



## **Report of the CITES Tree Species Programme – Validation Workshop on Agarwood Report**

**Kuala Lumpur, Malaysia, 20-22 June 2022**

### **REPORT**

Agarwood (also known as eaglewood and gaharu) is produced in several Asian countries and used in incense, perfume and small carvings. It is formed in the heartwood of (mainly) *Aquilaria* and *Gyrinops* trees when they become infected with a type of mould. Prices of up to USD 100 000 per kg have been recorded for top-quality agarwood, leading to unsustainable levels of extraction and the listing of all species of *Aquilaria* and *Gyrinops* in Appendix II of CITES since 2004.

In August 2019, the 18th CITES Conference of the Parties adopted decisions (available on the [CITES website](#)) intended to strengthen the capacities of national authorities to control trade in agarwood species. The CITES Secretariat is implementing, or facilitating the implementation of, these decisions, which included a call for a study on agarwood-producing species.

The draft report on agarwood-producing species, which was prepared by ITTO under an agreement with CITES, examines the cultivation, inoculation technologies and best management practices of agarwood-producing species and reviews wild and planted agarwood resources as well as processing technologies, products and regulatory practices. The report builds on the outcomes and recommendations of the [2018 CITES Tree Species Programme Regional Meeting for Asia](#) and an [international meeting on agarwood](#) convened by ITTO in 2015.

The workshop was held in Kuala Lumpur, Malaysia, on 20–22 June 2022 (Annex I: workshop agenda). It was attended by 50 people (including ten who joined virtually) (Annex II: list of participants) from range and importing States with experience in agarwood management in the wild and in plantations, who critically examined the report and provided inputs for its revision. The revised report will be published and presented at the 19th CITES Conference of the Parties, which will be held in Panama in November 2022.

## Opening Session

In her video opening statement, Ms. Ivonne Higuero, Secretary General of CITES, briefed all participants on historical background starting from 1994 when agarwood trees were first listed in Appendix II of CITES, indicating sustainable, legal, and traceable trade of agarwood has been a key focus of CITES' work on plants in the Asian region. She reminded that at almost every meeting of the Conference of the Parties or Plants Committee, there is an agenda item relating to trade, management, or conservation of these tree species. There is even a CITES resolution dedicated to this group of taxa. After almost three decades of CITES work on agarwood, she stressed that it is certainly timely to undertake a comprehensive review of trade, conservation status, management, and propagation of these species and thus the workshop would be an opportunity to hear views and to receive contributions of agarwood range States to this important effort. She affirmed that the review and joint efforts would help the CITES community to take stock of previous work, and to prioritize its efforts for the future.

In her opening statement, Ms. Sheam Satkuru, Executive Director of ITTO, indicated that range States of agarwood and importing countries, over the years, have made significant progress in implementing CITES regulations in relation to agarwood-producing tree species, providing examples of ITTO having assisted its member countries to sustainably manage agarwood resources through a range of projects and activities, including in collaboration with CITES under the CTSP and the preceding ITTO-CITES Program. She also referred to work in Malaysia (focused on *Aquilaria*), in Indonesia (focused on *Aquilaria* and *Gyrinops*) and in several other range states, focused on improved management of natural agarwood sources, as well as assisted production via inoculation and plantation development. She reminded participants that the issue of plantations is one that arises frequently in discussions of several CITES-listed tree species. She stressed that if management is carried out correctly, plantations can ensure a sustainable supply of products while alleviating pressure on natural forests. However, the profits from plantations can encourage the over-exploitation and conversion of remaining natural forests; moreover, it is extremely difficult to reproduce the quality of naturally produced materials in plantations. She said plantation investment programmes should be accompanied by efforts to ensure the sustainable management of remaining natural forests, which are the repositories of genetic material for the continued improvement of plantations. She affirmed ITTO's strong support for continuation of this important work with the CITES Secretariat to ensure that trade in agarwood is not detrimental to the survival of the species.

In his opening statement, YB Datuk Ali Biju, Deputy Minister of Energy and Natural Resources of Malaysia, stated that the long standing collaboration of both Secretariats of ITTO and CITES assisted Malaysia in implementing numerous forestry and biodiversity projects through the ITTO-CITES Program, eight (8) projects under the Phase I of the Program and five (5) under its Phase II, two (2) out of which assisted Malaysia to obtain important information on phenology, reproductive ecology and genetic population of *Aquilaria malaccensis* and develop a database and information system – myCITES for the management and conservation of agarwood. He further introduced the latest project under the CITES Tree Species Programme entitled 'Establishment of Arboreta and Strengthening Institutional Network for Conservation of *Aquilaria malaccensis* in Peninsular Malaysia', indicating two arboretas established under the project would serve as species repository for genetic conservation. He stressed the importance of the workshop to meet milestone of CoP18 Decision 18.203-204, which is intended to strengthen capacities of national authorities to control trade in agarwood species.

## **Presentations (Annex III)**

Mr. Martin Otto Hitziger, Associate Plant Species Officer, Scientific Services of CITES Secretariat, briefed participants on background of agarwood listings and related CITES Decisions and Resolutions adopted, adding other relevant details of work between CoP18 and CoP19.

Mr. Ian Thompson, lead consultant on the study, presented the report and reminded participants of the objectives of reviewing the report and current CITES issues/concerns regarding agarwood, problems in the CITES trade data on export and import of agarwood, common conservation measures and enforcement efforts, followed by recommendations.

The following range states made detailed country presentations:

Bangladesh  
Bhutan  
Cambodia  
China  
India  
Indonesia  
Lao PDR  
Malaysia  
Myanmar  
Nepal  
Thailand  
Viet Nam

## **Working Groups**

Three working groups were established to carry discussions on the following themes and their recommendations are attached as Annex IV.

WG 1: Developing NDFs

WG 2: Harvest/export registration system

WG 3: Consistent terminology and units for reporting exports and imports to CITES and how to improve the CITES glossary

The results of the information presented in the country reports and the conclusions/recommendations of the working groups are reflected in the final agarwood report ("A review of agarwood producing genera: CITES considerations, trade patterns, conservation and management") which will be finalized and posted on the ITTO ([www.itto.int](http://www.itto.int)) and CITES ([www.cites.org](http://www.cites.org)) websites in due course.

## Annex I: Workshop Agenda

<b>Sun., 19 June 2022</b>	Arrival of participants in Kuala Lumpur
<b>Mon. 20 June 2022</b>	
08:30 – 09:00	Registration by participants
09:00	Prayer reciting
09:05 – 09:40	Opening Session <ul style="list-style-type: none"> <li>• Opening video speech by Ms. Ivonne Higuero, Secretary General of CITES</li> <li>• Speech by Ms. Sheam Satkuru, Executive of ITTO</li> <li>• Officiating speech by YB Datuk Ali Biju, Deputy Minister of Energy and Natural Resources</li> <li>• Presentation of token of appreciation to YB Datuk Ali Biju, Deputy Minister of Energy and Natural Resources</li> <li>• Presentation of token of appreciation to Ms. Sheam Satkuru, Executive Director of ITTO</li> </ul>
09:40 – 09:45	Group photo
09:45 – :10:15	Coffee/Tea break
10:15 – 12:30	Morning Session - chair: Dr. Norwati bt. Muhammad (FRIM) <ul style="list-style-type: none"> <li>• CITES presentation on agarwood listing and subsequent resolutions/decisions from COP/Plants Committee + associated work (15-min.)</li> <li>• Detailed presentation of agarwood report including remaining gaps/draft recommendations for further work – Ian Thompson (25-min.)</li> <li>• Country reports and discussions               <ul style="list-style-type: none"> <li>• Malaysia (25-min.)</li> <li>• Bangladesh (25-min.)</li> <li>• Bhutan (25-min.)</li> <li>• China (25-min.)</li> </ul> </li> </ul>
12:30 – 14:00	Lunch
14:00 – 16:00	Afternoon Session – chair: Mr. Thang Hooi Chiew (Regional Coordinator for Asia under the CITES Tree Species Programme) <ul style="list-style-type: none"> <li>• Country reports and discussions               <ul style="list-style-type: none"> <li>• Cambodia (25-min.)</li> <li>• India (25-min.)</li> <li>• Indonesia (25-min.)</li> <li>• Lao PDR (25-min.)</li> <li>• Myanmar (25-min.)</li> </ul> </li> </ul>
16:00 – 16:30	Coffee/Tea break
16:30 – 18:00	Chair: Dr. Steve Johnson - ITTO <ul style="list-style-type: none"> <li>• Nepal (25-min.)</li> <li>• Thailand (25-min.)</li> <li>• Viet Nam (25-min.)</li> <li>• Introduction of working groups (WG) and their mandates</li> </ul>
18:30	Cocktail



<b>Tue. 21 June 2022</b>	
08:30 – 10:30	<p>WG 1: Developing NDFs (location to be confirmed) – chair: Mr. Teckwyn Lim</p> <p>WG 2: Harvest/export registration system (location to be confirmed) Chair: Cr. Maman Turjaman</p> <p>WG 3: Consistent terminology and units for reporting exports and imports to CITES and how to improve the CITES glossary (location to be confirmed) Chair: Mr. Martin Otto Hitziger (CITES)</p>
10:30 – 11:00	Coffee/Tea break
11:00 – 12:30	WGs to continue
12:30 – 14:00	Lunch
14:00 – 15:30	WGs to continue
15:30 – 16:00	Coffee/Tea break
16:00 – 17:00	<p>Afternoon Session – chair: Dr. Lillian Chua (Malaysia)</p> <ul style="list-style-type: none"> <li>• Reports by working groups</li> </ul>
<b>Wed. 22 June 2022</b>	
Morning Session	<ul style="list-style-type: none"> <li>• Field trip to FRIM agarwood arboretum and 'agarwood inoculation demonstration'</li> </ul>
13:00 – 14:30	Lunch at the hotel
14:30 – 16:00	<p>Concluding Session – chair: Mr. Martin Otto Hitziger (CITES)</p> <ul style="list-style-type: none"> <li>• Discussion and final recommendations and finalization of report/presentation at CITES COP</li> <li>• Concluding comments/wrap-up</li> </ul>

## CITES Tree Species Programme - Validation Workshop on Agarwood Report

### List of participants (as of 1 July 2022)

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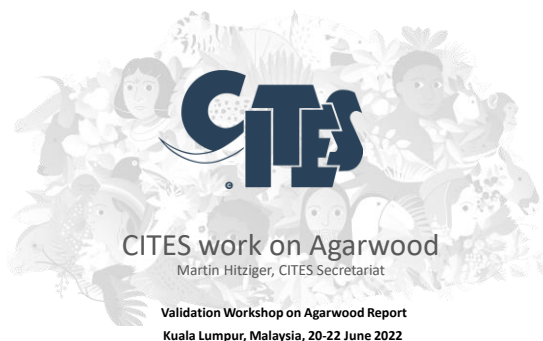
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## Virtual Participation

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### **Annex III: Presentations**



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## Resolution 16.10 on Agarwood producing taxa

Exemptions from CITES terms and definitions regarding artificial propagation:

- “under controlled conditions” includes
  - mixed plantations gardens,
  - non-natural environment manipulated by human intervention for the purpose of producing plants
- “cultivated parental stock” includes seeds or propagules obtained from wild

Parties and the Secretariat to use the agarwood NDF guidance ([CoP16 Inf. 11](#))

Range States and exporting Parties to establish registration systems and to use the [Agarwood glossary](#)



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## Agarwood Decisions at CoP18

Monitor the implementation of Res. 16.10 for conservation impacts and possible problems:

- Questionnaire
- Trade data
- Conservation status
- A potential study



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## Agarwood listings in CITES Appendices

- CoP9 (1994, USA): *Aquilaria malaccensis* (Appendix II)
- CoP13 (2004, Thailand): *Aquilaria* spp., *Gyrinops* spp. (Appendix II)
- CoP16 (2013, Thailand): Annotation #14 replaces Ann. #4: exhausted agarwood powder exempted
- CoP17 (2016, S. Africa): Wood chips exempted

Agarwood currently listed with Annotation #14: *All parts and derivatives except:*

- seeds and pollen;
- seedling or tissue cultures obtained in vitro, in solid or liquid media, transported in sterile containers;
- fruits;
- leaves;
- exhausted agarwood powder, including compressed powder in all shapes; and
- finished products packaged and ready for retail trade, this exemption does not apply to wood chips, beads, prayer beads and carvings.



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## Agarwood agenda item at PC24

CoP17 Agarwood decisions requested PC to

*monitor the implementation of Resolution Conf. 16.10 to assess any potential conservation impacts to the long-term survival of agarwood-producing species and possible problems arising from the implementation*

PC did not submit a document regarding this review

Secretariat submitted a revised Agarwood glossary

PC proposed new draft Decisions



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## Other relevant work CoP18-CoP19

Source code Y on ‘assisted production’ (Res. 11.11 on *Trade in Plants*):

- plant specimens that
  - do not fulfil the definition of ‘artificially propagated’
  - propagated or planted for the purpose of plant production in an environment with some human intervention
- any legally and sustainably sourced propagation materials
- requires permits, NDFs and LAFs

[Guidance on terms related to artificial propagation](#)  
incl. sections on Agarwood



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## Agarwood agenda item at PC25

Findings (PC25 Doc. 24, PC25 Doc. 24 Add.):

- Seeds and propagules mostly from cultivated parental stock
- Diverging opinions on the usefulness of the provisions on artificial propagation in Res. 16.10 and whether source code Y could replace these
- No responding Party uses Agarwood NDF guidance
- Only Thailand states implemented a national registration system
- Glossary reported to be unclear; difficult differentiation between
  - oil from the wild and cultivated sources
  - exhausted and non-exhausted powder

**Recommendation:** Postpone consideration of potential revisions to Res. 16.10, provisions on artificial propagation, NDF guidance, glossary post-CoP19



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## CITES Tree Species Project work on Agarwood

**Establishment of Arboreta and Strengthening Institutional Network for the Conservation of *Aquilaria malaccensis* in Peninsular Malaysia**

Outputs: [Guidelines](#), [Outreach Action Plan](#), [Establishment of Arboreta and Strengthening Institutional Network for Species Conservation](#)

**Discussions on Agarwood management during the CITES Tree Species Programme Regional Meeting for Asia (Indonesia, 25-29 June 2018)**

**Review of the Agarwood-producing genera *Aquilaria* and *Gyrinops* spp.: CITES considerations, trade patterns, conservation and management**

Ian Thompson, Lim Teck Wyn and Maman Turjaman



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### An overview of agarwood producing species: *Aquilaria* and *Gyrinops*

Report by:  
Ian Thompson, ITTO Consultant  
Teck Wyn Lim, Resource Stewardship Consultants Sdn Bhd  
Maman Turjaman, Indonesia National Institute for Research and Innovation

June 2022



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### Purpose of the review report

- Provide an update and summary of species
- Brief overview of CITES issues on agarwood
- Summary of export and import data
- Assess current conservation measures
- Summarize plantation management
- Recommendations for: exporting countries, importing countries, and CITES



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The genus <i>Aquilaria</i> – at least 20 species		
Species	IUCN status	Country with population
<i>Aquilaria malaccensis</i>	CR	India, Myanmar, Bhutan, Vietnam, Malaysia, Indonesia, Philippines, Thailand, Singapore, Bangladesh, Nepal
<i>Aquilaria microcarpa</i>	EN	Brunei, Indonesia (Kalimantan, Sumatra), Malaysia (Peninsular, Borneo)
<i>Aquilaria apiculata</i>	DD	Philippines
<i>Aquilaria baillonii</i>	DD	Cambodia, Lao PDR, Vietnam
<i>Aquilaria banaensis</i>	VU	Vietnam, Cambodia, Lao PDR*
<i>Aquilaria beccariana</i>	VU	Brunei, Indonesia (Kalimantan, Sumatra), Malaysia (Peninsular, Borneo)
<i>Aquilaria citrinicarpa</i>	DD	Philippines
<i>Aquilaria cumingiana</i> ( <i>Gyrinops cumingiana</i> )	VU	Malaysia (Borneo), Indonesia (Kalimantan, Maluku, Moluccas, Papua), Philippines
<i>Aquilaria khasiana</i>	CR	India, Bangladesh
<i>Aquilaria apiculata</i>	DD	Philippines
<i>Aquilaria parvifolia</i> ( <i>Gyrinops parvifolia</i> )	DD	Philippines
<i>Aquilaria rostrata</i>	CR	Malaysia (Peninsular)
<i>Aquilaria rugosa</i>	VU	Vietnam, Cambodia, Thailand
<i>Aquilaria subintegra</i>	DD	Thailand
<i>Aquilaria urdanensis</i>	DD	Philippines
<i>Aquilaria yunnanensis</i>	VU	China (Yunnan), Lao PDR, Vietnam (2019)
<i>Aquilaria filaria</i> ( <i>Aquilaria acuminata</i> )	VU	Indonesia (East Nusa Tenggara, Moluccas, Papua), New Guinea, Philippines
<i>Aquilaria sinensis</i>	VU	China (Guangdong, Guangxi, Hainan, Yunnan), (Lao PDR in plantation only)
<i>Aquilaria crassna</i>	CR	Bhutan, Cambodia, Lao PDR, Thailand, Vietnam
<i>Aquilaria hirta</i>	VU	Malaysia (Peninsular, Borneo), Indonesia (Kalimantan, Sumatra), Thailand

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### The genus *Gyrinops* – at least 8 species

Species	IUCN status	Country with population
<i>Gyrinops decipiens</i>	EN	Indonesia (Sulawesi)
<i>Gyrinops versteegii</i>	VU	Indonesia (Nusa Tenggara, Sulawesi, Moluccas, Papua), New Guinea
<i>Gyrinops walla</i>	VU	Sri Lanka
<i>Gyrinops caudata</i>	VU	Papua, New Guinea
<i>Gyrinops ledermannii</i>	EN	Papua, New Guinea
<i>Gyrinops moluccanna</i>	EN	Indonesia (Moluccas, Papua), New Guinea
<i>Gyrinops salicifolia</i>	EN	Papua, New Guinea
<i>Gyrinops vidalii</i>	CR	Thailand, Cambodia, Lao PDR, (Vietnam?)



