 kg valued at between BRD 2000-4000. charged with collecting Aquilaria Beccariana or 'Kayu Gaharu' on June 17 this year in Ulu Sungai Belalong Forest Reserve, Temburong, which is an offence under section 19 (d) of the Forest Act (Chapter 46). **Six months imprisonment, and three strokes of cane for immigration offence.** (Rol, 2005)
2005	Sarawak	n/a	50 kg of gaharu en route to Peninsular Malaysia seized by Sarawak Forestry Corporation
2006	Sungai Medit, Mukim'Rambai, Tutong district, Brunei.	Ten Indonesians	Entered via Limbang. Imam Surji bin Suparno, 33, arrested, jailed 6-months, caned 3-strokes (Rol, 2006)
6-Apr	Ulu Sungai Bang Kidan, Kg Buau in Kuala Belait, Brunei	Three Sarawakians (Padan Laput, Henrick Danor and Satar Abd Rashid)	Three Malaysian men were each sentenced to jail for nine months with five strokes of the cane after pleading guilty to cutting trees

Appendix 6:
Decisions of the Conference of the Parties to CITES in effect after the 13th meeting

Agarwood-producing taxa

Directed to Parties

13.61 The DNA work currently being undertaken by the National Herbarium of the Netherlands under contract to the Secretariat should continue and should be aimed at investigating the options for the development of identification tools based on molecular analysis.

13.62 As the trade is in the readily-identifiable product of agarwood, studies should include all known agarwood-producing taxa, not only the CITES-listed species *Aquilaria malaccensis*, and the possible inclusion of all agarwood-producing taxa in Appendix II needs to be discussed.

13.63 Further field research should be conducted on trade dynamics, including in the major importing and re-exporting States and territories of Southeast Asia, East Asia and the Middle East.

Directed to the Secretariat

13.64 The Secretariat should invite IUCN to re-evaluate the threatened status of all agarwood-producing taxa according to the IUCN criteria (Version 3.1).

13.65 The Secretariat shall:

a) assist in obtaining funding from interested Parties, intergovernmental and nongovernmental organizations, exporters, importers and other stakeholders to support a capacity-building workshop on trade in agarwood prior to the 14th meeting of the Conference of the Parties;

b) contingent on availability of external funding, cooperate with exporting and importing countries, as well as significant re-exporting countries and relevant experts, to convene a capacity-building workshop aimed at improving enforcement and implementation of the listing of *Aquilaria malaccensis* and other agarwood-producing species;

c) in addition to basic enforcement and implementation issues, include in the workshop a discussion of registration and labelling systems, types of agarwood products in trade and the potential for establishing personal effects exemptions for each, and the usefulness of such approaches for effective implementation; and

d) present at the workshop any new information from the Plants Committee on identification of agarwood products in trade, as well as information that would assist in determining sustainable harvest levels and making non-detriment findings.

Appendix 6a:
Decisions of the Conference of the Parties to CITES in effect after the 14th Meeting

Agarwood-producing taxa

Directed to Parties involved in agarwood trade and to the Secretariat	
14.137	Parties involved in trade in agarwood should, in consultation with the Secretariat, identify funds and produce identification materials for all forms of traded products under CITES control.
14.138	Parties concerned should identify and agree on which agarwood products and quantities should be exempted from CITES controls. Once agreed, Parties concerned should agree which range State will prepare and submit a proposal for amendment of the current annotation for agarwood-producing species to be considered at the 15th meeting of the Conference of the Parties.
14.139	Draft standardized units of reporting shall be considered at the 15th meeting of the Conference of the Parties.
14.14	Parties involved in agarwood trade shall prepare a glossary with definitions that illustrate the content of the amended annotations, the terms used and their practical application during enforcement and border controls. The Secretariat should facilitate the preparation and production of these materials, and strategies for incorporating them in training material.
Directed to Parties and the Secretariat	
14.141	Parties and the CITES Secretariat will work with intergovernmental and non-governmental organizations to seek ways to share information through the establishment of networks, organization of regional workshops, capacity-building programmes, exchange of experiences and identification of financial resources.
Directed to the Plants Committee and the Secretariat	
14.142	In consultation with relevant intergovernmental organizations such as the Food and Agriculture Organization of the United Nations, the Plants Committee in consultation with the Secretariat should draft a definition of non-timber forest products to be considered at the 15th meeting of the Conference of the Parties.
14.143	On the basis of the work on non-detriment findings for agarwood-producing species, that has been developed by TRAFFIC Southeast Asia and the Secretariat, the Plants Committee, in consultation with range States and the Secretariat, shall develop principles, criteria and indicators for the formulation of non-detriment findings for agarwood-producing species.
Directed to the Secretariat	
14.144	The Secretariat shall assist in obtaining funding from Parties, intergovernmental and non-governmental organizations, exporters, importers and other stakeholders to support a workshop aimed at strengthening the capacity of Parties to implement agarwood-related Decisions before the 15th meeting of the Conference of the Parties.

Appendix 7.

Harmonized Commodity Description and Coding System (HS) and CITES

The Harmonized Commodity Description and Coding System, popularly known as Harmonized System or HS, is a multipurpose goods nomenclature used as the basis for Customs tariffs and for the compilation trade statistics all over the world. The HS was developed by the World Customs Organization (WCO) and was implemented on 1 January 1988 by the International Convention on the Harmonized Commodity Description and Coding System (HS Convention). The HS is maintained by the WCO through the Harmonized System Committee. Currently 179 countries use it as the basis for their Customs tariffs and for the collection of international trade statistics

The system comprises more than 5,000 six-digit subheadings in a legal and logical structure supported by well-defined rules to achieve uniform classification. The HS classification structure consists of "Sections", "Chapters" (2-digits), "Headings" (4-digits) and "Subheadings" (6-digits). The HS headings and sub-headings provide the building blocks for more aggregated product classifications, such as the Standard International Trade Classification (SITC) classification of goods in international trade maintained by the International Trade Statistics Branch of the United Nations Statistics Division[64].

