REVIEW OF TRADE IN MERBAU FROM MAJOR RANGE STATES

TONG P.S., CHEN, H.K., HEWITT, J., AND AFFRE A.

A TRAFFIC SOUTHEAST ASIA REPORT

TRAFFIC
the wildlife trade monitoring network

BfN
Bundesamt für Naturschutz

The Rufford Maurice Laing Foundation

Published by TRAFFIC Southeast Asia,
Petaling Jaya, Selangor, Malaysia

Layout by Noorainie Awang Anak,
TRAFFIC Southeast Asia

Suggested citation: Tong P.S., Chen, H.K., Hewitt, J., and Affre A. (2009). *Review of trade in merbau from major range States* TRAFFIC Southeast Asia, Petaling Jaya, Selangor, Malaysia

ISBN 9789833393176

Cover: Logging truck transporting logs of kwila/merbau *Intsia* spp., among other species Vanimo, PNG.

Photograph credit: James Compton/TRAFFIC Southeast Asia

This report is printed in Malaysia using T-Kote, a total chlorine free environmentally friendly paper

REVIEW OF TRADE IN MERBAU FROM MAJOR RANGE STATES

Tong P.S., Chen, H.K., Hewitt, J., and Affre A.

James Compton/TRAFFIC

Ariel view of logs, including kwila/merbau *Instia* spp. awaiting export from the port of Vanimo, Papua New Guinea

CONTENTS

List of figures

List of tables

Annexes

ACKNOWLEDGEMENTS

In the course of this project many individuals contributed their time, expertise, original research and professional advice. Special thanks in this regard are due to the numerous people who provided valuable information through interviews, correspondence and unpublished reports. Firstly, this report would not have been possible without the assistance and co-operation of the Forestry Department (Peninsular Malaysia); Sarawak Forestry Corporation; Malaysian Timber Industry Board; Sarawak Timber Industry Development Corporation; and BRIK (Indonesia). We would like to express our gratitude to the *Dinas Kehutanan Provinsi Papua* Papua Province Forest Service—especially to Marthen Kayoi; *Balai Pemantapan Kawasan Hutan* (BPKH) Forest Area Gazettment Service Office Jayapura Province; *Balai Konservasi Sumber Daya Alam* (BKSDA) Federal Agency of Natural Resources Conservation Papua I; *Balai Seritifikasi Penguji Hasil Hutan* (BSPHH) Jayapura; WWF Indonesia; Conservation International Papua Programme; *Dewan Perwakilan Rakyat Papua* (DPRP) Papua Provincial Parliament; *Majelis Rakyat Papua* (MRP) Papua People's Assembly; and the Association of Concessionaries Papua and PT Hanurata Unit Jayapura. Thanks to Tonny Soehartono for his assistance in providing contacts for meetings and interviews in Papua and West Papua, Indonesia, and the WWF office in PNG, which was contracted to co-ordinate the work on the island of New Guinea, and to WWF Papua office, in particular Ted Mamu, Lyndon B. Pangkalis and Pius Piskaut, and WWF PNG.

The authors would particularly like to thank the Belgian Timber Importers Federation, the European Federation of the Parquet Industry and Greenpeace Belgium who contributed information to this study.

Thanks are due to those who reviewed the report and provided advice and assistance during the project. Reviews of earlier drafts were gratefully received from Kerstin Canby of Forest Trends; Krystof Obidzinski of CIFOR; Aimi Lee Abdullah of Malaysian Timber Council; Ani Mardiastuti; Tajudin Edy Komar and Listya Mustika Dewi of FORDA; and Sanath Kumaran.

This project and report were also dependent on the assistance and valuable advice of Steven Broad, and Sabri Zain of TRAFFIC International and other TRAFFIC colleagues: James Compton, Volker Homes, Maija Sirola, Craig Kirkpatrick, Xu Hongfa, Joyce Wu, Kahoru Kanari, Akiko Ishihara, Simon Habel, Roland Melisch, Massimiliano Rocco, Glenn Sant, Noorainie Awang Anak, Azrina Abdullah and Ann Gomez.