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### How valuable a commodity is agarwood?

- Akter et al. (2013) indicated global trade at US\$6 to 8 billion in 2012
- But ....according to 'Persistence Market Research' the value of traded chips alone in 2018 was US\$30-32 billion (a lot closer to correct)
- First-grade agarwood sells for about \$100,000/kg
- Oil sells for about US\$487/tola ( = 12 ml), with the best oil selling at >\$530 in 2021




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### Current CITES issues/concerns about agarwood

- Exporting countries want exemption for plantation wood – but there are concerns about the mixing of wild wood in with plantation wood
- Several species in both genera are not commercial or do not produce agarwood, but these species are listed regardless
- The current glossary does not meet requirements of users – definitions unclear, too many products (21 types)
- Monitoring the impact of Resolution 16
- Assistance in the preparation of NDFs (only 2 recent NDFs, 2 others out-of-date)
- Need improved information on illegal harvest and enforcement
- Question about including (or not) 'exhausted powder' under controlled export products




6




### Problems in the CITES data on export and import of agarwood

- Data are recorded in too many ways – as reported by countries
  - derivatives, chips, extract, live specimens, logs, oil, powder, sawn wood, specimens, wax, carvings, timber, jewelry, timber pieces, stems, medicines, leaves, veneer, seeds, dried plants, boxes, bottles, and wood products
- Data are recorded in too many units:
  - m<sup>3</sup>, g, or kg for most wood products, kg, ml, or litres for oil and extract, number of specimens, g, or kg for plants and stems, boxes for something (unit = box)
  - Or, no units for many entries
- > 25% of the entries have no species name – just the genus
- From 2000-2020, >236,000 kg were exported with no country named
- 6,273,402 kg more recorded as imported than was reported exported (>300,000 kg/yr)




7



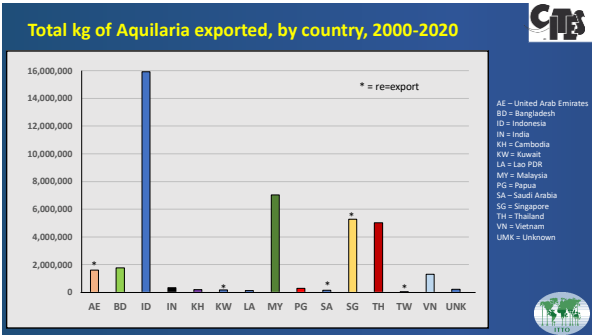
### Value of the CITES agarwood database

- Only dataset on import and export of agarwood
- Provides trends over time
- Indicates which countries are major importers and exporters
- Provides data on product types
- Provides data on product source – planted, wild, seized, other
- Provides data on the actual species in trade

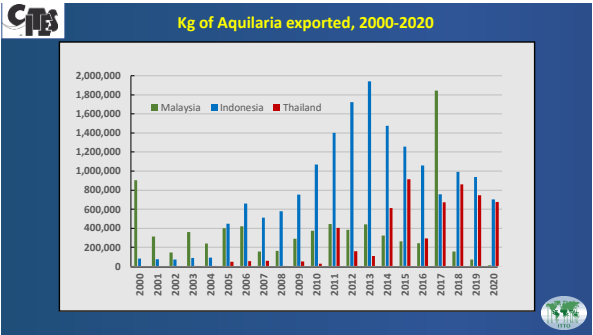
Taxon	Term	Unit	Country	Total	2000	2001
Aquilaria malaccensis	derivatives	bottles	CN	13200	13200	
Aquilaria malaccensis	derivatives	cartons	CN	5260	4610	650
Aquilaria malaccensis	derivatives	g	CN	1296.1		
Aquilaria malaccensis	derivatives	kg	CN	974.775		101.28
Aquilaria malaccensis	derivatives		CN	4681.78		
Aquilaria malaccensis	dried plants	g	CN	1849		
Aquilaria malaccensis	extract	g	CN	180		
Aquilaria malaccensis	jewellery		CN	0		



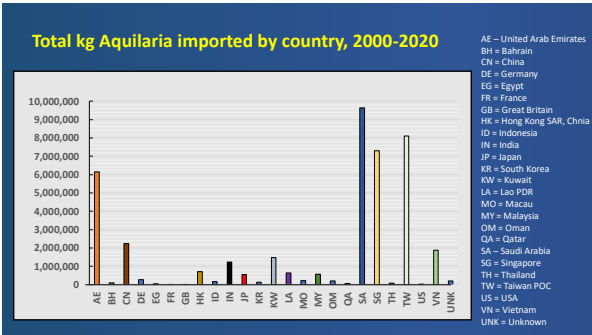
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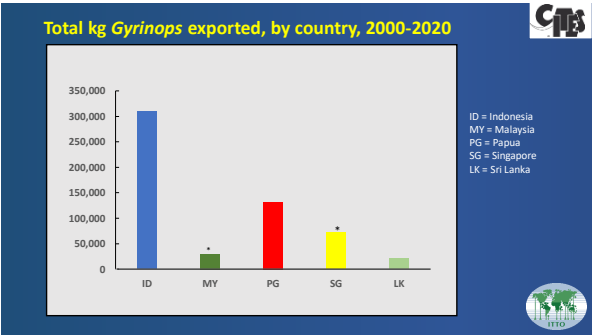
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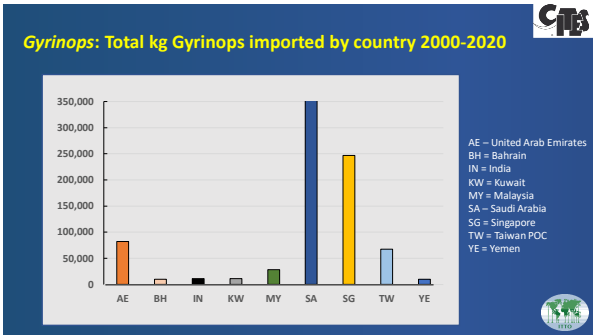
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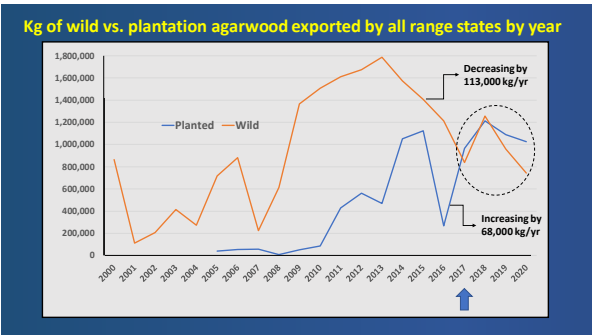
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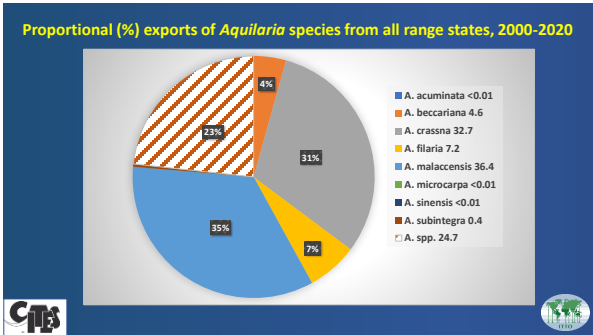
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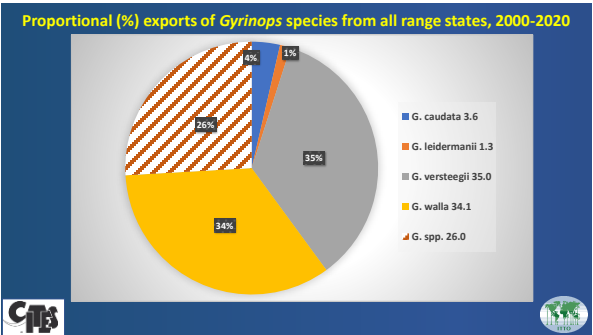
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14



15



16

**Distinguishing Aquilaria from other tree species and plantation from wild agarwood**

- Advances in both genetics and chemical difference detection
- Genetic bar-coding has been used successfully to distinguish:
  - 1. Among species (both in Aquilaria and vs. other trees)
  - 2. Geographic origin (China, Malaysia)
  - 3. Plantation vs. wild, in *A. sinensis*
- E.g., work on bar-coding by S. Y. Lee in Malaysia, currently can be used to distinguish among species (cost \$440/sample)
- Successful discrimination between wild and plantation origin using “DART-TOFMS” Direct Analysis in Real Time (Time of Flight) Mass Spectrometry – Espinosa et al. 2014 – multiple countries

17

**Current information on populations**

Country	Plantation*	Wild	Past information (planted)
Malaysia	2500 ha (1.6 million trees)	1.11 million (2013)	1.3 million trees (2018)
Indonesia (excl. Papua)	1750 ha (3.5 million trees)	No data	3.1 million trees (2018)
Thailand	576 ha planted, 1825 ha mix planted	No data	
China	21,767 ha (Hainan and Guangdong only)	130,000 (2013)	24,607 ha (2018)
Vietnam	16,000 ha	No data	20,000-30,000 (2020)
Lao PDR	6,600 ha (partial only)	950	
Cambodia	500 ha (1 million trees)	No data	
Bangladesh	5000 ha plus 1 million in home gardens	No data	6000 ha
India	5000 ha (10 million trees)	No data	10 million trees (2018)
Sri Lanka	No data	No data	
Myanmar	34,750 trees home gardens (2018), and 864 ha planted, 2458 ha mix planted	No data	
Nepal	120 ha (24,000 trees) (2018)	No data	

\*Note: If trees were reported for plantations, this was converted to ha by dividing by 2000

18

### Common conservation measures

- List species under endangered species acts and make all wild harvest illegal (all countries)
- Try to re-establish populations by planting trees (6 countries)
- Develop plantations as alternative source of agarwood (all)
- Provide seeds/seedlings for home gardens (5 countries)
- Enforce regulations for trade and against illegal activities (all)
- Census wild populations and develop proper NDFs (4-5 countries)
- Active research programmes (3 countries: China, Malaysia, Sri Lanka)
- Management plan (3 countries: Indonesia, Malaysia, Lao PDR)

19

### Enforcement effort in Malaysia and Sri Lanka

Arrests/yr Peninsular Malaysia

T.W. Lim et al. 2022

Gynopage wrecks confiscated by Sri Lanka Customs

Window to Nature, M. Rodrigo

- regular reports in most producer countries of amounts seized
  - e.g., Philippines: 145 kg seized 2018-2021
- CITES enforcement data were not available for this study

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### Plantation management

- Some countries still use physical wounding, but most countries now drill trees and apply a fungal inoculant
- Little success for chemical inoculant, except in *A. sinensis*
- Favoured species: *A. malaccensis*, *A. crassna*, or *A. filaria*
- Plant seedlings when 60-90 cm tall
- Spacing – most use 2 m to 3 m
- Many plantations are mixed species (e.g., with coffee)

21

### Plantation registration system

- Most countries now have some form of registration system
- May include bar-coding of trees (Thailand, China)
- Permits for traders to buy and transport wood
- Controls via CITES export permitting system
- However, known mixing of wild and plantation wood

Diagram illustrating the Indonesian system to control export of wood. The process flow is: Agarwood Collector → Agarwood Local Trade → Shipping/Transportation Permit → National Trader → Exporter/Registration → Export Permit → Export Destination Country. The diagram also shows the role of CITES in the export permit process.

22

### Recommendations (1): exporting countries

- Need for proper NDF; includes population census
- Better enforcement; and training for customs staff
- Simplify online registration/license system for plantations
- License system for traders with penalty for buying wild wood where not allowed
- Develop/implement management action plans
- Create a national agarwood tax fund that would collect fees paid by users (traders, manufacturers, sellers)
- Manage for genetic diversity in wild and plantation populations
- Apply to funding agencies for improvement programmes: AfOCO, ITTO, UNDP, etc., including technologies to identify wood origin

23

### Recommendations (2): importing countries

- Consider providing funding to range states to improve wild agarwood populations e.g., through the CTSP
- Better enforcement – and training of customs staff with penalty system for importing illegal product

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Recommendations (3): CITES



- Work with botanical gardens to improve finalize taxonomy of the *Aquilaria/Gyrinops* genera
- Parties should consider listing additional agarwood-producing species in trade, such as *Aetoxylon sympetalum*
- The current ‘glossary of agarwood products’ requires further work to reduce the scope and ensure that there is clarity of the terms
- Address the inconsistencies in the agarwood import/export database
- Ensure that export quotas are species-specific
- Assist countries in NDF preparation



**Acknowledgements:**  
Thank you to the several countries that responded to the study questionnaire:  
India, Thailand, Indonesia, Malaysia, Lao PDR, Vietnam, China, Cambodia, Sri Lanka.

Questions?





Management of Agarwood Plantations & Implementation of CITES for Trade in Agarwood Products in Bangladesh





BANGLADESH FOREST DEPARTMENT  
MINISTRY OF  
ENVIRONMENT, FOREST AND CLIMATE CHANGE

1

Background Information


- Two varieties of Agar plant grows in Bangladesh, namely *Aquilaria malaccensis* and *A. khasiana*, where *A. khasiana* is very rare.
- Naturally grows in north-east & south-eastern hills but now under threat of extinction.
- The production of agarwood started about 400 years ago in Suzanagar Union of Barolekha Upazila of Moulvibazar district.
- Agarwood was produced from forest based agar tree.
- Due to limited access to reserved forest, people started to cultivation in household land.
- Practice of raising in private home gardens for many years.
- Since 2000, Agar plantation is being raised by Forest Department in Government Forest Lands and Govt. initiative has taken to aware general



2

Contd....

- From Government initiative, experimental plantation with other species started in early nineties by Bangladesh Forest Department (BFD).
- Total 5000Ha. Agarwood plantations were raised under Agar Plantation project(2000-2011) by BFD. And before that period around 1000 hac plantation was raised from Govt. initiative.
- Distribution of One million agar seedling at cost price among local people .
- 10,000 local people have been involved as participants as per Social Forestry Model.



3

Contd....

- Preferable rainfall min. 1800mm. & temp. 20-25°C.
- Preferable altitude about 500m and slope not more than 45°.
- Prefer good drainage condition.
- Naturally agar formed after 20yrs & found only in 10% trees, artificially induced method applied locally & it is possible to get agar within 10yrs from almost 100% trees.



4

Agar Trees in Bangladesh

- Scatteredly found in - Moulavibazar, Chittagong & in Rangamati, Khagrachari and Bandarban districts of Chittagong Hill Tracts(CHTs).
- Original seed source.
- Plantations are in all Forest Areas (6000 Hac).
- Private plantations (approx. 150000 Hac) in Moulavibazar district and CHTs(Rangamati, Khagrachari and Bandarban).



5

Nursery & Plantation Mgt. Techniques

- Seed Collection & Sowing: June-July
- Seeds are collected from mother trees and sown in the seedbed or container within 24hrs.
- After 1 week, germination started & competed within 1 month
- 1 yr old seedlings are planted during rainy season
- Generally planted at an spacing of 2.75mx2.75m, but in home gardens it may be 1mx1m to 1.5mx1.5m spacing



6



Nailing & Agar Deposition

- Indigenous Method is popular in Bangladesh
- Nailing commonly used
- Chem. Kit method- not popular in Bangladesh



7

Nail Removing & Chipping

- Nailing done from top to bottom at an age of 6-10 yrs
- After 4-5 yrs of nailing, trees are felled, nails are removed and chips are made manually by using sharp axe and Dao (knife).



8

Agar Oil Extraction

- Very crude & indigenous method -
- Water distillation
  - Water-steam distillation
  - Steam distillation
- 0.02-0.89 % oil can be extracted (BFRI,2009)



9

Implementation of CITES Rules

- Signed: 1973
- Ratified: 20 November 1981
- Entered into force: 18 February 1982
- Management Authority: Chief Conservator of Forests on behalf of Bangladesh Government
- Scientific Authority: Wildlife advisory Board
- Legal Instruments In Force:
  - Forest Act, 1927 (Last amended in 2000)
  - Bangladesh Wildlife (Preservation) Order 1973 (Amended in 1974)
  - Plant Variety Protection Act, 2003
  - Bangladesh Forest Produce Transit Rule, 2011
  - Imports and Exports (Control) Act, 1957
  - CITES enlisted species are regulated as per CITES guideline
  - Wildlife (Preservation and Security) Act, 2012
- Agar Tree Selling Rules 2012

10

Trade of Agar Products in Bangladesh (Export Data)



Year	Agar Chips		Agar Oil	
	Agar Oil (KG)	Agar Chips (KG)	Agar Dust (KG)	
2017	113	157,220	24,000	
2018	147	193,940	43,000	
2019	193	182,880	40,000	
2020	270	273,527	23,100	
2021	356	339,559	15,175	

11

Agar Products Trade in Bangladesh

Bangladesh is an important Agarwood producing country. The Agarwood Industry is a growing sector in Bangladesh and exporting Agarwood products to many countries in the world.

