MINISTRY OF ENVIRONMENT & FORESTRY
RESEARCH & DEVELOPMENT
OF AGARWOOD TECHNOLOGY

Dr. Maman Turjaman
Dr. Erdy Santoso

ENVIRONMENT & FORESTRY RESEARCH,
DEVELOPMENT & INNOVATION AGENCY (FORDA)
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Ministry of Research & Technology 2010
Ministry of Law & Human Right 2012
Ministry of Research & Technology 2014
## Trading of International Wild Agarwood

- **15 century ago**: trading of wild agarwood
  - low volume, high quality
- **Indonesia**: one of bigger exporter countries
- **Species**: >15 jenis *Aquilaria*; > 7 *Gyrinops*
- **Production**: depend on natural forest
- **> 1990**: demand high volume, low quality
  - (worried endangered condition)
- **Status**:
- **World**: needs 4500-5000 Tonnes of agarwood/year

### Gaharu*

- agarwood
- aloewood
- eaglewood
- **oud** [عود]
- **chénxiāng** (沉香)
- **jinkō** (沈香)
- **kyara** (伽羅)
- **trakm hrueng**
- **"akil"** (अकिल)
- **mai kritsana"** (ไม้กฤษณา)
WHAT’S AGARWOOD?

- Blackish brown to black
- Emits a wonderful fragrant
- Where an injury has occurred
- Age & genetic tree
- Environmental conditions
- Attacked by endophytic fungi
- Fusarium solani

Price: 1 kg = USD 50-300,000

Agarwood formation by insects

- Termites
- Zeuzera Coffeae
- The black ant
- Stem borer
Agarwood producing tree species in Asia

1. *Aquilaria malaccensis*
2. *Aquilaria beccariana*
3. *Aquilaria hirta*
4. *Aquilaria microcarpa*
5. *Aquilaria cumingiana*
6. *Aquilaria audate*
7. *Aquilaria brachyantha*
8. *Aquilaria urdanetensis*
9. *Aquilaria citrinaecarpa*
10. *Aquilaria parvifolia*
11. *Aquilaria rostrata*
12. *Aquilaria crassa*
13. *Aquilaria banaense*
14. *Aquilaria khasiana*
15. *Aquilaria subintegra*
16. *Aquilaria agallocha*
17. *Aquilaria grandiflora*
18. *Aquilaria secundana*
19. *Aquilaria moszkowskii*
20. *Aquilaria tomentosa*
21. *Aquilaria baiionli*
22. *Aquilaria sinensis*
23. *Aquilaria apiculata*
24. *Aquilaria acuminata*
25. *Aquilaria yunnanensis*
26. *Aquilaria filaria*

1. *Gyrinops versteegii*
2. *Gyrinops moluccanna*
3. *Gyrinops decipiens*
4. *Gyrinops ledermanii*
5. *Gyrinops salicifolia*
6. *Gyrinops caudate*
7. *Gyrinops podocarpus*
Distribution of *malaccensis* group

- *A. malaccensis*
- *A. beccariana*
- *A. microcarpa*
- *A. hirta*

Distribution of *filaria* group

- *Aquilaria fillaria*
- *G. versteegii*
- *G. moluccana*
- *G. ladermanii*
THE WOOD OF THE GODS

Agarwood is the King of Incense

BENEFITS

- Asthma
- chronic fatigue
- sexual dysfunction
- Anxiety
- sleep disorders
- weight reduction
- Detoxification
- Intoxication
- Constipation
- skin disorders
- premature aging
- pulmonary care
- circulatory problem treatment of headaches

They had a “significant reduction in body weight”
To be used as a “prevention and treatment of metabolic disorders”
Anti-bacterial agent
Proven antipyretic (reduces body temperature thus reducing fever naturally)
Analgesic (reduces pain naturally)
Antioxidant agent
Agarwood oil is as a fixative

WILD AGARWOOD

AGARWOOD PLANTATION

ARTIFICIAL PROPAGATION OF AGARWOOD

Agarwood plantation

Inoculation

Harvest

0 y 1y 2y 3y 4y 5y 6y 7y 8y 9y 10y 11y 12y 13y 14y 15y
POTENCY OF AGARWOOD PRODUCING TREES
(Data from 30% of Regency= 3.5 million trees)

MAP OF AGARWOOD CULTIVATED PRODUCTION FY 2020

KETERANGAN:

MAP OF AGARWOOD CULTIVATED PRODUCTION FY 2020

KETERANGAN:

TOTAL 21 PROVINSI
- Gaul A: 6.094.000 kg
- Gaul B: 19.490.075 kg
- Gaul C: 31.662.270 kg
Agarwood Industry: ONE STOP SERVICE

- Nursery
- Plantation
- Inoculation
- Harvesting
- Processing & Grading
- Product diversification
- Packaging
- Promotion
- Export

Agarwood tree & Durian tree

Agarwood cultivation: Powering a green economy
PLANTATION:
HOME GARDEN & AGROFORESTRY

Fish water fresh in ponds (West Kalimantan)

Arowana
(Scleropages formosus)
Monoculture of agarwood plantation
Aquilaria microcarpa

KUALA KAPUAS-CENTRAL KALIMANTAN

How to inoculate

more effective & efficient

Eliciteur

Agarwood (18 months)

Agarwood (36 months)
Aquilaria malaccensis

SOME RESULTS:

Location: nursery of Forestry office - Tarakan – North Kalimantan

Inoculation date: 20/10/2012
Observation 1: 9/11/2012 (20 days)
AFTER ONE YEAR

5/11/2012 to 15/11/2013

1x3 cm² → 5x20 cm²

Aquilaria malaccensis

> 30 times

Location: Borneo University, Tarakan (North Kalimantan Province)

Fresh agarwood: 920 kg
Dry agarwood: 480 kg

Aquilaria malaccensis
First harvest of agarwood in Sanggau, West Kalimantan

Barabai-Kandangan, South

Sukabumi, West Java

First harvest of agarwood in Lingga island, Riau Archipelago, Indonesia

One agarwood tree (dbh 25 cm- harvest : 2 kg/tree)

Price : USD 40/100 g
(9-month after inoculation)
Estimation PRICES of agarwood producing inoculated

<table>
<thead>
<tr>
<th>Year</th>
<th>Price Range</th>
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</thead>
<tbody>
<tr>
<td>1-year</td>
<td>USD 50-100/kg</td>
</tr>
<tr>
<td>2-year</td>
<td>USD 150-250/kg</td>
</tr>
<tr>
<td>3-year</td>
<td>USD 400-800/kg</td>
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EVERGREEN FOREST LTD.

Vietnam
Cluster of agarwood production

- Agarwood
- Agarwood oil & perfumery
- Incense & Herbal
- Accesoris & decoration
- Farmer group/private company
- Agarwood chips
- Agarwood Oil
- Market
- Agarwood tea
- Bracelet
- Agarwood stick
- Agarwood tea
Leaf tea (Aquilaria sinensis)  
Flower tea  
Agarwood aromatherapy  
Gaharu stick  
Granular tea  

High price of agarwood bracelet at agarwood outlet in Shanghai
Agarwood oil industry

Agarwood trees plantation at Gopeng-Malaysia
Gaharu ecotourism at Gopeng hill-Malaysia

300 Ha gaharu budidaya

Agarwood factory

Agarwood tea
Central Bangka Regency

Agarwood cluster in Lamandau Regency (Central Kalimantan)
Training of agarwood cultivation and technology

agarwood diversification products: One Stop Service
XIE-XIE
SYUKRON
THANK YOU
OBRIGADO
TERIMA KASIH