Special thanks go to Hajo Schmitz-Kretschmer, of the German CITES Scientific Authority, *Bundesamt für Naturschutz* (BfN—Federal Agency for Nature Conservation), for his advice and assistance to the study. TRAFFIC's research of this report was made possible by funding support from BfN. Additional funding to support selected stakeholder consultations in Yokohama and in Jayapura, Papua, Indonesia, were provided by Keidanren Foundation. This funding support is gratefully acknowledged. The Rufford Maurice Laing Foundation is also gratefully acknowledged for its support to TRAFFIC in the final stages of production of this report.

ABBREVIATIONS, ACRONYMS AND DESCRIPTORS

ATITB	*Association Technique Internationale des Bois Tropicaux*
BfN	*Bundesamt für Naturschutz* (Federal Agency for Nature Conservation)
BKSDA	*Balai Konservasi Sumber Daya Alam* (Federal Agency of Natural Resources Conservation)
BPKH	*Balai Pemantapan Kawasan Hutan* (Forest Area Gazettement Service Office)
BRIK	*Badan Revitalisasi Industri Kehutanan* (Forest Industry Revitalisation Body)
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
dbh	Diameter at breast height
DPRP	*Dewan Perwakilan Rakyat Papua* (Papua Provincial Parliament)
EIA	Environmental Investigation Agency
EP	Environmental Plan
EC	European Commission
EU	European Union
FEP	European Federation of the Parquet Industry
FOB	Free On Board
FSC	Forest Stewardship Council
FWP	forest working plan
HPH	*Hak Penguasaan Hutan* (Indonesia forest concession)
HS	Harmonized Commodity Description and Coding System
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature (formerly the World Conservation Union)
LSS	Large squares and scantlings
m	metres
MRP	Papua People's Assembly
pers. comm.	personal communication
PNG	Papua New Guinea
PNGFA	Papua New Guinea Forest Authority
PROSEA	the Plant Resources of Southeast Asia
NGO	non-governmental organization
SFM	sustainable forest management
SMS	selective management system
spp.	species
UNEP	United Nations Environment Programme
UNEP-WCMC	UNEP World Conservation Monitoring Centre
VU	Vulnerable
WWF	The global conservation organization
WWF SPP	WWF South Pacific Programme
WTO	World Trade Organization

EXECUTIVE SUMMARY

In recent years, possibly in the context of the international attention to the growing problem of illegal logging and related trade and its negative impact on forests and tree species, there has been increased willingness to extend international collaboration and co-operation between producing and importing countries. CITES has increasingly been accepted as a useful tool to complement strategies for sustainable management of timber species and for combating illegal trade through the verification of permits in CITES provisions.

The sustainability of harvest of many tropical timber species currently is not well documented and there is a lack of relevant national, and to some extent localized, data on management, harvest and trade, which might be used as a basis for sustainable management. Some species may be under threat because of detrimental levels of use and international trade. Scientifically sound data are needed to inform policy, regulation, management and trading decisions, and even to fulfil the current listing criteria of CITES, if that is the intention.

Reports from non-governmental organizations have raised concerns about the scale of illegal trade in merbau, a timber from nine species in the genus *Intsia* and there is concern over the sustainability of harvests from natural merbau populations. The study on which this report is based, funded by *Bundesamt für Naturschutz*, the German Federal Agency for Nature Conservation (BfN), aimed to investigate in detail the international trade in merbau timber and to provide scientific and current data on the population status, harvest management and trade in these species. The report offers recommendations to promote the sustainable management of harvest and trade in merbau, particularly in the range States of Papua New Guinea, Indonesia and Malaysia, but also in selected merbau consuming countries.