- Exporter : 16 nos.
- Importer : 31 nos.
- Importer countries are:  
Kingdom of Saudi Arabia, Kuwait, United Arab Emirates, Qatar, France, Oman, Kingdom of Bahrain, Tanzania and Libya.
- About 900 Nos. CITES Security Stamps have been used for exporting agar products from 1985 till to-date.

12

## Current Challenges

- Due to lack of popularization regarding the high economic return from the species, the amount of trees planted is not so satisfactory.
- High import duty charging by the importing countries.
- Lack of scientific technique for artificial induction.
- Lack of scientific & efficient modern technology and knowhow for production of Agar oil.
- Crude method causes misuse of resource & low quality
- Lack of training on product diversification knowledge and value addition.
- Lack of Govt. initiative to formalize the sector.

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## Recommendations

- Awareness program is required to popularize the valuable Agarwood species to grow and conserve.
- Assessment of Agar population in the natural forest stands should be carried out and Assisted Natural Regeneration and Enrichment plantation may be done in the natural forest sites of agar.
- More plantation of agar producing species may be raised from Government and private initiative as well .
- Soft loan provision for the Agarwood producers may encourage them.
- Registration for the Agarwood exporters is needed.


14

Thanks for Patient Hearing





15





## ENVIRONMENTAL POLICY IN BHUTAN





Druk Gyalpo  
Jigme Singye Wangchuck

THE  
VISIONARY KING

As mandated in its constitution, **Bhutan preserves (at all times) 60 percent of its land under forest cover.** Bhutan has succeeded in doing so. More than 51% of the country is protected—the largest percentage of any Asian country. Most of it is intact forests.

National Forest Policy of Bhutan 2009

The Constitution further charges the Government to ensure that a minimum of 60 percent

Bhutan is increasingly being recognized for its development philosophy of **Gross National Happiness**. His Majesty Jigme Singye Wangchuck, the Fourth Druk Gyalpo and the people of the Kingdom of Bhutan were the recipient of the first **Governor of the Earth** award in 2005 instituted by UNEP. In 2006, His Majesty the Fourth Druk Gyalpo was awarded the prestigious World Wildlife Fund (J. Paul Getty Center) **Living for a Conservation Leadership** and was inducted into the **Kyoto Earth Hall of Fame** for His Majesty's outstanding contribution to the protection of the global environment in 2011.

INTRODUCTION-CITIES																																			
15 August 2002																																			
Party status																																			
Type	Party status	Date of joining																																	
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<p style="text-align: center;"><b>List of Totally Protected Plants</b></p> <p style="text-align: center;">SCHEDULE I</p> <table border="1"> <thead> <tr> <th>Sr.</th><th>Local Name</th><th>Common Name</th><th>Botanical Name</th></tr> </thead> <tbody> <tr> <td>1.</td><td>Apar-tagen</td><td>Engle Wood hicken, Aow Wood</td><td><i>Aquilaria malacensis</i></td></tr> <tr> <td>2.</td><td>Yarha-paozooq</td><td>Chinese catapilla</td><td><i>Cnidopogon chinensis</i></td></tr> <tr> <td>3.</td><td>Pingang-moring</td><td></td><td><i>Gentiana crassicaulis</i></td></tr> <tr> <td>4.</td><td></td><td>Snow down Lily</td><td><i>Lilylethe yunnanensis</i></td></tr> <tr> <td>5.</td><td>Tider-saguen</td><td>Bihar poppy</td><td><i>Moripapav. goudoti</i></td></tr> <tr> <td>6.</td><td>Kerung-dhang</td><td>Yew</td><td><i>Taxus baccata</i></td></tr> <tr> <td>7.</td><td>Blooming-gawa-cho</td><td>Ginseng</td><td><i>Panaxis pseudoginseng</i></td></tr> </tbody> </table>				Sr.	Local Name	Common Name	Botanical Name	1.	Apar-tagen	Engle Wood hicken, Aow Wood	<i>Aquilaria malacensis</i>	2.	Yarha-paozooq	Chinese catapilla	<i>Cnidopogon chinensis</i>	3.	Pingang-moring		<i>Gentiana crassicaulis</i>	4.		Snow down Lily	<i>Lilylethe yunnanensis</i>	5.	Tider-saguen	Bihar poppy	<i>Moripapav. goudoti</i>	6.	Kerung-dhang	Yew	<i>Taxus baccata</i>	7.	Blooming-gawa-cho	Ginseng	<i>Panaxis pseudoginseng</i>
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## INTRODUCTION-RESEARCH




**FORESTRY INSTITUTE HEAD QUARTER  
BUMTHANG-UWICER**



**Visit us at website: [www.uwicer.gov.bt](http://www.uwicer.gov.bt)**

**ALTITUDE OF 2800M AMSL**

## INTRODUCTION –PAST

- Naturally occurring agarwood found in Panbang, Manas, and Phibsoo areas.
- No specific government policies on agarwood cultivation and management.
- No massive and systematic cultivation practices.
- Non of local people getting benefit from agarwood yet.
- Late Dasho Keiji Nishioka initiated private agarwood plantation in early 70s in Panbang but no technical support followed thereafter.
- Lack of experts

6

### History of Sub-Centre Establishment

The New Research Sub-Centre under the umbrella of UWICER (Ugyen Wangchuck Institute for Conservation and Environment Research Established in March 2017 in Gelephu (Sub-Tropical Area in the South-Central part of the Country).

Research nursery at Gelephu



Field activities the Sub-Centre has acquired 25 acres on lease from NLC (approved 16 acres) and as of now has 3 hectare agarwood long-term research plantation at Santengang, Bhur.

7

### CURRENT-MANDATES OF THE SUB-TROPICAL RESEARCH CENTRE


#### Mission

To conduct research and provide information and technologies for sustainable development of forestry and allied natural resources for socio-economic development.

- Develop and promote technologies related to commercial viable timber and bamboo species in the sub-tropical region.
- Conduct research and generate technologies on high value commercial species such as Agarwood and also sandalwood.
- Conduct research on wild flora and fauna of Bhutan's sub-tropical region.

8

### INTRODUCTION-AGARWOOD POTENTIAL AREAS



Subtropical Zone (150m to 1800m) vegetation.

9 districts out of 20 districts in our country.

9

### RESEARCH ACTIVITIES



### COLLABORATION -FDI

out. The objectives of the study will be:

1. To ascertain genotypic identity of natural and planted agar trees.
2. To quantify the amount of agar oil per unit wood mass.
3. To determine the quality of agar oil and its contents.
4. Best inoculation method/s and ascertain success rate of infection.
5. To develop test products and explore market feasibility.

**Expected Output**  
In line with the above objectives of the pilot study, the following outputs are targeted through the pilot study:

1. Establish genetic identity of Bhutanese agar wood trees.
2. Quantity of agar oil per unit mass of natural and planted agar trees.
3. Quality and contents of agar oil from natural and planted trees.
4. Best inoculation method recommended for successful infection of agar trees.
5. Develop initial test products (oil, incense, wood chips, etc) and brand.
6. Establish prices for agar oil and products in international markets.

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### RESEARCH ACTIVITIES



### COVID 19 PANDEMIC



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### PROPOSED RESEARCH ACTIVITY –FUNDING

### FUNDING REQUIRED USD 10,000.00 for PROJECT

Ugyen Wangchuck Institute for Conservation and Environmental Research (UWICER)  
Department of Forest and Park Services, Ministry of Agriculture and Forests,  
Lamal Gumpo, Bhumtang, Bhutan

**Research Title:**  
Development of an Agarwood DNA barcode library for Bhutan

**1. Summary**  
The purpose of this research is to identify the species of Agarwood trees growing in the natural forests, plantations, and home gardens in Bhutan. Suitable DNA barcodes will be evaluated on plant samples provided by UWICER. DNA will be extracted from the samples, potential DNA barcodes will be sequenced, and species identity will be determined against the master library developed by IUPAC. The DNA database created from this study will serve as evidence to the identity of Agarwood species growing in Bhutan. More importantly, identity of the native Agarwood moluccensis, a natural heritage of Bhutan will be established.

**2. Objectives**

- To identify species specific DNA barcodes for natural A. moluccensis and A. thuyoides
- To determine the identity of important Agarwood species grown by local farmers
- To determine the phylogenetic placement of both species to other known Agarwood species

12

PROPOSED RESEARCH ACTIVITY –

Agar wood inducement in *Aquilaria malaccensis*, for rural poverty alleviation.

Objective:

- Test different wounding methods which could lead to the formation of agarwood in the plantation.
- Make successful method available to the growers of the agarwood at nominal price.

**Methodology: (to be refined after the field visit)**

The *Aquilaria* trees of 3 - 8 years will use for the experiment under the Sarapha dongchiag. There will be six treatments. Cut with knife or chiseling, drilling, drilling and putting sugar and salt into the holes, drilling and insertion of pipes, nailing and control. The treatment will be assigned or applied randomly. There will be six replications with total of thirty six trees in each location. The minimum DBH of 10 cm in diameter will be selected for the study. The trees selected for the inoculation should be sound without any signs and symptoms of wounds and injuries on the stems. The details are as under:

13

PROPOSED RESEARCH ACTIVITY –FUNDING??

“INNOVATION, THINK BIG ACHIEVE BIG”

Development of agarwood plantation online -develop online REGISTRATION SYSTEM for the general public.



“PLANTED AS MANY AS MORE THAN 100 THOUSAND AGARWOOD SEEDLINGS SINCE 2018 WITH FDI PROPOSAL IN BHUTAN BY UWICER/DOFPS

14

WAY FORWARD

Promoting research collaboration among all agarwood-producing countries (technologies and expertise exchange). (CITES RECOMMENDATION)

Research to enhance the productivity of trees (inoculation technology development)

Study on the potential of Agarwood plantation in a large scale.

Population status survey of natural agarwood trees.

Motivating private growers and advocating sustainable harvest.

Capacity building of farmers, traders, and government personnel.

Formulate Agarwood cultivation, harvesting, and processing guidelines

15

UWICER INITIATIVES –AGARWOOD RESEARCH

ADVANTAGES OF AGARWOOD PLANTATION TECHNOLOGY IN THE SUBTROPICAL REGION

- Agarwood for income generation to contribute to poverty alleviation improving the livelihoods of poor people in the region (help growth of the local economy).
- Ensure diversity of genetic resources is maintained in natural habitats and ex-situ conservation.
- Opportunity to augment existing wild agarwood resources through community and private forestry
- Significant contribution in terms of the environmental conservation of this endangered species, as well as providing a carbon sink to reduce greenhouse gases.
- Encourage use of degraded and fallow land of the private registered land holdings in addition to State Reserve Forest.
- Furthermore, contribute to maintaining of 60% forest cover (Constitution of Bhutan and Forest Policy).

16

KADRINCHE LA

Thank You.

CITES

17

CITES TREE SPECIES PROGRAMME

VALIDATION WORKSHOP ON AGARWOOD REPORT

**Cambodia Country Report**

**Status of Agarwood**

Mr. Kry Masphal and Mr. Vuthy Lic  
Forestry Administration  
The Ministry of Agriculture, Forestry, and Fisheries

20-22 June 2022, Kuala Lumpur, Malaysia

Current Status

- Species: Aquilaria crasna, A. baillonii, A. Malaccensis, and A. rugosa;
- Location: Cost line areas with highest rainfall (3500 – 4000 mm per annum) of the country (see map);
- Forest type: Evergreen forests;
- Elevation of the areas: 1000 – 1400 meter above sea level;
- Rain pattern: about 260 days of rains per annum;
- Government prohibited species: MAFF regulation.



Current Status (cont.)

- Like many other plant species, Agarwood (wood and oil) have been used for religious believes, family incomes, and ornament for local people for centuries (e.g. religious status, incense);
- Commercial networks are among Cambodia, Thailand, Malaysia, and Vietnam;
- Exported quantity: 315,000 kg (during 1993 - 1998) and 200,000 kg (in 2016) (Sinly, 2022);
- Price of Agarwood oil could be up to 4,000\$US per liter of oil;
- There is no more commercial scale of collection of Agarwood from the wild in Cambodia, although few Agarwood hunters keep searching it in the wild;



Map depicted by Sinly, 2022



Current Status (cont.)

- Almost all areas of (former) Agarwood are Protected Areas, but no specific strategy and activity have been developed for the Agarwood species;
- There is no officially restoration and plantation mechanism established for Agarwood Management, rather, species conservation and protection in general;
- Few Cambodian family-scale firms have continued their import/export Agarwood in Cambodia;
- Agarwood plantations, A. Crasna and A. Malaccensis, have been increases for the last five years or so.



Current Status (cont.)



- Phnom Penh Post (2014): wild oil is four time more expensive than the plantation one
- Photos from Cambodian Friends (Facebook, 2018)

Challenges

- ❖ Un-sustainable harvest of the wild Agarwood conducted by un-controlled, organized and unorganized collectors;
- ❖ No Non-Detrimental Finding (NDF) has been conducted;
- ❖ Lack of Research and Development Mechanism, especially by the State, although mandated staff have been focusing on protection of wild Agarwood;
- ❖ Lack of capacity of officials and private in leading sustainable management of the species in the wild.

New Development

➤There are many, mostly private- and family-scale, attempts and piloting sites of Agarwood plantations in the former areas of wild Agarwood;  
➤Thai and Cambodian Firms bolstered 100 million USD to improve plantation of Agarwood;  
➤In their plantations, small-scale and family-scale firms, have tried to imitate natural processes of Agarwood development (inoculation);  
➤AFOCO has been taken into consideration of funding for piloting of Agarwood Restoration in four provinces of the species home range areas.



Thank you for your kind attentions







### The Definition of ‘Artificially Propagated’ of CITES-listed Tree Species

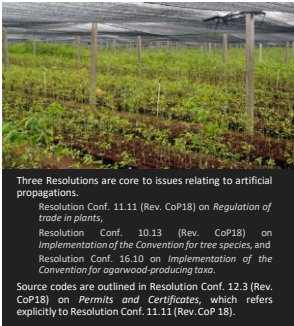
Zeng, Yan Ph. D.  
Endangered Species Scientific Commission, P. R. China

1

The exemptions for artificially propagated specimens contained in Article VII of CITES



2



Three Resolutions are core to issues relating to artificial propagations.

Resolution Conf. 11.11 (Rev. CoP18) on *Regulation of trade in plants*,

Resolution Conf. 10.13 (Rev. CoP18) on *Implementation of the Convention for tree species* and

Resolution Conf. 16.10 on *Implementation of the Convention for agarwood-producing taxa*.

Source codes are outlined in Resolution Conf. 12.3 (Rev. CoP18) on *Permits and Certificates*, which refers explicitly to Resolution Conf. 11.11 (Rev. CoP18).

3

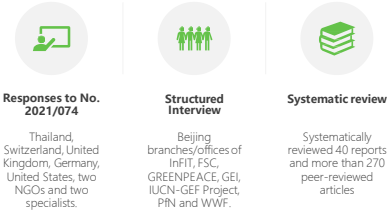
- Res. 10.13 recommends that timber or other parts and derivatives from mono-species plantations be considered as “artificially propagated” products.
- Work and knowledge of range States led to the revision of Res. 11.11 for some Appendix-I trees grown from wild-collected seed to be treated as artificially propagated specimens in exceptional circumstances (CoP13 Doc. 53)
- Discussions on the definition of “artificially propagated” in Res. 10.13 led to the adoption of Res. 16.10 with a definition of “artificially propagated specimens” specifically for agarwood-producing taxa (CoP16 Doc. 67.1, CoP16 Doc. 67.2).
- The Plants Committee discussed reconciling subtle differences in the definition of ‘AP’ of trees (PC24 Doc. 16.2, PC25 Doc. 23 and its addendum, PC25 SR1).

CITES. 2021. Preliminary guidance on terms related to the artificial propagation of CITES regulated plants. UNEP-WCMC, Cambridge.

3

The 2021-2022 study focuses on tree plantations

Consideration of the application of Res. 10.13 (Rev. CoP 18) is a premise for considering potential amendments to Res. 16.10.



4



### Trees are being planted

The UN Decade on Ecosystem Restoration witnesses a shift in policy to balance forest restoration and wood production.

5

Polycymakers face trade-offs between environmental and production goals

Multispecies tree planting is providing better timber production and ecosystem services, with substantial benefits in terms of productivity, stability, community structure, and biodiversity.

doi:10.1126/science.abm6363; doi:10.1126/science.abm649

5

Parties have laws and measures in place for the sustainable cultivation of ‘CITES trees’ for productive purposes



6

6

## 7

Among selected CITES tree species, plantation types are diverse,






- but there are currently fewer cases of agroforestry or forest enrichment.