The preamble to the HS Convention refers to the importance of ensuring that the HS is kept up-to-date in light of changes that may occur in patterns of international trade. The HS has been amended four times. The first amendment occurred in 1992 and consisted mainly of editorial amendments. The second amendment came into force on 1 January 1996. It incorporated substantial changes affecting about ten percent of the nomenclature. The third amendment came into force on 1 January 2002 and the fourth amendment comes into force on 1 January 2007. In future, the HS is intended to be amended every five years.

The CITES Secretariat has had a long and close cooperation with the WCO, including the conclusion of a formal memorandum of understanding. At one time WCO and CITES held regular meetings of a WCO/CITES working group. This cooperation resulted in some of the amendments to the HS related to the separate identification of goods "of environmental and social concern". In particular, revisions of the HS have incorporated new sub-headings to facilitate the monitoring and control of CITES species and products thereof. The heading live animals (01.06) was split into 8 subheadings and six new subheadings were added to the section "meat" (02.08 and 02.10); headings for swordfish and toothfish were added. The revisions included suggestions from the CITES Secretariat to specify certain animal species in the text of subheadings. The term "marine [or fresh water] mammals" was thus replaced by the expression "whales, dolphins, and porpoises (mammals of the order Cetacea); manatees and dugongs (mammals of the order Sirenia)".

Despite these changes, there are numerous outstanding proposals for the WCO to specify additional taxa in the HS. The Conference of Parties to CITES has repeatedly directed the CITES Secretariat to liaise with the WCO to provide specific HS codes for taxa of particular concern. These taxa include sharks and shark

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64 SITC Rev. 3 (1986) (ST/ESA/STA/SER.M/34/Rev.3, E.86.XVII.12) (<unstats.un.org>)

parts and derivatives (Decision 10.126); live seahorses, dried seahorses, live pipefishes (and pipehorses) and dried pipefishes (and pipehorses) (Decision 12.56); as well as tortoises and freshwater turtles and for products thereof (Decision 13.37). On a less formal basis, there have also been calls for specific HS codes to be created for CITES tree species such as big-leafed mahogany and its value-added products; sea cucumbers; and the Porbeagle shark (*Lamna nasus*).

There appears to be a degree of reluctance to incorporate additional species-specific codes in the HS. The Twenty-second meeting of the Animals Committee held in Lima (Peru), 7-13 July 2006, noted that work with the World Customs Organization had encountered "difficulties" and the CITES Secretariat was "not optimistic regarding future changes to customs codes" (AC22 Inf. 3). Indeed, as early as 2001, the CITES Secretariat said it felt it had "already done what it could" citing "practical difficulties" in making further additions to the HS since it was "very difficult" to allocate codes to the products containing parts or derivatives of CITES species; and therefore "the HS system had been applied to the maximum extent possible to CITES specimens" (Anon., 2001g). In response to a request to include specific HS codes for sharks, the WCO informed the CITES Secretariat that "there was no opportunity for further elaboration of [shark species] identification codes within the Harmonized System, other than that the WCO could include a single code for all [shark] species listed on CITES Appendices thus flagging up those species for customs officers" (Anon., 2002d).

Due to the difficulties between the CITES Secretariat and WCO, some have suggested to include HS codes for CITES species on national Customs codes. Individual countries have extended the six-digit HS nomenclature to up to ten digits for national tariff purposes. National Customs codes have the advantage of being able to be revised more frequently than the five-year interval of the HS.

Appendix 8.

Information on seizures by the Department of Wildlife and National Parks, Peninsular Malaysia

No.	Area	Year	Prosecute	Fine
1	H.S. Tekam, Jerantut	2001	3	Jailed 16month/person
2	Ulu Sg. Ketil, Gua Musang	2004	2	Jailed 1 night
3	Felda Mentara, Gua Musang	2004	1	Compound RM3,000.00
4	Bkt Pakoh,Aring, Gua Musang	2004	1	Jailed 5 thn
5	Felda Aring 5, Gua Musang	2005	4	Jailed 3 years 10 month and 2 strokes of rattan/person
6	Sg. Tanum, Merapoh	2002	2	Jailed 6month/person
7	KM 48 Jln.Gua Musang K.Lipis	2004	4	Jailed 18 months/person
8	Sg. Yu, Merapoh	2005	1	Compound RM1000.00
9	Bkt 7(Lipis-Merapoh)	2005	1	Compound RM3000.00
10	Sira Kuda, Temenggor	2003	4	Surrendered to the ATM (Pulau Banding)
11	H.S Ulu Muda	2004	3	Surrendered to the PDRM Daerah Sik
12	Taman Negara (Sg. Kalong Merapoh)	2002	2	Jailed one year and 2 stoke of rattan/person
13	Pasir Raja, Terengganu	2003	5	Jailed 4 months/person
14	Taman Negara (Sg. Cacing & Sg. Atok)	2003	125	(a) Jailed 6mths/person(2) (b) Jailed 3mths/person(10)
15	Taman Diraja Belum	2004	8	Jailed 4 months/person
16	Taman Negara (Sg.Relai)	2005	7	Jailed 16 months/person
17	Banjaran Titiwangsa (OPS Bamboo)	2005	2 3	(a) Jailed 20 months/person (b) 1 prson; jailed 4 months
18	Taman Negara (Terengganu) Sg. Cacing	2005	2	2 persons; fined RM 4,500.00/person
19	Sg.Mentong, Tasik Kenyir	2006	3	Jailed 8 months/person

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