Trees of *Instia* species are widely dispersed, from East Africa where they were introduced, through tropical Asia, to the tropical islands of the Pacific Ocean and northern Australia. The most widespread species is *I. bijuga*. In general, harvesting of merbau is not adequately controlled in a majority, if not all the range States. This is because merbau is not a target species for management and enforcement but falls under general forestry administration. Lack of data shows there is considerable uncertainty over whether management and trade are sustainable. The major problem in trying to determine the sustainability of merbau harvest is the lack of forest inventories, as most range States do not conduct national forestry inventories. Assessment of merbau resources is critical to verifying the sustainability of harvests.

When it comes to trade data, Indonesia and Papua New Guinea have incomplete trade data on exports of merbau logs and processed merbau products. In some cases, sets of data from different sources but for the same trade do not correspond. Malaysia has more comprehensive merbau trade data than other range countries. All in all, available data and observations from range States show that a significant portion of merbau is harvested to feed export demand. China is the only importing country with specific HS codes (codes of the Harmonized Commodity Description and Coding System) to track merbau imports. Of the countries examined, China appears to be the largest importer of merbau, followed way behind by Europe. There is a need to compare and analyse statistics between export and importing countries owing to the significant discrepancies found even in the limited merbau statistics available: China's merbau import data do not match corresponding export data. Problems of data discrepancy between export countries and import countries are common and cannot easily be solved.

Country information

Malaysia

According to the Forestry Department of Peninsular Malaysia, using peninsula-wide forestry inventory data, there are 1.1 million merbau trees with a diameter at breast height (dbh) more than 45 cm, with an estimated volume of 5.1 million m^3. Sabah and Sarawak do not have such detailed inventory data. Peninsular Malaysia has the highest merbau log production of the three regions of the country by far, but accounts for less than 2% of total log production in Peninsular Malaysia. In Sabah, merbau only accounted for 0.5% of total log production from 2000 to 2004. In Sarawak, the amount was even lower, at 335 m^3–1955 m^3, from 2000 to 2004. Merbau sawn timber comprised 2.5% to 4.0% of total sawn timber volumes exported from 2000 to 2004 by Peninsular Malaysia.

Indonesia

The estimated coverage of merbau in Indonesia is almost 33 000 000 hectares (ha), with an estimated volume of 6.17 m^3/ha. The provinces of Papua and West Papua alone had 49.5% of the total merbau in Indonesia in the 1980s. Merbau from islands in Indonesia enters the supply chain along with merbau from these provinces, but not much information is available about production, harvest and trade systems in place to ensure legal sourcing or sustainability of the resource from these islands.

Allegations about illegal logging in Indonesia, in particular in Papua, are a major cause for concern. The Indonesian Government has made a strong effort to curb illegal logging, through strengthening the policy and legal framework, changes in monitoring procedures and enforcement efforts. Even so, further review and streamlining of Indonesia's numerous regulations governing the forestry sector, issued by a number of ministries and provinces, would be beneficial. Measures to ensure legal timbers as the first step towards sustainability are in the pipeline. In Papua, the total merbau log production in 2002 was just over 251 000 m^3, accounting for around 52% of all log production from Papua. This production could be conducive to illegal logging, as the capacity of the forest industry is very high. The tenure of local communities could be strengthened to allow greater negotiation rights for forest access by logging companies.

While the authorities are taking measures to control licensing, forestry operations and trade in important timber-supplying provinces (e.g. Papua), movement of illegally sourced logs and timber to export markets continues. Many merbau logs harvested in Papua and West Papua are destined for inter-island trade within Indonesia but this trade is not monitored and controlled.

Papua New Guinea (PNG)

In PNG, the issue is one of making strong efforts to ensure the laws and procedures are comprehensive and full compliance. An estimated 5% of production forests in PNG contain merbau. PNG exported 1.5 to 2.0 million m^3 of logs annually from 2000 to 2005. Merbau accounts for 6.4% to 10.9% of total wood products exported during the same period.

Importing countries

China in recent years has recorded statistics for merbau, the timber being a valuable import for local industry. These are useful data which provide a valuable tool to assist exporting countries to determine if any procedural loopholes are being exploited or if illegal export exists, using China's import statistics as a starting reference point.