Table of standard deviations (SD) listed weekly, 19781 against a constant = 0.0000				
Variable	Standard deviation	Frequency	Minimum	Maximum
19781	0.0000	1	0.0000	0.0000
19782	0.0000	1	0.0000	0.0000
19783	0.0000	1	0.0000	0.0000
19784	0.0000	1	0.0000	0.0000
19785	0.0000	1	0.0000	0.0000
19786	0.0000	1	0.0000	0.0000
19787	0.0000	1	0.0000	0.0000
19788	0.0000	1	0.0000	0.0000
19789	0.0000	1	0.0000	0.0000
19790	0.0000	1	0.0000	0.0000
19791	0.0000	1	0.0000	0.0000
19792	0.0000	1	0.0000	0.0000
19793	0.0000	1	0.0000	0.0000
19794	0.0000	1	0.0000	0.0000
19795	0.0000	1	0.0000	0.0000
19796	0.0000	1	0.0000	0.0000
19797	0.0000	1	0.0000	0.0000
19798	0.0000	1	0.0000	0.0000
19799	0.0000	1	0.0000	0.0000
19800	0.0000	1	0.0000	0.0000
19801	0.0000	1	0.0000	0.0000
19802	0.0000	1	0.0000	0.0000
19803	0.0000	1	0.0000	0.0000
19804	0.0000	1	0.0000	0.0000
19805	0.0000	1	0.0000	0.0000
19806	0.0000	1	0.0000	0.0000
19807	0.0000	1	0.0000	0.0000
19808	0.0000	1	0.0000	0.0000
19809	0.0000	1	0.0000	0.0000
19810	0.0000	1	0.0000	0.0000
19811	0.0000	1	0.0000	0.0000
19812	0.0000	1	0.0000	0.0000
19813	0.0000	1	0.0000	0.0000
19814	0.0000	1	0.0000	0.0000
19815	0.0000	1	0.0000	0.0000
19816	0.0000	1	0.0000	0.0000
19817	0.0000	1	0.0000	0.0000
19818	0.0000	1	0.0000	0.0000
19819	0.0000	1	0.0000	0.0000
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19821	0.0000	1	0.0000	0.0000
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19825	0.0000	1	0.0000	0.0000
19826	0.0000	1	0.0000	0.0000
19827	0.0000	1	0.0000	0.0000
19828	0.0000	1	0.0000	0.0000
19829	0.0000	1	0.0000	0.0000
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19838	0.0000	1	0.0000	0.0000
19839	0.0000	1	0.0000	0.0000
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19852	0.0000	1	0.0000	0.0000
19853	0.0000	1	0.0000	0.0000
19854	0.0000	1	0.0000	0.0000
19855	0.0000	1	0.0000	0.0000
19856	0.0000	1	0.0000	0.0000
19857	0.0000	1	0.0000	0.0000
19858	0.0000	1	0.0000	0.0000
19859	0.0000	1	0.0000	0.0000
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19862	0.0000	1	0.0000	0.0000
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19864	0.0000	1	0.0000	0.0000
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19867	0.0000	1	0.0000	0.0000
19868	0.0000	1	0.0000	0.0000
19869	0.0000	1	0.0000	0.0000
19870	0.0000	1	0.0000	0.0000
19871	0.0000	1	0.0000	0.0000
19872	0.0000	1	0.0000	0.0000
19873	0.0000	1	0.0000	0.0000
19874	0.0000	1	0.0000	0.0000
19875	0.0000	1	0.0000	0.0000
19876	0.0000	1	0.0000	0.0000
19877	0.0000	1	0.0000	0.0000
19878	0.0000	1	0.0000	0.0000
19879	0.0000	1	0.0000	0.0000
19880	0.0000	1	0.0000	0.0000
19881	0.0000	1	0.0000	0.0000
19882	0.0000	1	0.0000	0.0000
19883	0.0000	1	0.0000	0.0000
19884	0.0000	1	0.0000	0.0000
19885	0.0000	1	0.0000	0.0000
19886	0.0000	1	0.0000	0.0000
19887	0.0000	1	0.0000	0.0000
19888	0.0000	1	0.0000	0.0000
19889	0.0000	1	0.0000	0.0000
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19895	0.0000	1	0.0000	0.0000
19896	0.0000	1	0.0000	0.0000
19897	0.0000	1	0.0000	0.0000
19898	0.0000	1	0.0000	0.0000
19899	0.0000	1	0.0000	0.0000
19900	0.0000	1	0.0000	0.0000




Intensity of human intervention and the environment are not applicable

- Aside from forest enrichment, there are no significant differences between several types of plantations in making NDFs and LAFs.
- Mono-specific plantations, on the other hand, are generally less beneficial and environmentally friendly.

[illegible]

				
<p><b>National legislation</b></p> <p>Some Parties do not use the definition in Conf. 10.13 because it is not fit for their environment</p>	<p><b>Res. 11.11 (Rev. Cop18)</b></p> <p>the specimen(s) may be treated meeting the definition of 'artificially propagated in accordance with Resolution Conf. 11.11 (Rev. Cop18)</p>	<p><b>Assisted protection</b></p> <p>source code "Y" could be applied to specimens produced through some particular silviculture practices, such as enrichment plantings and assisted natural regeneration</p>	<p><b>Other terms</b></p> <p>divergent views on whether the lack of definitions for the terms "tree" and "plantation" affected the application of Res. 10.13 (Rev. Cop18)</p>	<p><b>More cases</b></p> <p><i>Prunus Africana</i>, <i>Dabergia</i> spp., <i>Aniba roseocedra</i>, <i>Abies guatemalensis</i> and <i>Piceopsis elata</i></p>



- 
**“Mono-specific”**  
 is Irrational in modern restoration ecology and biodiversity conservation, and impractical for implementation of the CITES.
- 
**Definition of plantation**  
 is needed if considering adding mixed-species plantations into paragraph 1. f) of Resolution Conf.10.13 (Rev. CoP18).
- 
**A potential solution**  
 is to delete paragraph 1. f) of Resolution Conf.10.13 (Rev. CoP18) and end a long-standing confusion and controversy.





Status of Agarwood- INDIA

1

### Indian biodiversity

- Constitutes 2.4% land area of the world
- Includes 1.3 billion population being 8% in the world
- Center of 4 global biodiversity hotspot, viz., Himalayas, Indo-Burma, the Western Ghats and Sundaland
- 8<sup>th</sup> mega-biodiverse country in the world
- 7500 km of coastline and includes 25 marine PAs

2

### Protected Area Network

S. No.	Protected Areas	2014	2021
1	National Park	103	106
2	Wildlife Sanctuaries	535	564
3	Conservation Reserve	64	99
4	Community Reserve	43	218
	<b>Total</b>	<b>745</b>	<b>987</b>

PA network covers 5.26% of area of Country

3

### Agarwood

- Aquilaria malaccensis* is one of 15 tree species in the genus *Aquilaria*, family Thymelaeaceae, (Mabberley, 1997), *Aquilaria malaccensis* and *Aquilaria khasiana*, the two species found in India.
- Agarwood, or 'Oud' or 'Aghor' is a fragrant resinous wood and is valued for its distinctive fragrance and is used for making incense and perfumes.
- Formed in the heartwood of Agarwood trees when they become infected with a type of mold.
- The aromatic qualities of agarwood are influenced by the species, geographic location, its branch, trunk and root origin, length of time since infection, and methods of harvesting and processing.
- Native to south-east Asia and the Indian subcontinent and in India, it occurs naturally mostly in the foothills of North-Eastern states as well as West Bengal up to an altitude of 1000 m above mean sea level. Cultivated populations of *Aquilaria malaccensis* are found in Assam, Tripura, Kerala, Karnataka, and limitedly in other States such as Tamil Nadu, Telengana, Andhra Pradesh, Goa, Maharashtra and Gujarat.

4

### Agarwood trees- conservation in India

- Cultivated populations of *Aquilaria malaccensis* are found in Assam, Tripura, Kerala, Karnataka, and limitedly in other States such as Tamil Nadu, Telengana, Andhra Pradesh, Goa, Maharashtra and Gujarat.
- The natural population of *Aquilaria malaccensis* has been drastically reduced over the years due to over-exploitation and illicit felling.
- Remnant natural stands are found only in remote forest areas, protected areas (National Parks and Wildlife Sanctuaries) and some community forests in the hilly areas of Northeast India.
- It is currently listed as Critically Endangered in the IUCN Red List and in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- Unscientific extraction and extensive exploitation have been a factor in population reduction.

5

### Agarwood trees- conservation in India



- The legal framework presently governing the extraction and utilization of *Aquilaria malaccensis* is the Indian Forest Act, 1927 and the various State Forest Acts, and the rules framed thereunder, which regulate the harvest, transit, storage and trade of forest produce.
- The other legal provisions related to the management of *Aquilaria malaccensis* are the Wildlife (Protection) Act, 1972 in respect of those remnants of wild populations located within the Wildlife Sanctuaries and National Parks.
- Biological Diversity Act, 2002 which will apply in case any novel product or medicine is developed from any material sourced from the wild or the community forests.
- The international trade is regulated by the EXIM Policy.

6



Uses of Agarwood

- Agarwood has three principal uses: medicine, perfume and incense. Smaller quantities are used for other purposes, such as carvings.
- Agarwood is traded in several raw forms, ranging from large sections of trunk to finished products such as incense and perfumes
- Agarwood chips and flakes are the most common forms of agarwood in trade.
- Only 10-20% of a large slab or piece of agarwood can be drawn into chips and flakes, with the remainder sold as powder/dust or used for oil distillation
- Agarwood oil is a highly valuable and frequently traded product. Oil is produced by steam distillation of generally low-grade agarwood chips and powder.
- The main product of *Aquilaria* species in international trade is the fragrant agarwood and its derivatives.



Non-Detriment finding for *Aquilaria Malaccensis*

- Key recommendations of the RFRI NDF Report on *Aquilaria Malaccensis*:
  - In view of the limited remnant population of the species in the wild, a negative advice has been rendered for harvest and export of wild populations;
  - An export quota of 25000 Kg per annum has been recommended for Agarwood chips and powder and 1500 kg per annum for Agar oil for FY 2021 – 22. Revision of the quota has been recommended after three years i.e. in 2024.
  - Cultivation of *Aquilaria malaccensis* needs to be promoted and production of quality planting stock, raising of plantations in areas that are unfit or unremunerative for agriculture, and raising of agarwood as a part of agroforestry system or as shade crop for tea need to be incentivised.

Non-Detriment finding for *Aquilaria Malaccensis*

- Key recommendations of the RFRI NDF Report on *Aquilaria Malaccensis* (continued):
  - Harvesting from plantations may be permitted subject to registration of plantations so as to keep a record of growing stock in order to fix and revise the export quota in future;
  - Industries processing the timber need to be registered;
  - There is a need to develop a robust mechanism for collection of statistics, as well as to conduct awareness programmes on CITES;

Population estimates of agarwood (> 10 cm dbh) (Source: FSI), as per the NDF report

Sr. No	State	Population in forest	Population in Trees Outside Forests (TOF)	Total population reported by FSI	Remarks on differing estimates / current survey
1	Assam	3,42,605	1,98,164	5,40,769	Forest department has reported a population of 14.33 lakhs in nonforest areas (Anon., 2018)
2	Kerala	72,480	0	72,480	21.50 lakhs of plants are reported by the planters, in non-forest areas.
3	Manipur	29,47,669	0	29,47,669	Information could not be collected due to travel restrictions
4	Odisha	2,64,822	0	2,64,822	Information could not be collected due to travel restrictions
5	Nagaland	0	4,000	4,000	Information from Forest department was restricted to two districts. From other districts information could not be collected due to travel restrictions
6	Rajasthan	0	3,282	3,282	Information could not be collected due to travel restrictions
7	Telangana	0	12,950	12,950	Information could not be collected due to travel restrictions
8	Tripura	0	59,243	59,243	Forest department has reported a population of 54.54 lakhs in forest and non-forest areas.
9	Karnataka	0	0	0	Population of 24.88 lakhs is reported from private planters.
		36,27,576	2,77,639	39,05,215	

Export Quota for Agarwood

- In accordance with the recommendations of RFRI, and keeping CITES regulations in mind, the CITES Management Authority has established the following export quota for artificially propagated agarwood (*Aquilaria malaccensis*) for the financial year 2021-22:
  - Agarwood chips and powder: 25,000 kg per annum; and
  - Agar oil: 1500 kg per annum.
- In accordance with the recommendations of RFRI, export of artificially propagated agarwood is subject to registration of plantations and processing industries by States, and marking and verification of harvested trees.
- States have also been requested to promote cultivation of agarwood and conduct awareness programmes on CITES for various stakeholders.

Thank you...



## Country Report - Indonesia

### Agarwood in Indonesia

1

### Agarwood in Indonesia

- The Agarwood producing species consists of 13 species belong to two genera: *Aquilaria* and *Gyrinops* that distributed throughout Indonesia.
- Four species of genus *Aquilaria*, e.i: *A. malaccensis*, *A. hirta*, *A. beccariana* and *A. microcarpa* are known to grow in **western part** of Indonesia
- The other nine species: *Aquilaria cumingiana*, *A. filaria*, *Gyrinops decipiens*, *G. caudata*, *G. ladernianii*, *G. malaccana*, *G. podocarpus*, *G. salicifolia*, and *G. versteegii* are distributed in **eastern part** of the country
- As a CITES Appendix II species, agarwood trade permits is regulated by the Ministry of Forestry as the CITES Management Authority (MA) and secretariat of SA for Biodiversity – National Research and Innovation Agency is served as CITES Scientific Authority (SA)



2

### Data of export quota Agarwood (2017-2021)

	Year	Agarwood		
		<i>Aquilaria malaccensis</i>	<i>Aquilaria filaria</i>	<i>Gyrinops versteegii</i>
Quota (kg)	2017	178,500	515,800	5,000
	2018	151,725	490,010	4,500
	2019	116,069	490,010	3,825
	2020	101,000	490,010	3,250
	2021	101,000	490,010	3,000

3

### Recent Agarwood Studies & Researches in Indonesia (2018-2022)

- Some studies were done during these periods in some producing agarwood regions, e.i: Lesser Sunda Island, and West Papua
- Rozak, Andes Hamuraby, Zaenal Mutajien, & Destri. 2021. *Biomass Estimation of Agarwood (Aquilaria filaria (Oles) Mer) in the Kerat Recapture of West Papua*. Journal of Tropical Biodiversity and Biotechnology Volume 06 issue 01, p: 1-5
  - Sutomo, Rajif Iryadi, I Made Sumerta. 2021. *Conservation Status of Agarwood-Producing Species (Gyrinops versteegii) in Indonesia*. Biosaintifika Journal of Biology & Biology Education, Vol. 12, No. 2, p: 149-157
  - Kodey, Ruth Lince, Wolfman Yanya Mofo, & Petrus A. Dimara. 2021. *Harvested Technique of Agarwood Processing Plant from Agarwood Farmers at Mariga, District of Bihai*. Jurnal Kehutanan Papua Vol. 7, No. 2, p: 219 - 228
  - Irsyad, Afifi Fauzan, Ridestri Rindyastuti, Titus Yulistiyarini, Agung Sri Darmayanti, Budi Setiadi Daryono. 2020. *Genetic variation of agarwood producing tree (Gyrinops versteegii) from Panglir, Manggarai District, Flores Island, Indonesia using ISSR molecular markers*. Biodiversitas Vol. 21, No. 2, p: 485-491
  - Figio, Abban Putri, Sugeng Budiharta, Febrina Artauli Siahaan, Ridestri Rindyastuti. 2020. *Population structure of Gyrinops versteegii within floristic community in Ngapak Protection Forest, Flores Island, Indonesia*. Biodiversitas Vol. 21 No. 4, p: 1561-1568
  - Yulistiyarini, Titus, Abban Putri Figio, Sugeng Budiharta, Ridestri Rindyastuti. 2020. *Distribution of Gyrinops versteegii in varying vegetation structure, soil properties, and microclimate in western part of Flores Island, Indonesia*. Biodiversitas Vol. 21 No. 5, p: 1800-1808
  - Destri, Zaenal Mutajien, and Andes Hamuraby Rozak. 2020. *Agarwood in the forest community and its potential depletion in West Papua*. Jurnal Penelitian Kehutanan Wallacea, Vol. 9, No. 1, p: 1-12
  - Rindyastuti, Ridestri, Titus Yulistiyarini & Agung Sri Darmayanti. 2019. *Population and ecological study of agarwood producing tree (Gyrinops versteegii) in Manggarai District, Flores Island, Indonesia*. Biodiversitas Vol. 20, No. 4, p: 1180-1191

4

### National Seminar & Proceeding "Conservation and Use of Sustainable Plant & Animal, Indonesian Institute of Sciences (October, 2018)