This study showed that **Japan** is a small player in the trade and consumption of merbau. In Japan, the trade is mostly conducted by small, independent, direct-importing companies. **Singapore** and the **USA** do not capture merbau in their HS codes as there is no specific code for merbau products.

European Union (EU) statistics do not record species-specific information for merbau. A rough estimate of the volume of merbau timber that entered the EU in 2005 is about 30 000 m^3 with a round wood equivalent volume of 50 000 m^3. Fifty per cent of the estimated amount was probably supplied direct from Indonesia. Almost all the remainder was probably supplied, in roughly equal total volumes, by Malaysia and China. Imports from the other range States, primarily PNG, are likely to have amounted to less than 5% of the total. The EU does not appear to import as much processed merbau direct from range countries. However, if the export of flooring from China is an indication, the EU could be indirectly importing merbau products re-exported from China after processing there, although China's statistics do not cover processed merbau or composite materials and are not linked to import data.

The demand for merbau for flooring materials is set to continue in the EU and developed countries elsewhere, although civil society campaigns to gain consumers' recognition of the issues related to illegal logging of merbau may have an impact on consumer demand. Large companies that sell flooring, possibly made from merbau, would as a result seek to obtain legal merbau where possible.

The price trend appears to be upwards as a result of restrictions in supply. This is the result of enforcement actions carried out mainly in Indonesia and should reach a peak if it has not done so, before falling to a more stable price range in line with the limited legal supplies, for example from Malaysia. Other species will take over as substitutes for merbau when the price of merbau makes it unprofitable to use in lower-end flooring.

Unsustainable trade will continue as long as merbau round logs and products are logged in PNG and Indonesia without forest management plans. Until this change, the challenge to stop over-exploitation of merbau rests squarely with the range countries, and the implementation of domestic regulations within their own borders.

A possible international mechanism that could provide proof of legality is a CITES listing for merbau, either in Appendix II or III. This would mean that a CITES permit or certificate has to accompany shipments of merbau. Such controls will not be easy to implement as merbau is exported in various forms. Logs, timber and sawn wood, should be readily recognizable, but for more processed products, such as parquet and doors which may have been varnished or treated, identification by Customs and other non-timber experts will pose a challenge to the effective implementation of CITES. Two workshops, one held in Yokohama in November 2006 with an international gathering, and another in Jayapura, Papua, in January 2007 for a provincial discussion of the findings of this study, did not dismiss CITES as irrelevant to the control of merbau trade. Both groups considered the merits of CITES but further examination of the

advantages and disadvantages was recommended. The groups also called for greater awareness of CITES among various stakeholders, including governments, industry and civil society.

Recommendations

The following are offered as recommendations, based on the analysis above, for short- and long-term strategies for merbau conservation:

Strengthening national and international co-ordination

- There is an urgent need to strengthen the implementation of existing laws to control the licensing and management, and to regulate the harvest of this high-quality timber where applicable.

- Good communication is strongly encouraged at central and provincial government level, to implement country policy and legislation effectively.

- Statistical information between different agencies within a producer country such as Indonesia differs widely. Greater co-ordination and comparative analysis is required in-country to narrow the discrepancies in data without compromising data quality. A review of the internal systems and procedures for data-collection, and identification of useful statistics should be a high priority.

- There are only a few regional or international co-operation avenues to exchange intelligence on illegal shipments, cross border co-operation, enforcement training workshops, etc., which may help the Customs authorities and forestry agency officials to carry out their duties effectively and efficiently. It should be possible to work within ASEAN (through the Senior Officials on Forestry or ASOF), the Asia FLEG Task Force and other fora to bring forward merbau as a specific item for discussion and action, within the context of timber trade in general. Merbau has already been brought to the attention of the international community and taking specific co-operative action on this genus would help the timber sector in general.

CITES listing

- CITES Appendix III could potentially provide a useful international instrument to collect merbau trade data. Failing this, countries should create national HS codes for merbau products. In the short term, to reduce the gap in statistical discrepancy, producing countries and China should institute a prior notification and/or verification process for merbau shipments.

- Producer countries Indonesia, Malaysia and PNG should explore further the option of using a CITES listing for merbau, if this would assist in monitoring, control and enforcement of international merbau trade. Awareness of CITES in Papua, West Papua and PNG should be improved, including by highlighting that CITES is not a prohibition on trade, but a tool to assuring sustainable trade.

Further research

- Forest inventories are lacking or obsolete in producer countries. There is an urgent need to define local distribution, density/volume and population viability in natural forest clearly, especially for PNG and Indonesia. Resources should be made available to these producer countries to take on this task.

- Feasibility studies into the potential of the wood processing industry in Papua, West Papua and PNG, and an assessment of potential wood yield and of technical ability should be carried out in those locations, for example by ITTO or FAO. In this way, the prospects for venturing into secondary/semi-processed wood products and for wood yield will have been assessed prior to any possible eventual export ban on merbau logs.

- Scientific research on merbau should be conducted by the relevant national and regional forestry research organizations in PNG, Indonesia and Malaysia, the main exporting countries, to address the following important areas:

  a) the impact of exploitation on merbau populations, to create a time-series model and to predict population trends based on volume;

  b) regeneration capacity in logged-over areas;

  c) silviculture treatment in natural forest;

  d) merbau population density and distribution.

1.0 INTRODUCTION

The principles of Sustainable Forest Management (SFM) have recently been a goal for foresters, to ensure that the management of production forests can meet the demands for timber products without sacrificing the forest ecosystems. However, in many countries in the tropics (e.g. Indonesia, Papua New Guinea (PNG), countries in the Congo basin, and South America), as well as in some temperate countries, such as the Russian Federation, factors such as lack of skilled personnel, costs, illegal logging and illegal timber trade, combined with uncontrolled forest conversion, have made this goal of SFM difficult to meet. While illegal logging is a matter for each country to deal with under national regulatory frameworks, the complexity of subsequent trade flows make it difficult for importing countries to determine if timber cargoes are of legal provenance and from sustainably managed sources.

In recent years, possibly in the context of the growing problem of illegal logging and related trade and its negative impact on forests and tree species, there is an increased willingness to extend international collaboration and co-operation between producing and importing countries. Many timber species currently in trade are not sustainably managed and there is a lack of relevant data on status, harvest and trade, which might be used as a basis for such management. Some species may be under threat because of detrimental levels of use and international trade.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has provisions that control international trade in species and can provide a mechanism for determining sustainability of timber trade for listed species. CITES has been playing a positive role in the conservation of animal and plant species since 1975 when it first came into force. However, matters relating to tree species were not given much attention until the late 1990s and until recently only some 27 tree species and a few tree genera were listed in the CITES Appendices. There was a long-standing debate about the appropriateness of including commercial timber species in the CITES Appendices. Many countries, in particular range States, have opposed additional listing of commercially valuable timber species in the CITES Appendices, because they considered CITES-listing was primarily to ban trade for timber species or ushered in restrictive conditions that obstructed trade. Consequently, only a few important commercially traded timber trees were listed by 2005. Among the more prominent and heavily traded timber species that have been listed in the The

James Compton/TRAFFIC

Logs in lumber yard awaiting export from Vanimo, Papua New Guinea.

CITES Appendices include: Big-leafed Mahogany *Swietenia macrophylla*, ramin *Gonystylus* spp., and Lignum vitae *Guaiacum* spp. in Appendix II and West Indian Cedar *Cedrela odorata* in Appendix III.

Comprehensive population status information for merbau, a highly sought-after timber species from tropical Asia and the Pacific, is difficult to obtain, possibly because not much study of this genus has been made. Until recently, merbau was considered a lesser known timber species. In the annual review and assessment of the world timber situation for 2003 and 2004, compiled by the International Tropical Timber Organization (ITTO), merbau is not listed as one of the major species exported in industrial round wood, sawn wood and veneer and plywood products by Indonesia and Malaysia. Malaysia and Indonesia's current timber markets are largely composed of species in the Dipterocarpaceae family, such as *Shorea* and *Dryobalanops* species. Some commonly traded timber species documented by ITTO are meranti *Shorea* spp., Teak *Tectona grandis*, Jelutong *Dyera costulata*, keruing *Dipterocarpus* spp. and ramin.