#### 13 articles about agarwood in Indonesia:

- Distribusi dan Populasi Tumbuhan Penghasil Gaharu di Kawasan Sorong Raya, Papua Barat, Indonesia
- Dupatek Karakter Anatomi Daun Digunakan Untuk Identifikasi Spesies Penghasil Gaharu? Studi Kasus Koleksi Herbarium Aquilaria spp. dan Gyrinops spp. di Kebun Raya Bogor
- Barkoding DNA Gaharu Indonesia Menggunakan Marka dari Genom Kloroplas dan Genom Inti
- Ekologi Jenis Penghasil Gaharu (Gyrinops versteegii) di Pulau Lombok Indonesia
- Populasi Gaharu (Aquilaria malaccensis Lam.) di Provinsi Kepulauan Bangka Belitung
- Identifikasi Pola Fingerprint dan Komposisi Senyawa Kimia untuk Membedakan Kualitas Gaharu Jenis Gyrinops versteegii dari Beberapa Lokasi di Nusa Tenggara Barat
- Studi Habitat dan Variasi Morfologi Gaharu (Gyrinops Versteegii (Gig) Domke) di Kabupaten Manggarai, Flores
- Kultur Tunas (Aquilaria malaccensis Lam.) pada Beberapa Media dengan Penambahan Stokim untuk Konservasi In Vitro
- Analisis Stabilitas Jari Kromatografi Gas/Spektrometri Massa dari Metabolit Jenis Penghasil Gaharu di Provinsi Bengkulu
- Vegetasi, Struktur Kuantitatif Gyrinops versteegii (Gig.) Domke dan Rekomendasi Area Budidaryanya di Pulau Flores - Nusa Tenggara Timur
- Potensi dan Perdagangan Gaharu di Indonesia: Studi Kasus di Provinsi Nusa Tenggara Barat, Kalimantan Timur dan Riau
- Kajian Awal Gyrinops: Gaharu Lampung (Decaying Log) dan Potensi Tegakan di Kabupaten Amat, Papua



5

### Recent Publications on Agarwood Population in Indonesia

Species	Location	Population per ha or standing stock	Reference
<i>Aquilaria filaria</i>	South Sorong, West Papua province	2.5 individual and 2.89 seedlings	Destri et al. 2020
<i>Gyrinops versteegii</i>	East Lombok District, West Nusa Tenggara Province	2 individuals	Sutomo et al. 2021
<i>Gyrinops versteegii</i>	Manggarai District, Flores Island	22 individuals (pole)	Figio et al. 2020
<i>Gyrinops versteegii</i>	Manggarai District, Flores Island	6 individuals, 4 poles, 15 saplings, 23 seedlings	Rindyastuti et al. 2019
<i>Aquilaria sp.</i>	South Sorong District, Papua province	6 individuals	Destri et al. 2019
<i>Aquilaria sp.</i>	Maybrat District, Papua province	4 individuals	Destri et al. 2019
<i>Decaying log (Gyrinops sp.)</i>	Amat District, Papua Province	Mean diameter 30.33 cm Mean dry weight 26.66 kg	Alhand and Rahajoe 2019
<i>Aquilaria malaccensis</i>	West Bangka District, Sumatra	0.8 individuals	Yulizah et al. 2019
<i>Aquilaria malaccensis</i>	Beltung District, Sumatra	0.14 individuals, Diameter 60-80 cm Mean height 40m	Yulizah et al. 2019
<i>Aquilaria malaccensis</i>	Bengkulu Province, Sumatra	2 individuals	Partomiharjo et al. 2009
<i>Aquilaria beccariana</i>	Bengkulu Province, Sumatra	22 individuals	Partomiharjo et al. 2009

6



Progress of NDF Reports

- First NDF report of agarwood submitted in 2009
- Succeeding NDF for *Aquilaria filaria* is in drafting process
- Current studies focus:
  1. Updated population size & harvest estimation of *A. filaria* in Papua (the largest distribution area)
  2. Trade chain of *A. filaria* in Papua & Indonesia
  3. Agarwood trade impact to local communities and national economy
- Monitor agarwood tree planting progress in Papua



7

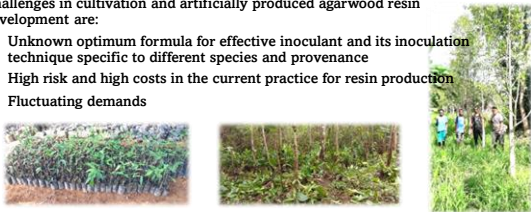
Short Report of Agarwood Artificial Propagation in Indonesia

- In the last few years, plantation activities are growing, especially for *A. malaccensis* (Sumatera & Kalimantan), *G. verticillata* (Lesser Sunda Islands), *A. filaria* (Papua)
- 3.4 millions of cultivated trees is estimated in the country (Santoso et.al., 2014).
- Directorate General regulation No. P.25/SET-IV/2014 on Registration Procedures for Agarwood Plantation currently in place. This regulation was drafted under collaborative program funded through the CITES-ITTO Phase II scheme in 2014
- Permits for establishment of plantation and its progress monitoring is regulated with Ministry regulation No. P.19/menhut-IL/2005 on captive breeding and artificial propagation operation
- Registration of plantation, to June 2021, records 20,590 individual trees with various diameter (6 – 25 cm), occupied total area 70.44 ha (private farm, monoculture and mixed species plantation)



8

- Attempts to differentiate agarwood product derived from wild and cultivated plant by means of chemical compounds detection is on going process in research
- Artificial resin production in cultivated plant applies various microbe inoculation techniques: injection holes, barking, nailing, infuse, etc.
- Challenges in cultivation and artificially produced agarwood resin development are:
  1. Unknown optimum formula for effective inoculant and its inoculation technique specific to different species and provenance
  2. High risk and high costs in the current practice for resin production
  3. Fluctuating demands



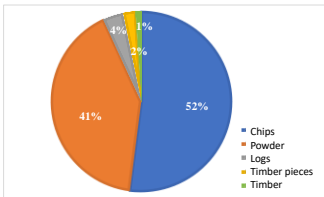
9

Population Management of Agarwood in Indonesia

- No harvest allowed in protected area/forest
- Government provide seedling to encourage people to plant the agarwood trees. Ministry of Forestry regulation No. 8/2021 also allowed people gather in a consolidated community to grow agarwood trees in the state forest
- Using agarwood tree in the restoration and forest recovery program
- MA monitor related activities through:
  1. Registration system for agarwood cultivation
  2. Registration for domestic and international trader prior to permits granting
  3. Imposing national quota for agarwood at provincial level

10

Various Products of Agarwood Export from Indonesia (2000-2019)



11

Recommendation



- Developing of non-detrimental findings for agarwood
- Encouraging appropriate technology to produce marketable agarwood

12

Briefly, Study on Agarwood Producing Species in Lao PDR.

Dr. Viengsamone THAMMAVONG, Deputy Head of Technician Division,  
Faculty of Forestry,  
The National Focal Point of Lao CITES SA.  
Ministry of Education and sports

Phouthone KOMKIENG, Technical Staff of Wildlife and CITES Management Division,  
Technical Assistant of CITES Management Authority (MA).  
Department of Forestry, MAF.

presentation Outlines

- 1.Introduction
- 2.Distribution and Species
  - Populations
  - Planted
  - NDFs
  - Production techniques
- 3. Population management
  - Main management techniques
  - Main practices for plantation establishment and management
- 4.Products
  - Registration
- 5. References

1

2

1.Introduction.

- In Laos, Aquilaria known by the vernacular names Mai khethsana or Mai Poheuang, are unique trees for its high demand trade productions of a fragrant and resinous wood, in-ternationally traded as Agarwood.
- Agarwood is used as in perfumes and as a component in traditional medicine. Agarwood has very limited use as a medicine against stomach ache and wounds, and is mainly known as being the most valuable and sought.
- To respond to the question of CITES as well as the Government of Lao if the Taxon of Agarwood harvested for commercial purpose is strictly conserved in the nature and the quota approved by the Government of Lao (GoL) is based on the Agarwood plantation resource,



Introduction (conti).

- At least 5 provinces at centre and northern Laos such as Vientiane Province, Xaisomboun, Louang-pabang, Oudomxay and Phongsali were visited. In each province,
- the study was focus on the most popular plantation and native sites of Agarwood that was recommended or advised by PAFOs and DAFOs for record and collect the specimens. The field was conducted between 10 June to 3 July 2021. 6 provinces or 6 PAFOs, 22 districts or 22 DAFOs, 49 gardens and 49 home gardens and 3 natural forest stands of Agarwood were visited.



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2.Distribution and Species.

- in term of the species ,the assessment has revealed at least 5 species
- 1. Aquilaria crassna Pierre ex Lecomte; 34 %
- 2. Aquilaria yunnanensis S. C. Huang ; 33 %
- 3. Aquilaria baillonii Pierre ex Lam. 16 %
- 4. Aquilaria sinensis (Loureiro) Sprengel 16 %
- 5. Aquilaria sp. 1%
- its occurrence distributions at the northern and central part of Laos are provided.
- The southern of Laos did not yet survey.



Populations.

- Individual/family owned
- Many villagers own also Aquilaria in their own garden. These trees are not counted in officially recognized plantation. But in total this represent a large of trees.
- Planted
- Approximate 6,597 ha (in 2 Provinces, other 4 provinces official data are in assessment), 8 other provinces will be assessed in 2022.
- NDFs
- regarding agarwood NDF
- No yet formalized but an assessment in 6 provinces of the country have been done in 2020-2021.
- This study plus local knowledge of different parties in Laos will allow to formalize an NDF



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Production techniques.

- 1. Natural – no intervention by human only aging.
- 2. Anthropic intervention (wood nail)
- 3. Chemical intervention but chemical stimulation seems no given success and remain in limited used today.

7

➤ main practices for plantation establishment and management.

- Plantation of plant done after 3 years at least in nursery.
- Village plantations were largely made from seeds from the surrounding mountains. Village communities favour plantations associating 2, 3 or even 4 taxa, a practice which aims without doubt to minimize the risks.
- There is a very important stock of planted Aquilaria whose maturity (15-25 years) ensures protection to the native resource in conservation whose exploitation is prohibited. The accumulation of these stocks can, however, generate discouragement among planters and lead them to seek alternatives to other crops such as cassava.
- This also indicates the need, for the future, to pay attention to a spreading out of renewal plantations.
- Each new plantation needs to be registered on the Department of Forestry of the district as each harvest and each transportation of the product.

9

Registration.

- Apply a registration system for exporters of pure or mixed agarwood products
- Export quota system exists for exportation approved by Government of Laos and Permit Cites Export are used for any exportation and checked by Department of forestry and Custom.
- National quota is obtain by compilation of each company declaration of expected export.

11

3. Population management.

➤main management techniques to ensure that wild populations persist

- In general, the ban on logging for timber with the closure of sawmills has prevailed in Laos since 2015.
- In the case of aquilaria that do not belong to the timber category,
- their exploitation is strictly prohibited if they have not been planted.
- Obtaining a cutting permit is an essential measure to ensure the proper management of their geographical origin.



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4.Products.

- Approximate amounts, the relative amounts of products produced by Lao people.
- This data are the total export quota given by CITES Geneva for 2022,
- but export declared quantity remain much less than those figure.

- (1.) 1.910 kg of essential oil (95,500 kg of wood). Artificially propagated for commercial purposes.
- (2.) 42,000 kg of Wood powder. Artificially propagated for commercial purposes.
- (3.) 134,000 kg of Wood chips. Artificially propagated for commercial purposes.
- (4.) 7,600 m3 of Logs. Artificially propagated for commercial purposes.

10

5.References

- GUIDELINE,TAXONOMY STUDY ON AQUILARIA AND Gyrinops (THYMELAEACEAE) OF LAO PDR.
- For the main report :
- <https://drive.google.com/file/d/1rLQLymdDkily3FKiitb3Ly5xywlpbleY/view?usp=sharing>
- for the guide :
- [https://drive.google.com/file/d/1DbAP\\_Hisi3td2t4fYISUjCQ7\\_1UhaRccQ/view?usp=sharing](https://drive.google.com/file/d/1DbAP_Hisi3td2t4fYISUjCQ7_1UhaRccQ/view?usp=sharing)
- Department of Forestry, Ministry of Agriculture and Forestry
- Vientiane, Lao PDR Collaborate with Agroforex Company 292, Kaoliao road, Sibounheuangtha01000 Vientiane, Lao PDR

Country expertise  
Vichith Lamxay,  
Keophouang Chanthapanya,  
Chounlamany Xayalath,  
Soumhone Kethan,  
Khamkone Seng boong,  
Soulinvath Lamavanh and Keosondone Souvannakhoumane

12

CITES Tree Species Programme  
Validation Workshop On Agarwood Report

MALAYSIA

Country report on the status of Agarwood

20-22 June 2022, Sheraton Imperial Hotel,  
Kuala Lumpur

Presentation outline

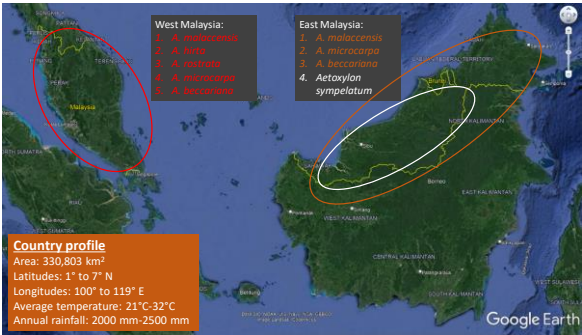
- Species background
- Malaysia and IUCN Red List assessment
- Related laws and regulations
- Current agarwood resources
- Conservation, R&D, awareness activities
- Enforcement

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2

SPECIES BACKGROUND

- *Aquilaria* species recorded: *A. beccariana*, *A. hirta*, *A. malaccensis*, *A. microcarpa* & *A. rostrata*;
- *Gyrinops* species recorded: None;
- *Aetoxylon* species recorded: *A. sympetalum*;
- Found from lowland dipterocarp forests, lowland mixed dipterocarp forests, freshwater swamp forests, heath forests, hill forests up to 1000 meter above sea level;



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MALAYSIA AND IUCN RED LIST ASSESSMENT

Conservation assessment was based on 'IUCN Red List Categories and Criteria version 3.1 (2001)'.

Species	Peninsular Malaysia Red List	IUCN Red List
<i>A. beccariana</i>	DD (2011)	VU (2018)
<i>A. hirta</i>	VU (2011)	VU (2018)
<i>A. malaccensis</i>	VU (2011)	CR (2018)
<i>A. microcarpa</i>	DD (2011)	EN (2018)
<i>A. rostrata</i>	DD (2011)	CR (2017)

RELATED LAWS AND REGULATIONS

- International Trade In Endangered Species Act 686 (2008)**
- to implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora, and to provide for other matters connected therewith.
- National Forestry Act 313 (1984)**
- to provide for the administration, management and conservation of forests and forestry development within the States of Malaysia and for connected purposes.
- Wood-Based Industries Act 314 (1984)**
- to confer on State Legislatures authority to pass laws with respect to the establishment and operation of wood-based industries.
- Act 105 Malaysian Timber Industry Board (Incorporation) Act 1973**
- to make better provisions respecting the Malaysian timber industry.
- Customs Order (Prohibition on Exports & Prohibition on Imports) [2022]**

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**Sabah:**

Extraction of Agarwood / Ramin that naturally grows from Forest Reserve / State Land has been prohibited by the State Government:

(Chief Conservator of Forest Circular CF:37/2017)

-However, the State Government encourages entrepreneurs to plant agarwood in their own private land/areas for commercial purposes.

-Apart from that, the State Government also implemented agarwood planting in the Forest Reserve at scale for the purpose of forest sustainability in Sabah.

**Forest Enactment (1968)**

-Forests preservation, forest produce regulations control.

**Forest (Timber) Enactment (2015)**

-Registration for activities related to wood industry in Sabah.

**Sarawak:**

**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.

**CURRENT AGARWOOD RESOURCES**

**National quota and export volume**

Year	Agarwood Quota	Export	Year	Agarwood Quota	Export
		(KG)			(KG)
2005	-	260,184	2014	200,000	199,334
2006	-	284,987	2015	200,000	195,418
2007	180,000	147,821	2016	150,000	121,364
2008	170,000	170,000	2017	150,000	117,658
2009	200,000	182,301	2018	150,000	38,550
2010	200,000	197,581	2019	150,000	35,945
2011	200,000	190,757	2020	150,000	9,977
2012	200,000	199,999	2021	150,000	8,160
2013	200,000	199,583	2022	50,000	205*

Sources: MFB  
\*January to April 2022

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**Malaysia agarwood export volume (2015 – 2021)**

Products/ Year	2015	2016	2017	2018	2019	2020	2021
	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)
Woodchips and Agarwood Blocks	161,471.09	92,911.00	84,264.10	32,521.70	32,202.65	9,870.00	5,550.00
Agarwood Oil Essence	33,780.09	28,453.61	32,593.60	6,028.40	3,742.40	107.2	2,610.80
Agarwood Powder (After Processing)	167.00	-	800.00	-	-	-	-
TOTAL	195,418.09	121,364.61	117,657.70	38,550.10	35,945.05	9,977.20	8,160.80

**Sabah**

Between 2010 to 2021, only export trades were recorded. No import activities were carried out throughout the respective year:

Year	Product	Code	Quantity	Unit	RM FOB	10% Royalty
2010	Gaharu Oil	K06	410.00	ml	10,250.00	1,025.00
2010	Gaharu Block	K08	96.00	kg	11,200.00	1,120.00
2010	Gaharu Chips	K09	18.00	kg	2,000.00	200.00
2011	Gaharu Oil	K06	225.00	ml	13,163.75	1,316.75
2012	Gaharu Block	K08	10,903.90	kg	214,200.00	21,420.00
2012	Gaharu Chips	K09	14.00	kg	48,210.00	4,821.00
2013	Gaharu Block	K08	97.50	kg	48,750.00	4,875.00
2014	Gaharu Block for Carving	K08	73.00	kg	50,000.00	5,000.00
2016	Gaharu block	K08	5.80	kg	10,000.00	1,000.00
2021	Gaharu Block for Carving	K08	20.00	kg	53,000.00	5,300.00
Total					466,773.75	46,677.75

Cultivation area: 33.05 Ha.  
Total trees: 28,733 trees and 20,000 seedlings (saplings)  
Data as of June 2022

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**Sarawak**

- Until early 2000's Sarawak recorded at average 1,000,000 m<sup>3</sup> annually, almost all collected from the wild.
- *Aetoxylon sympetalum* & *Aquilaria malaccensis* are the only two agarwood producing species traded in/exported from Sarawak within 2020-2021 based on SFC licensing & permit record – of 689.1kg only.
- There are 5 companies with commercial farming license for agarwood as of 2022, but no record of importer/exporter.
- Census on *Aetoxylon* or *Aquilaria* plantation in Sarawak is yet to be done.