There is concern that the population density of mature merbau trees is decreasing in most parts of major habitat on the island of New Guinea and the surrounding islands, the result of over-exploitation that involves elements of indiscriminate and often illegal commercial logging (Shearman and Cannon, 2002). More recent reports have also raised concerns about the scale of illegal trade in merbau, from the province of Papua (Indonesia), most of which was destined for China (Ministry of Forestry, Indonesia, 2006). Since then, the Government of Indonesia has taken steps towards enforcing the law (EIA, 2006) but those most culpable for the illegal operations appear not to have been convicted (Illegal logging info(a), 2006). Merbau will continue to be harvested, in many cases legally, as the province of Papua has plans to develop vast areas of timber plantations of 645 000 ha, and 812 400 ha for pulp and paper plantations (M. Kayoi, Head of Papua Province Forest Service *in litt.,* January 2007).

Listing merbau in Appendix II or III would mean that a CITES permit or certificate had to be issued for merbau shipments prior to export, theoretically vouchsafing that authorities in the State of export were satisfied that specimens had been obtained in accordance with its laws for the protection of fauna and flora. An Appendix-II listing would further require that export of any merbau shipment only to be allowed if it were not detrimental to the survival of the species. In other words, CITES-listing could in theory provide certification of legality and sustainability (Chen, 2006). Merbau Appendix II listing proposal was submitted by the Denmark and Netherlands in the CoP 8, the proposal was withdrawn.

There are precedents for successful experiences with the listing of commercial tropical timber species in Appendices II and III:

- Mulliken and Buitrón (2002) concluded that Big-leafed Mahogany *Swietenia macrophylla* was better controlled and monitored in most range and consumer States following its listing in Appendix III than it was prior to that measure;
- the transfer of Big-leafed Mahogany to Appendix II in 2003 galvanized further steps to provide the regulatory framework to ensure trade was not detrimental to the survival of the species;
- poor implementation of Appendix III for ramin *Gonystylus* spp. in Malaysia, Indonesia and Singapore (Lim *et al.,* 2004) led to Indonesia's proposal for the species' subsequent listing in Appendix II, which was adopted by consensus at the 13th meeting of the Conference of the Parties to CITES, in 2004, paving the way for a better regulated and more sustainable trade.

In 2005, the Government of Indonesia began a consultation process to list merbau in CITES Appendix III. Indonesia sent out a letter to other merbau range States to ask if they could support a CITES listing. Indonesia has so far received no objection to the listing proposal. However, there has been no concrete progress with this possible Appendix III listing by Indonesia (H.K. Chen, pers. obs., April 2006).

This study, funded by the *Bundesamt für Naturschutz* (German Federal Agency for Nature Conservation, BfN) aims to investigate in detail the international trade in timber from merbau, to provide scientific and current data on the population status, harvest management and trade, and to give recommendations to promote the sustainable management of harvest and trade, particularly in the range States of PNG, Indonesia and Malaysia, as well as in selected merbau consuming countries.

2.0 BACKGROUND

Merbau consists of nine species. It is known by different local names in different countries. The major common names are captured in **Table 1**. Merbau is also commonly known as kwila, ipil, Moluccan iron-wood and Borneo teak.

Table 1
Common names for *Instia* spp. in various countries

Country	Common names
Indonesia, Malaysia	merbau
PNG	kwila, iban, mboan, bon, menau
Philippines	ipil, moluccan ironwood
UK	Borneo teak

Notes in this **Background** section are mostly adapted from Plant Resources of Southeast Asia, PROSEA, volume edited by Soerianegara and Lemmens (1994), unless specified otherwise.