**Summary of agarwood industry in Malaysia**

No	Subject	Statistic
1	Agarwood Planters Registered under ACT 686	251 Companies / Individuals
2	Area of Agarwood Plantation Registered under ACT 686	2,624 Hectare
3	Number of Agarwood Trees Registered under ACT 686	2,406,359 trees
4	Exporters / Importers of Agarwood Registered under ACT 105	17 Companies
5	Agarwood Essential Oil Manufacturer	22 Companies / Individuals
6	Area of Agarwood Tree Nursery Registered under ACT 686	6.052 Hectare
7	Agarwood Product Entrepreneur in Malaysia	> 50 Companies

Source: CITES, MFB and FOPM

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12

CONSERVATION, R&D, AWARENESS ACTIVITIES

CONSERVATION ACTION PLAN FOR THE THREATENED AGARWOOD SPECIES  
AQUILARIA MALACCENSIS IN PENINSULAR MALAYSIA 2016 - 2020

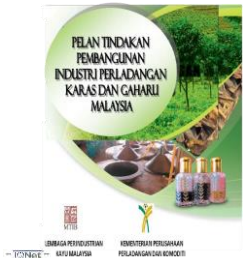


Chua, L.S.L., Lee, S.L., Lau, K.H., Nurul-Farhanah, Z., Tnah, L.H., Lee, C.T., Ng, C.H. & Ng, K.K.S. 2016. Conservation action plan for the threatened agarwood species *Aquilaria malaccensis* (Thymelaeaceae) in Peninsular Malaysia. Forest Research Institute Malaysia, Kepong, p74.

Lee, S.L., Nurul-Farhanah, Z., Tnah, L.H., Ng, C.H., Ng, K.K.S., Lee, C.T., Lau, K.H. & Chua, L.S.L. 2016. DNA profiling databases of *Aquilaria malaccensis* (Thymelaeaceae) for population and individual identification. Forest Research Institute Malaysia, Kepong, p18.

13

MALAYSIA AGARWOOD ACTION PLAN 2011 - 2020



- Officiated in March 2011 by Deputy Minister of Plantation Industries and Commodities (MPIC).
- Covers five main strategy components;
  1. The Establishment of Agarwood Plantation
  2. Human Capital Development
  3. Human Capital Development
  4. Development and Research
  5. Marketing and Trade
- MTIB, FRIM, JPSM, Sabah and Sarawak Forest Department, universities, and Agarwood Industry Players were involved.

14

CAPACITY BUILDING AND AWARENESS PROGRAM



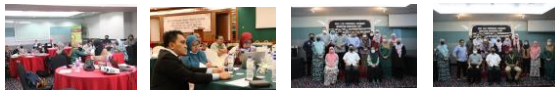
MTIB program with Other Government Agency (OGA) in Central Region [2021]



MTIB program with Other Government Agency (OGA) in Southern Region [2021]

15

- FDPM organised two workshops on SOP Preparation for CITES Permit and Act 686 Enforcement on 28 March – 2 April 2021 and 28 March – 1 April 2022.
- Another two awareness programmes on Act 686 to be organised in July and September 2022 for state officers.



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Workshop discussion session on preparation and improvement of SOP guidelines related to the enforcement on the requirements of Act 686 at the Tropical Rainforest Park Building Hall, Chinese Garden Forest Reserve, Sandakan.



Lecture by Senior Research Officer (Senior Botanist) Mr. John Sugau on the types of Gaharu tree species.

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Mr. Andurus Abi from the Sabah Forestry Department was conducting a question and answer session with participants from the "road show" in Tawau.



The participants were from Gaharu growers in Tawau.

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Participants from Gaharu growers in Sandakan.



Sabah Forestry Department field officers attending a brief in Kota Kinabalu.

Seri Kembangan, Selangor (22 December 2020)



Rantau Panjang, Kelantan (15 Julai 2019)



ENFORCEMENT

PHYSICAL INSPECTION AND CONFISCATION



MTIB enforcement team is conducting an inspection on Agarwood Woodchips and Essence Oil for Export [2021]



Inspection of Agarwood confiscation products (Forestry Department Case) [2021]



Agarwood confiscated without a CITES Permit (MAQIS Sase) [2020]

Enforcement of rules and legislation involving agarwood in Sabah:

1. Established a K9 Unit to detect illegally traded agarwood products or illegal agarwood smuggling.
2. Established a Protect Team Unit to monitor and control the encroachment of Forest Reserves (Illegal Acquisition of Agarwood).



- Illegal extraction & trade of agarwood detected:  
2019 ~ 1 case (Kuching)  
2020 ~ 3 cases (Miri)  
2022 ~ 1 case (Kapit)



Temporary camp built by the suspects.



The suspects were detained and the agarwood seized during one of the enforcement operation in Kapit, Sarawak.

25

26

2020 CASES

Dates	Species	Locations	Specimens	Quantity	Estimated Value (MYR)	Suspects	Acts involved	Charges
09/1/20	Aquiloria spp.	Gerik, Perak	Log	3kg	2,000.00	Local	National Forestry Act 1984	Compound
11/3/20	Aquiloria spp.	Kota Tinggi, Johor	Chip	3,648kg	252,419.00	Local	National Forestry Act 1984	Compound
			Powder	46,619kg				
03/6/20	Aquiloria spp.	HS Sokar Talu, Kelantan	Chip	6kg	1,500.00	Foreigner	National Forestry Act 1984	Imprisonment
13/7/20	Aquiloria spp.	Gua Musang, Kelantan	Chip	1.9kg	1,000.00	Foreigner	National Forestry Act 1984	Under investigation
22/12/20	Aquiloria spp.	Seri Kembangan, Selangor	Log	24.32m <sup>3</sup>	184,000.00	Local	National Forestry Act 1984	Confiscation
			Extract	5,010.13L				
			Oil	0.7L			Wood-Based Industries, Act 1984	

2021 CASES

Dates	Species	Locations	Specimens	Quantity	Estimated Value (MYR)	Suspects	Acts involved	Charges
9.3.21	Aquiloria spp.	Kompit, 20 HK, Sungai Rasi, Kuala Krai, Kelantan	Chip	0.1kg	80.00	Foreigner	National Forestry Act 1984	Imprisonment
13.3.21	Aquiloria spp.	Kompit, 172, HS Bekun, Perak	Chip	3.55kg	1,230.00	Foreigner	National Forestry Act 1984	Imprisonment
12.7.21	Aquiloria spp.	Kompit, 589, HS Labis, Marang, Johor	Chip	1.13kg	1,388.00	Foreigner	National Forestry Act 1984	Imprisonment

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- Forestry Department of Peninsular Malaysia (FDPM)
- Malaysian Timber Industry Board (MTIB)
- Sabah Forestry Department (SFD)
- Sarawak Forestry Corporation (SFC)
- Forest Research Institute Malaysia (FRIM)

29



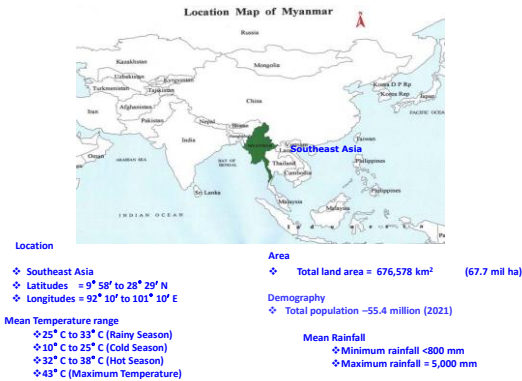
1

SCOPE OF PRESENTATION

- Country Profile
- Forest Resources Status in Myanmar
- Policy, Laws, Rules and Regulations of Forestry and Environment Sector
- Review of *Aquilaria* species Resources in Myanmar
- Challenges and Opportunities

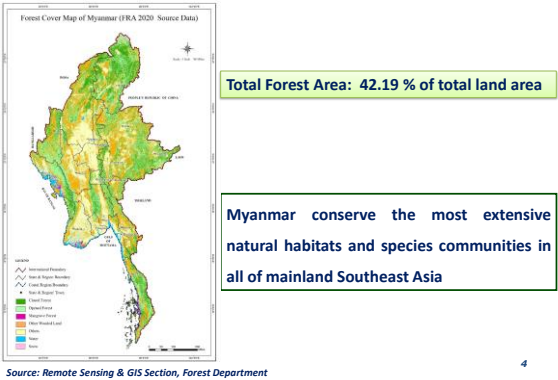
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Country Profile



3

FOREST RESOURCES STATUS IN MYANMAR



4

Natural Resources in Myanmar: Forestry Sector  
Forest Cover Status – FRA 2020 Source Data

Category	Area (.000ha)	% of total country area
Closed Forest	11811.8	17.46
Open Forest	16283.61	24.07
Mangrove	448.4804	0.66
Total forest	28543.89	42.19
Other Wooded lands	18756.05	27.72
Others	18386.8	27.18
Water	1971.14	2.91
Total	67657.88	100

5

Forest Resource Base

- The forest flora of Myanmar is diverse, varying from sub-alpine, dry and moist deciduous forests, tropical rain forests to mangrove forests.
- Depending on topographic, edaphic and climatic conditions.
- They are classified as followed:
  - tropical evergreen,
  - mixed deciduous,
  - Highland forest, savanna and
  - alpine vegetation types



6

Sustainable Forest Management

Sustainable Forest Management:

Maintain biodiversity, productivity, regeneration capacity, vitality to fulfil ecological, economic and social functions of forests.

SFM concept encompasses-

- Both natural and planted forests in all geographic regions and climate zones
- All forest functions, managed for conservation, production or multiple purposes
- To provide a range of forest ecosystem good and services at local, regional and global levels.

7

7

Planning Frameworks related to SFM

- Myanmar a 30-year National Forest Master Plan (2001-2002 to 2030-2031)
- Forestry Sector Comprehensive Development Plan (2011-2012 to 2030-2031)
- Forest Management Plan (2016-17 to 2025-26) for 69 districts
- National Biodiversity Strategy and Action Plan (adopted in 2012, revised in 2016)
- National REDD+ Strategy (2020)
- Myanmar Climate Change Strategy and Action Plan (2018-2030)
- Myanmar Climate Change Master Plan (2018-2030)



9

9

Distribution

- Bangladesh, Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, and Thailand
- Kachin, Sagaing, Mandalay, Magwe, Shan, Kayin, Tanintharyi

Habitat

- Terrestrial
- Hill evergreen forest, Lowland evergreen forest and moist deciduous forest
- Up to 700 m altitude



11

Policy, Laws and regulations related to SFM

- Forest Policy (1995)
- Environmental Policy (1994)
- National Environmental Policy (2019)
- National Land Use Policy (2016)
- Myanmar Climate Change Policy (2018)
- National Wetland Policy and Action Plans (2019)



Environmental Conservation Law (2012) and Rules (2014)  
Conservation of Biodiversity and Protected Areas Law (2018) and Rules (2019)  
Forest Law (2018) and Forest Rules (to be enacted)

8

8

Review of Agallalochia Species Resources in Myanmar

Family	- Thymeleaceae
Scientific name	- Agallalochia malaccensis Lam.
Synonym	- A. agallocha Roxb.
Common name	- Agarwood, Eaglewood
Local name	- Thit-hmwe, A-kyaw
Growth Form	- Evergreen tree up to 20 m height, fragrant resinous heartwood
Flowering & Fruiting	- Flowering (April – June), Fruiting (April-September)
Cultivation	- Seeds
Uses	- Edible and Medicinal



10

Conservation status

- Critically Endangered (CR) (IUCN 3.1)
- It is declared as a Reserved Tree under the " Essential Supplies and Services Act" since 1979.
- The extraction of agarwood from the wild is strictly prohibited by Law.

- \* Forest law (1992) & (2018)
- \* Forest Rules (1995)
- \* The Protection of Wild Life and Protected Areas Law (1994)
- \* Rules Related to The Protection of Wild Life and Protected Areas Law (2002)
- \* Community Forestry Instructions(1995)

12



Agarwood Products in Myanmar



13

Agarwood Plantation in Myanmar

- Local people planted Agarwood trees (*Aquilaria malaccensis*) as home garden trees since more than 25 years ago.
- Commercially large scale Agarwood plantation was started by private sector since 2006.
- Currently, (299355) trees in local communities and (3020 ha) in private of agarwood plantation have been registered at Forest Department.



14

Aquilaria Trees Plantation of Private by States & Regions (2007-2022)

No.	State/Region	No. of Acre (Aquilaria Plantation)	No. of Acre (Aquilaria & other species Plantation)	Total (Acre)
1.	Kachin	57.00	1000.00	1057.00
2.	Chin	-	25.00	25.00
3.	Sagaing	-	857.00	857.00
4.	Tanintharyi	256.70	86.50	343.20
5.	Bago	743.00	2657.00	3400.00
6.	Magway	200.00	100.00	300.00
7.	Mandalay	22.00	60.30	82.30
8.	Mon	25.00	-	25.00
9.	Yangon	77.85	1200.00	1277.85
10.	Shan (South)	6.87	77.13	84.00
11.	Shan (North)	-	11.50	11.50
	<b>Total</b>	<b>1388.42</b>	<b>6074.43</b>	<b>7462.85</b>

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Registered of Aquilaria Plantation under FD

No.	State/Region	No. of Acre	No. of Plant
1.	Kachin	222.735	104,583
2.	Kayin	0.26	88
3.	Tanintharyi	5.8136	1,528
4.	Bago	113.45	47,737
5.	Mandalay	58.74	34,621
6.	Mon	46.175	25,968
7.	Yangon	94.79	65,623
8.	Shan	35.11	19,207
	<b>Total</b>	<b>577.074</b>	<b>299,355</b>



16

Guidelines and Procedures for Registration

- ❖ The guidelines and procedures for registration of establishment of plantation, for inoculation of planted agarwood trees and for the production of agarwood are being formulated under existing rules and regulations of Forest Department to meet with CITES resolution.
- ❖ To claim the national export quota, the MA and SA of Myanmar will conduct under the relevant guidance of CITES.
- ❖ In order to promote the systematic conservation and extraction of plantation source agarwood, **Myanmar Agrawood Entrepreneurs Association (MAEA)** has been formed on 21<sup>st</sup> January 2013.

17

Export of Agarwood through CITES Management Authority, Myanmar

No	Quantity	Year	From	To
1	10 kg of chips	2019	Exporter, Myanmar	Taiwan
2	10 kg of chips	2020	Exporter, Myanmar	Taiwan
3	10 kg of chips	2021	Exporter, Myanmar	Taiwan
4	2 kg of chips	2021	Exporter, Myanmar	Kuwait
5	2 kg of chips	2021	Exporter, Myanmar	Kuwait
6	2 kg of chips	2021	Exporter, Myanmar	Kuwait
7	480 kg of chips and 8 cc of Agarwood oil	2021	Exporter, Myanmar	Hong Kong

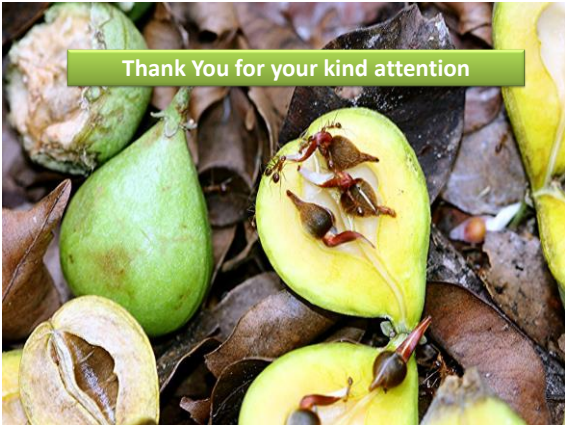
18



CITES Certificate for Export

Challenges and Opportunities

- Negative impacts on the economic and social aspects behind on COVID-19
- Deforestation in existing RF and PPF
- Demand on harvest of timber and NTFPs for subsistence livelihoods during pandemic
- Impact on conservation activities
- Increase expansion of subsistence agricultural lands
- Environmental degradation Poverty and population growth
- Weak law enforcement and poor coordination mechanism among line ministries in fighting against illegal logging and trading
- To be promoted scientific researches, awareness raising , knowledge and experience sharing , capacity building programme, co-operation with regional, national and international





Status of Agar-wood in Nepal

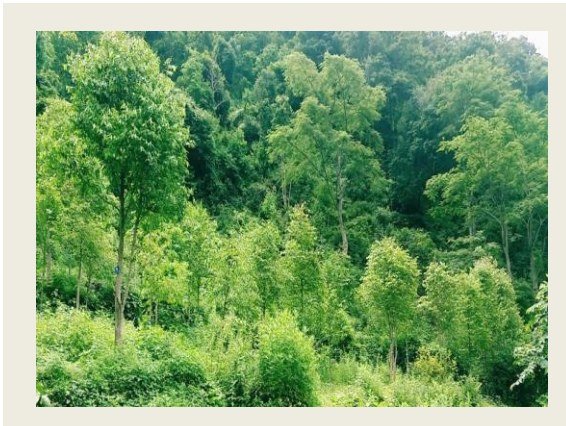


Validation Workshop on  
Agarwood Report


20-22 June, 2022, Malaysia

NEPAL


1



2




Presentation outline




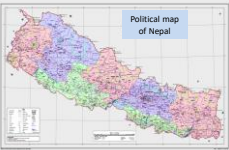


- Introduction
- Agarwood in Nepal
- Issues and challenges
- Issues of export
- Way forward

3



NEPAL







- Area: 147,516 km<sup>2</sup>;
- Altitude: 58 m-8,848.86 m (Mt. Everest)
- 5 Physiographic regions and 77 districts
- 35 forests types, 75 vegetation types and 118 ecosystems
- Biodiversity hotspot and lies at a transition zone of six adjoining floristic regions

Population: ~29 million




4



NEPAL



**Geography:** 8 tallest mountains in the world  
**Birth place** of lord Buddha and Sita,  
**Diverse population:** 125 cast (including nomadic tribes),  
123 languages/dialects), rich culture



5

5




NEPAL




- Forest Area 44.74 %
- Rich Biodiversity
- High Value Medicinal Plant
- Friendly People



6



## Biodiversity of Nepal




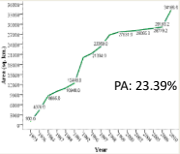


**Rich biodiversity**

- Over 876 species of the bird
- Over 640 species of butterfly
- Over 443 tree species
- 208 species of mammals
- 123 species of reptile
- CITES listed plants**
- Appendix I: 2 spp. (Paphiopedilum spp.)
- Appendix II: 499 spp. (20 and whole orchidaceae family excluding that included in Appendix I)
- Appendix III: 5 spp.


**PA: 23.39%**

**Increase in PAs**




- ✓ **285 endemic species**
- ✓ **3.1 % of world flora**
- ✓ **1.1 % of world fauna**
- **About 235 Tigers**
- **745 Rhinos**
- **492 Water Buffalo**

7




## Status of Agarwood




- *Aquilaria malaccensis* is the common species planted in Nepal.
- Because of its distinctive fragrance it is used for perfumes, incense, carvings, and jewellery.

**Conservation Status:**

- ✓ *A. malaccensis* is considered vulnerable according to current IUCN RED List categories.
- ✓ Appendix II of CITES from 1995.



8



## Agarwood in Nepal



contd.


- Although Nepal is rich in Biodiversity, naturally occurring Agarwood trees have not been reported yet, but some private cultivation practices have been initiated since 25 years.
- Initially Agarwood was introduced in Nepal from Bhutan, Myanmar, India and Thailand by Bhutanese refugees in eastern Nepal (Jhapa, Taplejung ) and by the people who returned from Assam, India in western Nepal.



9



## Agarwood in Nepal



contd.

- *Aquilaria malaccensis* species of Agarwood is cultivated in Jhapa, Morang, Ilam, Panchthar, Sarlahi, Sindhuli, Lalitpur, Chitwan, Tanahun, Nawalparasi, Kaski, Kapilbastu, Gulmi, Arghakhanchi and other districts of southern Nepal.
- The resin-embedded wood is valued in different cultures for its distinctive fragrance used for incense and perfumes.
- About 500-600 matured trees are seed source in Eastern Nepal and few in the western Nepal.
- Government has just started inoculation however, we are still waiting for the result of about 300 trees inoculated by private owner.
- Small scale commercial plantations have been done in Jhapa and Ilam district.
- More than one lakh seedlings were planted.



10



## Agarwood in Nepal



contd.

- Since last decade Agar wood is high priority plant for private plantation.
- Small scale private cooperatives and companies have started Agar wood plantation in different district. For example:
  - Gajurmukhi Herbal Pvt. Ltd. has planted about 20,000 seedling in eastern since last four years (Duwagadi and Jhapa)
  - Retired army personnel planted on about 4 ha. land in central Nepal (Gulmi)
  - A cooperative planted 1000 seedlings in Kaski,
  - Two cooperative in Nawalparasi cultivated about 2000 seedlings .
  - Kalash Agro Pvt.Ltd. and New Resunga and Research firm have been initiated as joint company.



11



## Agarwood in Nepal



contd.

**Government Initiation**

- Department of Forests and Soil Conservation (Management Authority of CITES) has started official plantation of Agarwood by distributing 50000 seedlings to communities, individuals.
- Royalty for Agarwood fixed.
- More than one lakh seedlings are ready for plantation.
- Established two demonstration (Jhapa & Tanahun) and two plantation plots (Jhapa & Kapilbastu) for research.



12





### Agarwood in Nepal contd.



- Department of Forests and Soil Conservation started data collection and mapping of Agarwood plantation.
- Collection and documentation of information about Agarwood growers.
- Collection of detailed information of different stages of trees/poles/saplings and seedlings.
- Initiated inoculation
- Prepared Procedural guideline for plantation, management and marketing.



13




### Tomography and Inoculation







14



### Issues and challenges



- Source and quality of seedling
- Agar formation depends on the method of inoculation, inoculums and technology
- Capacity building for quality Agarwood production. (Silviculture and inoculation Knowledge).
- impact of inoculation on agar formation, the human health and environment.
- Market and Purchase assurance.



15



### Issues for export




- Determining the national studies of CITES species focusing (Agarwood)
- Local domestic harvest of agarwood
- Data consistency and coherence
- Enforcement of precautionary measures
- Monitoring measures
- Preparation and validity of NDF
- Conservation and action plan
- Methods used for productivity, inoculation, harvesting

16



### Way forward



- Policy: Plantation of exotic species and risk associated with agar formation and marketing.
- Resource: Manpower, Money, Machine, Mechanism .
- Capacity Buidling: Human Resource Development of grower, trader and government official.
- Institutional mechanism and organisation especially focusing with Agarwood.
- Research and reporting.

17







18

THAILAND- Country Report  
Agarwood Plantation Management

Presented by

Ms SUMALEE TONGDONAE

CITES Management Authority of Thailand for Flora  
Department of Agriculture  
Ministry of Agriculture and Cooperatives

1

Agarwood producing species in Thailand

Species*	National Distribution	Status	
		National (2017**)	Global (IUCN Red list)
1. <i>Aquilaria crassna</i> Pierre ex Lecomte	N, NE, E	VU	CR
2. <i>Aquilaria hirta</i> Ridl.	S	R	VU
3. <i>Aquilaria malaccensis</i> Lam.	S	VU	CR
4. <i>Aquilaria subintegra</i> Ding Hou	S	R	DD
5. <i>Aquilaria rugosa</i> K.Le-Cong & Kessler	N	DD	DD
6. <i>Gyrinops vidalii</i> P.H.Hô	NE	CR	CR

CR = critically endangered VU = Vulnerable, DD = data deficient, R = Rare

Reference: \* Smiland, 2001 Thai Plant Names. Department of National Parks, Wildlife and Plant Conservation.  
\*\*Threatened Plants in Thailand - Bangkok : Department of National Parks, Wildlife and Plant Conservation, 2017. 224 p.

2

Legal Framework and Law Enforcement for Utilization of Agarwood

Forest Act. B.E. 2484 (1942) and amended.

Determine wild agarwood woodchip as restricted minor forest product, prohibit on trade but can be possessed not exceed 1.5 kg/family for personal and household purposes.

3

Legal Framework and Law Enforcement for Utilization of Agarwood (cont.)

Plant Act. B.E. 2535 (1992) and amended to implement within the CITES for flora.

Define Plants under CITES listed as conserved plant.

Control import and export of conserved plant by issuing CITES permits.

Control source of the specimens in trade by register nursery for agarwood seedling and Plantation of agarwood tree.

Thailand do not allow to export wild agarwood products except for scientific research purpose.

4

Trade of Agarwood in Thailand

Fig 1 Agarwood export volume during the year 2017 to 2021 of Thailand

Woodchip

Compound oil \*

Contain 10-50 % agarwood pure oil

The figures show that *Aquilaria crassna* is the most exported both woodchips and compound oil from 2017 to 2021. During this period, the volume of woodchips export slightly declined, while the export of compound oil moderately increased.

5


NDF for Agarwood producing in Thailand

In 2015-2016, we conducted research on Non detriment finding (NDF) for *Aquilaria crassna* in Thailand.

Radar Plot of the factors affecting the management of *Aquilaria crassna* Pierre ex Lecomte in Thailand

The result found that the factors was effected to the survival of *A. crassna* in the wild as,  
Major factors:  
- Life form-free  
- Habitat destruction  
Minor factor:  
- No incentives for species conservation.

6



### Agarwood Plantation Management

**1. Notification of Department to determine the definition of Artificially Propagated (AP) to comply with Res.Conf. 11.11 Regulation of Trade in Plant and Res.Conf. 14.10 Implement of the convention for agarwood – producing taxa as follow;**

Grow under control conditions and manipulated by human intervention for the purpose of producing plant, **plant part and derivatives**;

- Maintained in sufficient quantities of cultivated parental stock.
- The collection of propagules are legal acquisition.

**2. Notification to Nursery Registration for Agarwood seedlings.**

Criteria and conditions :

- Seed sources; home garden, private or community production plantation.
- The Artificially propagation have to comply with the definition in Department Notification.

**15 Nurseries about 6 million seedling (A. crassna)**

7

### Agarwood Plantation Management

**3. Notification to Plantation Registration for Agarwood tree.**

Criteria and conditions :


1. Seedling sources; home garden, private or community production plantation and registered nurseries.
2. rights in Land (plantation) : the ownership or hire
3. Land rights documents;
  - Title Deed.
  - Pre-emptive Certificate **1500**
  - Certificate of Utilization.
  - Document indicating permission to possess the land.
4. Inform the competent officer by 5 days before harvest and make product stocks (woodchips, oil etc.) which derive from harvested.
5. The registration certificate holders have to inform the remaining plants in the plantation every year by 31 January next year.

8


### The area of agarwood plantations (ha) which register with Department of Agriculture

Items	Gardens	Mono-species	Mixed-species
State owned	-	-	24
Community owned	-	-	-
Individual/family owned	-	377	1.558
Company owned	-	199	233.50

Planted Agarwood Tree ( 385 registers)




**99.5 %** *Aquilaria crassna* (1,136,223 Plants)




**0.5 %** *Aquilaria malaccensis* (5,710 Plants)

9


### Plantation type




**Mono plantation**



**Mono plantation**



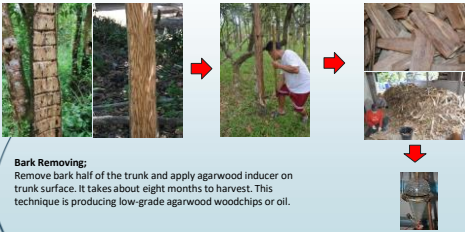
**Mixed plantation**



**Mixed plantation**

10


### Agarwood induction technique and how to harvest



**Bark Removing:**  
Remove bark half of the trunk and apply agarwood inducer on trunk surface. It takes about eight months to harvest. This technique is producing low-grade agarwood woodchips or oil.

11

### Agarwood induction technique and how to harvest

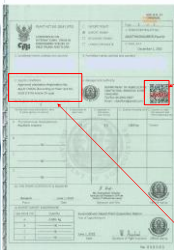


1. Make the tree wounding by drilling, do not inject any substance into the holes, and repeat it 2 or 3 times. It takes about two-five years to harvest.

2. Drill small holes in agarwood trunk and twigs, and apply agarwood resin inducers such as bio-fermented water, agarwood water distillation, or other biochemicals into the holes of the tree. It takes about two-five years to harvest.

12

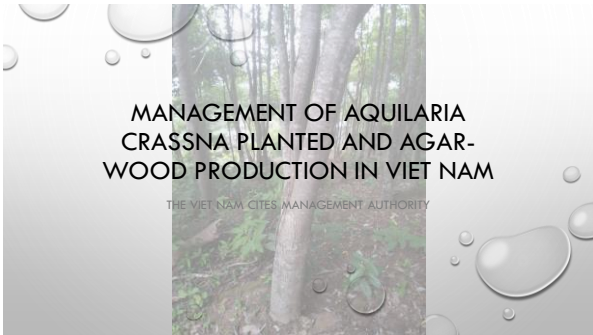
E- CITES Permit for plants



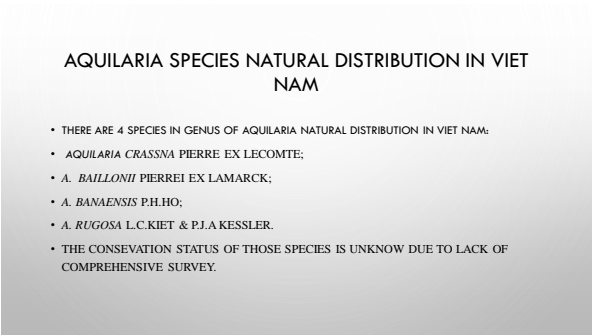
- Since 1 January 2022, we issuing E-CITES permit for plant (notification No. 2022/003) .Accesses at website: <http://nsw.doo.go.th/nsw/>
- The permit will be printed on secure paper with a tracking QR code
- The applicant does not receive the original secure document for advance export or re-export or import until the permit or certificate is actually exported or imported. Then the CITES MA. will print a document with the signature of the plant inspector on it.
- The applicant can print the permit themselves in this situation, but not on secure paper.

Agarwood Plantation Registration  
Number AQ-TH xxxxx

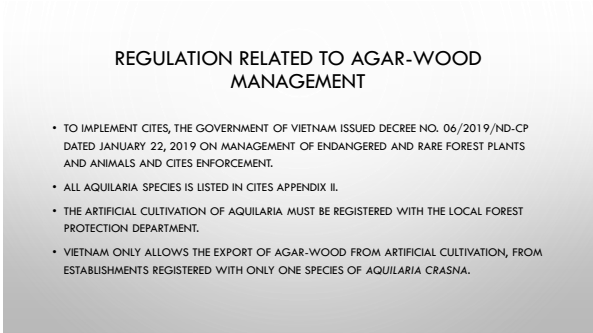




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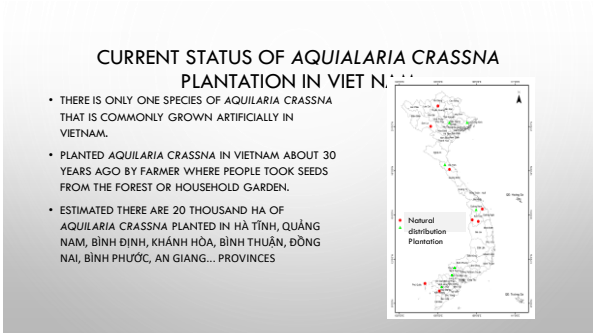
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3



4



5



6



CURRENT STATUS OF AQUILARIA CRASSNA  
PLANTATION IN VIET NAM

- PLANTED AT HOSEHOLD OR COMMUNITY GARDEN;
- PLANTATION FOREST WITH SINGLE SPECIES OF AQUILARIA CRASSNA;
- MIXING WITH OTHER FOREST SPECIES.



7

Some methods of creating artificial agarwood by acting on plants

Drill a hole and  
chemical  
Acid sunfuric or  
Sodium metan bisunfit



Drill a hole and fungi  
Phialophora sp. and  
Fusarium sp.



Harvesting  
At least after 24  
months

8



9

AGARWOOD PRODUCTS PRODUCED FROM  
AQUILARIA CRASSNA

- LIVE SEEDING TREE;
- LOGS, SAW WOOD;
- MANUFACTURED PRODUCTS



10

AGARWOOD PRODUCTS PRODUCED FROM  
AQUILARIA CRASSNA

- WOOD CHIPS
- WOOD POWDER
- OIL
- HANDICRAFT SUCH AS BEADS, PRAYER  
BEADS AND CARVINGS...



11



12



## AGARWOOD EXPORTATION FROM VIET NAM

2020	E	974	incense	573.0	kg	UAE, SAUDI ARABIA, KUWAIT, QATAR, OMAN, EGYPT, BAHRAIN, YEMEN, JAPAN, KOREA, TAIWAN (BOC), CHINA.
			Oil	209.0	lit	
			Wood chip/piece	62 160.0	kg	
			Woodblock	350.0	kg	
			Woodlog	77.0	kg	
	Wood sawdust/powder	135 432.0	kg			
	I	21	Wood sawdust/powder	4 500.0	kg	INDONESIA
			Wood chip/block	4 337.0	kg	

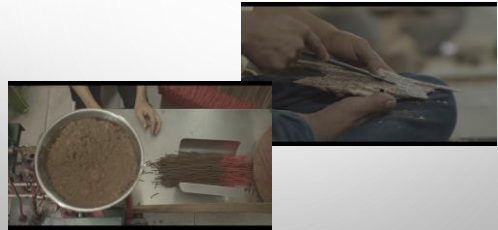
AGARWOOD EXPORTATION FROM VIET NAM

2021	E	1088	Insece	10,457.0	kg	UAE, TAIWAN (ROC), SAUDI ARABIA, CHINA, KUWAIT, QATAR, OMAN, EGYPT, BAHRAIN, JAPAN, KOREA
			Oil	334.0	lit	
			Wood chip/piece	91,600.0	kg	
			Wood block	719.0	kg	
			Woodling	465.0	kg	
			Wood sawdust/powder	294,155.0	kg	
	I	30	Wood sawdust/powder	1,000.0	kg	LAO, INDONESIA, MALAYSIA
			Wood chip/block	219,275.0	kg	

## AGARWOOD EXPORTATION FROM VIET NAM

2022	E	495	Incence	10,213.0	kg	UAE, TAIWAN (ROC), SAUDI ARABIA, CHINA, KUWAIT, QATAR, OMAN, EGYPT, JAPAN, KOREA
			Oil	175.0	lit	
			Wood chip/piece	174,119.0	kg	
			Wood block	867.0	kg	
			Wood log	615.0	kg	
			Wood sawdust/powder	232,143.0	kg	
	I	13	Wood chip/block	214,010.0	kg	LAO, INDONESIA

AGARWOOD EXPORTATION FROM VIET NAM



## RECOMMENDATION OF VIET NAM

- IT IS NECESSARY TO DEVELOP A MANUAL TO IDENTIFY SAMPLES OF COMMONLY TRADED AGARWOOD, TO DISTINGUISH IT FROM NATURAL AGARWOOD.
- AMENDING ANNOTATION #14, ALLOW EXEMPTION OF CITES PERMIT WITH LESS THAN 10MML OIL.
- IT IS NECESSARY TO ADD DEFINITION OF PLANTED TREE IN PUBLIC LAND IN URBAN OR RURAL AREA IN RESOLUTION 16.10 IMPLEMENTATION OF THE CONVENTION FOR AGARWOOD-PRODUCING TAXA.

THANK YOU



## **Annex IV: Reports of Working Groups**

DRAFT

## **Recommendations from NDF Break-out Group**

Recommendations for Parties to the Convention (CITES):

1. Parties are encouraged to consider taking up ecologically based national-level inventories of agarwood-producing species. In particular, studies may be carried out to determine the regeneration of agarwood trees (both individual trees and populations).
2. Parties are encouraged to consider the inclusion of all agarwood-producing species in Appendix II of the convention. In particular, Malaysia and/or Indonesia may propose that *Aetoxylon sympetalum* be included in Appendix III. Parties at COP20 may propose that the species be included in Appendix II.
3. Parties are encouraged to establish/strengthen a database for the identification of the origin of agarwood specimens. The database could contain site-specific profiles (e.g. DNA) of agarwood-producing species from the various range states.
4. Parties are encouraged to examine the potential for the management of wild populations. Integration of traditional harvesting systems using indigenous knowledge of local communities (in line with the

provisions of the Convention on Biological Diversity) may be included.

#### Recommendations for Parties and the CITES secretariat:

1. The secretariat, with the support of the Parties, is encouraged to develop detailed guidelines for carrying out Non-detriment Findings (NDFs) on agarwood producing species.
2. In developing the above guidelines, the secretariat, with the support of the Parties, is encouraged to consider:
  - (a.) the appropriateness of establishing quotas based on weight or volume;
  - (b.) the extent to which such quotas relate to the number of mature standing trees using a precautionary approach;
  - (c.) focusing on the harvesting regime rather than using standard conversion factors.



WORKING GROUPS 2

HARVEST/EXPORT REGISTRATION SYSTEM

Chair Person : Maman Turjaman  
Secretary : Inge Yongesa

Kuala Lumpur, 21 June 2022

1

WG 2: Harvest/export registration system (Penang room rear) – chair: Dr. Maman Turjaman; Secretary (Take Notes: Inge Yongesa)

1. Mr. Md. Oliul Haque (Bangladesh)
2. Mr. Vinod Kumar (India)
3. Ms. Inge Yongesa (Indonesia)
4. Mr. Phuthone Komkieng (Laos)
5. Dr. Lillian Chua Swee Lian (Malaysia)
6. Ms. Connie Geri (Malaysia)
7. Mr. Bernard Valentine (Malaysia)
8. Mr. Alister Lazarus Radin (Malaysia)
9. Mr. Ramlee Ahmad (Malaysia)
10. Ms. Sunita Muhammad (Malaysia)
11. Mr. Surendra Prasad Adhikary (Nepal)
12. Mr. Maheshwar Prasad Niraula (Nepal)
13. Ms. Sabana Pathak (Nepal)
14. Ms. Sumalee Tongdonae (Thailand)
15. Mr. Lic Vuthy (Cambodia)
- Remote participation
16. Mr. Syed Quavi (India)

2

SUMMARY – DISCUSSION - REGISTRATION SYSTEM		
No.	Registration	Information
1.	Plantation Registration	<ul style="list-style-type: none"><li>- Thailand, Malaysia, Indonesia, Laos, Cambodia</li><li>- Necessary information for application: Document of the land (ownership or rent land document), The source: planted by the farmer and natural tree, Information Name of species, quantity, the size and the age of the tree, The plantation type: mono and mix planted</li><li>- Monitoring: check the document and inspect/check the ground</li><li>- The period of the permit registration for 1 year (have to renewal every year by mean pay the registration fee every year), 4, 5 years and as long as the farmer still manage the plantation.</li><li>- There is nursery, Some nursery are registered and not.</li><li>- There is a registration fee and not.</li><li>- There is a report for inoculation activity and not.</li><li>- Monoculture (Spacing line) : 3x3 m, 2x2m</li></ul>
2.	Harvest Registration	<ul style="list-style-type: none"><li>- Apply in some counties.</li></ul>
3.	Transport Activity	<ul style="list-style-type: none"><li>- All countries : Need a permit</li></ul>
4.	Quota allocation from plantation	<ul style="list-style-type: none"><li>- there is country set the quota allocation from the plantation (India), others no</li></ul>
5.	Wild source	<ul style="list-style-type: none"><li>- Only Indonesia is still set the quota from the wild.</li><li>- NDF is necessary, there for the registration perhaps not necessary</li></ul>

3

WG2 --- Some issues have been discussed to resolve :

1. Countries do not have a method to distinguish between wild and planted agarwood raw products and this remains a problem in trade.
2. Not all countries have established a registration system for harvest/exports.
3. Develop and implement online technologies to support the registration and monitoring for plantation and for exporters.

4

WG2 --- Some issues have been discussed to resolve :

4. Thailand and Vietnam have formal registration systems for plantation agarwood. The Government of Thailand implemented a law (2015) to enable controls on CITES-listed plants, including plantations of *A. malaccensis* and *A. crassna*, and established an online national agarwood registration system.

5. The regulation involves the plantation growth under controlled conditions and legal acquisition of parent stock from private or state lands, or purchased internationally. Thailand also requires registration of the geographic origin of agarwood products. The law requires that growers of agarwood register electronically with the Department of Agriculture, including providing the nursery number, parent plant stock number and the quantity to be traded.

5

WG2 --- Some issues have been discussed to resolve :

6. Hence, all plantations are registered, verified by inspection, and must have management plans that ensure sustainability. Applications for export permits are thoroughly vetted and all shipments are inspected by customs and quarantine departments (UNCTAD 2017). Starting this year, plantation owners must inform the competent officer 5 days before harvest and about which products (woodchips, oil, etc.) will be derived from the harvest.

7. In Vietnam, all *A. crassna* plantations operated by companies or households must be registered with the forest department, which is responsible for enforcing the regulations through a number of local ranger stations. Permits for transport must be issued before agarwood can be moved from the plantation.

6

8. The State Governments in India are just now developing its registration system for agarwood growers, agarwood distillers, and processors or raw to finished products.
9. In India, traders and exporters can purchase the agarwood products through a system called the LPC (Legal Procurement Certificate) and subsequently trade it within the country. Exporters can also purchase agarwood through the LPC system and export it with CITES permit issued by CITES - MA and a phytosanitary certificate issued by the Plant quarantine / Plant protection Branch of the Ministry of Agriculture.
10. Increase capacity buildings to distinguish between wild agarwood and artificial propagated materials require a series of trainings for inspectors, customs, Enforcement officers, etc.

7

Table. Update country carry out harvesting and exporting registration

No.	Country	Harvest Registration
1.	Thailand	<ul style="list-style-type: none"><li>- Necessary information:</li><li>- Document of the land (ownership or rend land document)</li><li>- The source must be planted by the farmer</li><li>- Nama of species, quantity, the size and age</li><li>- The plantation type: mono and mix planted</li><li>- Monitoring: check the document and inspect/check the ground</li><li>- The period of the permit registration for 5 years</li><li>- The nursery is registered</li></ul>

8

Table. Update country carry out harvesting and exporting registration

No.	Country	Harvest Registration	Export Registration	Implementation
2.	Malaysia	<ul style="list-style-type: none"><li>- Malaysia (general)</li><li>- Have a few agencies and have each authority to issued the permit.</li><li>- have registration system for the plantation (still manual &amp; still progress to build online system</li><li>- The application can be from personal and private company</li><li>- There is a registration fee</li><li>- Ground verification/inspection</li><li>- Every year have to renew the permit</li><li>- The nursery is also registered</li><li>- Permit/ Licence to export , re-export and import</li><li>- Harvesting of wild gaharu is prohibited for Sabah and Sarawak. In Peninsular Malaysia approval depends on state authority</li><li>- Planter and nursery operators must register their areas and number of trees/ seedlings. Conditions such as land title, species , number of trees, location and areas, planting spacing</li><li>- Harvesting approval for Sabah and P. Malaysia</li></ul>	<ul style="list-style-type: none"><li>- Registered company/individual required to apply with relevant documents</li><li>- Must show the legal source of products</li></ul>	<p>Challenges:</p> <ul style="list-style-type: none"><li>• Difficult to differentiate the source of wild or plantation (sometimes mix)</li><li>• The problem of the registration that not many apply because of the ensure title of the land.</li></ul>

9

Table. Update country carry out harvesting and exporting registration

No.	Country	Harvest Registration
3.	India	<ul style="list-style-type: none"><li>- No quota allocated from the wild</li><li>- Quota only from the plantation based on data information from the NDF report consist of chips and oil.</li><li>- No registration system for plantation and now is still developing the registration process.</li><li>- Plantation need certificate of origin.</li><li>- There is a permit for transportation for plantation produced</li><li>- The plantation activity in the private land.</li><li>- To harvest produce from plantation need a permission from Forest Department.</li></ul>

10

Table. Update country carry out harvesting and exporting registration

No.	Country	Harvest Registration
5.	Lao PDR (special region frm central part & North part of Lao)	<ul style="list-style-type: none"><li>- Necessary information:</li><li>- Document of the land (ownership or rend land document)</li><li>- The source planted by the farmer and natural tree</li><li>- Nama of species, quantity, the size and age</li><li>- The plantation type: mono and mix planted</li><li>- Monitoring: check the document and inspect/check the ground</li><li>- The period of the permit registration for 4 years</li><li>- The nursery is registered</li></ul>

11

Table. Update country carry out harvesting and exporting registration

No.	Country	Harvest Registration	Export Registration	Implementation
6.	Bangladesh	No registration at plantation and harvest level yet	CITES Export Certificate	

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Table. Update country carry out harvesting and exporting registration

No.	Country	Harvest Registration	Export Registration	Implementation
7.	Nepal	Data collection of plantation is started (on progress)  Not yet from the plantation	Not yet	Take permission to fell the agarwood tree from Forestry Department

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Table. Update country carry out harvesting and exporting registration

No.	Country	Harvest Registration	Export Registration	Implementation
8.	Indonesia	Regulation Ministry of Forestry 447/2003  Regulation Directorate General PHKA 25/2014	Certificate : domestic & overseas  Plantation registration: Individual/Farmer group/Company Owner land Location Species GPS Verification from Forestry Office (as long as stakeholders consistently do business)	

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Table. Update country carry out harvesting and exporting registration

No.	Country	Harvest Registration	Export Registration	Implementation
9.	Cambodia	There is no official data  Plantation registration as whole all forest plantations	NTFPs	On going

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Country	Conservation measures	Management plan for agarwood	Export quota established and/or NDF	Harvest control method
Bangladesh	• No harvest of wild trees			• Wood must be from plantations only
Bhutan	• No harvest of wild trees		No	
Cambodia	• 80% natural forest protected and no harvest of wild trees permitted • Develop plantations	No	No	• Plantations must be registered and enter harvests into a logbook
China	• No harvest of wild trees; • Assisted regeneration of wild population • Gene bank • Develop plantations in other countries • Strict import/export rules	Yes (2018-2022 for <i>A. sinensis</i> in Hong Kong)		• From plantations each tree is bar-coded
India	• No harvest of wild trees and no export of wild product • Gene bank • Restocking wild populations	Yes, with a sustainable use policy	NDF and quota	• Plantations must be registered (home gardens do not) • any agarwood requires a transport permit
Indonesia	• No harvest in PAs • Government provides seeds or seedlings to individuals and maintains nurseries	Yes	NDF and export quota	• Requires harvest certificate and to transport wood

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Country	Conservation measures	Management plan for agarwood	Export quota established and/or NDF	Harvest control method
				• Registration system for plantations • Quota for wild harvest by Province and species
Malaysia	• Regulated harvest in reserve forest • No harvest in PAs • Restoration of wild populations • Exported agarwood must have a certificate	Yes – 2016 Conservation Action Plan	NDF and national export quota	• Requires a certificate to remove wood and for export
Myanmar	• No harvesting of wild trees • Does not export agarwood	No	None	• Registration system for plantations
Nepal	• No harvesting of wild trees • Seedlings provided to communities by government, about 100,000/yr • Intends to recover wild population	No	No need as does not export	Need permission to harvest from Forest Department

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Indonesia -Papua	• Assisted regeneration in wild	No	NDF and quota	
Sri Lanka	• None	No	None	
Thailand	• No harvesting in protected areas and no harvest of wild trees • Use a distribution map • Forest communities >10,000 register for use as NTFP	No	NDF for <i>A. crassna</i>	• Harvest only allowed from plantations • Registration system for plantation wood
Philippines	• Illegal to harvest any <i>Aquilaria</i> spp. or to remove seeds or seedlings from wild populations • Permit required to import seeds or seedlings • Permit required to move products to/from plantations • All wild trees are protected • Government provides seeds for home gardens	No	None	• Planation forestry permitted with controls, as of 2021
Vietnam			None	• Harvest only in plantation • Registration system for plantation wood

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*Distinguishing between plantation and wild origin agarwood products*

Among the several implementation challenges for CITES controls within countries are the inability to differentiate wild from artificially propagated agarwood, and the lack of knowledge about administrative procedures by people with home gardens to comply with the requirements for trading their agarwood. It is of particular interest to agarwood producing countries to be able to export products from plantation trees that can be managed, as opposed to wild trees that are endangered and therefore cannot be used for exported products. While some countries have instituted product registration systems that can identify and follow the chain of custody, there is still uncertainty that wild wood, usually illegally harvested, has not been included in with wood from a plantation.

Increase capacity buildings to distinguish between wild agarwood and artificial propagation requires a series of trainings for inspectors at MA

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**Regarding Plantation Registration**

ENCOURAGES

Range States to establish the plantation registration system for the artificial propagation of agarwood-producing trees;

RECOMMENDS

Exporting States to establish online technologies to support the registration and monitoring for plantation and for exporters. Samples of the labels used and lists of relevant exporters should be communicated to the Secretariat by exporting States, and then be provided to all Parties through a Notification; needs capacity building to management authority to distinguish wild agarwood and artificial propagation

ENCOURAGES

Parties to make use of the Glossary as a reference while inspecting and controlling specimens of artificial propagation products.

THANK YOU



## Working Group III

Agarwood - Glossary

### Topics discussed

- Units for reporting trade
- Exhausted vs. non-exhausted agarwood powder and dust
- Products defined in the agarwood glossary

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### Unit of oil

- The use of units in CITES permits and trade database of agarwood is not unified between countries
- All products should be in same unit, Kilogram (carving products, Molding compressed from exhausted powder, Prayer beads / Necklace / Wrist, Beads etc...)
- The working group recommend to use kg for measurement of agarwood oil in trade
- Units such as pieces, bottles, etc, should only be used in addition to specifying total product weight in kg
- Only exception: live specimen to be reported in numbers (seedling, tissue culture specimen)

### Exhausted and non-exhausted agarwood dust and powder

- There is confusion for border control officers to ID Exhausted and Non-Exhausted agarwood dust and powder products. Currently, exhausted agarwood powder and dust is exempted from CITES control.
- Some range states Authorities still issuing CITES permit for export exhausted product of Agarwood powder and dust, while other do not.
- Working group recommend Plant Committee to discuss with all range state whether the exemption of exhausted agarwood powder in #14 annotation of Appendices should be maintained or changed.

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### Review of agarwood glossary

- The purpose of the Glossary is to help the Border officer to ID the products on trade.
- All wood log, wood block, wood pieces, wood chips should be treated the same as for trade in other CITES-listed species
- Working group recommends:
  - wood chips should be maintained
  - Wood block and piece can be merged into one category
  - Other product of agarwood unit used in Kg
  - The live specimen should be in number

Thank you

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