2.1 Origin and geographic distribution

The genus *Intsia* is an Old World tree genus and occurs from East Africa (introduced), through tropical Asia to the tropical islands of the Pacific Ocean, and northern Australia (Johns *et al*., 1994). *I. bijuga* is the most widely distributed species, widespread in East Africa (Zanzibar), where it was introduced in 1934 (World Agroforestry Centre, 2006), the Indian Ocean Islands, India, Indochina, Melanesia, Micronesia, Polynesia and northern Australia.

Within Malesia, three species are recorded, *I. bijuga* the most common (Soerianegara and Lemmens, 1994) and also the only species that occurs in the Pacific islands to the east of PNG. On the island of New Guinea, three species have been recorded, but with uncertainties—*I. bijuga*, *I. acuminate* and *I. palembanica.* The first two species are often encountered—*I. palembanica* has limited occurrence in eastern New Guinea, while *I. bijuga* is fairly common, and, conversely, in western New Guinea, *I. palembanica* is common while *I. bijuga* is restricted.

I. bijuga, according to Verdcourt (1979), occurs from sea level up to 450 m above sea level. The trees occur most frequently in coastal areas, often in a zone behind the mangrove. Therefore, they are often treated as a member of the Indo-Pacific strand flora. In the Western Province of PNG, merbau occurs along the coast in the South Fly (P. Daur, pers. comm. to P. Piskaut, 2006) and around Benchback (S. Saulei, pers. comm. to P. Piskaut, 2006) but appears to be either rare or absent within its ideal altitudinal range in forests around the North Fly area, some 200 km inland. In west New Guinea (Indonesia), occurrences of merbau are recorded in the Vogelkop, Geelvink Bay, Fakfak, Mimika, Digul, and Jayapura (Verdcourt, 1979).

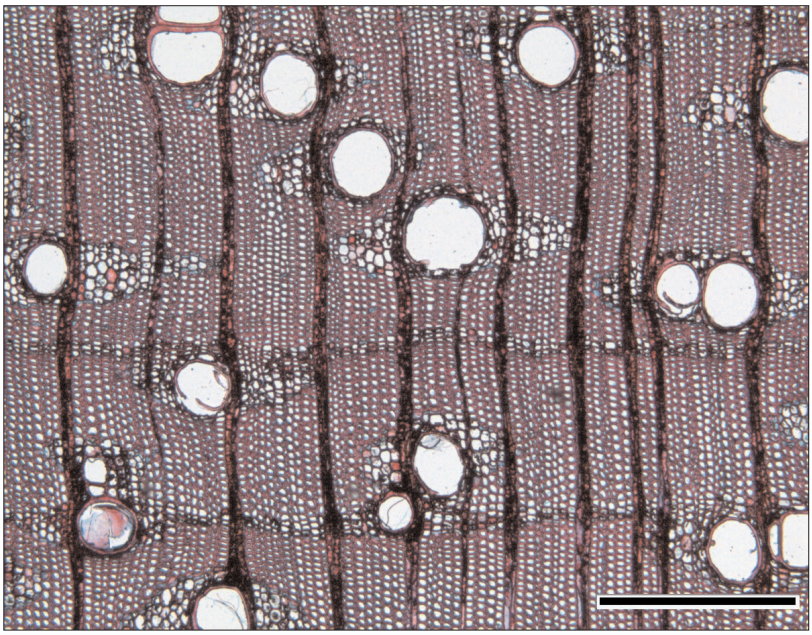
Intsia palembanica is widespread in Southeast Asia. The species is found inland up to 1000 m altitude.

Other known species are *Intsia amboinensis, I. bakeri, I. plurijuga, I. puberula, I. retusa* and *I. rhomboidea* (Soerianegara and Lemmens, 1994).

2.2 Uses

Merbau is a very good general purpose timber. It is suitable for a wide range of purposes because of its favourable physical and mechanical properties—e.g. a naturally high durability—combined with an appearance which is considered attractive.

Merbau is used in construction work in house-building, especially for high-class exterior joinery such as for windows, solid panel doors, framing and weatherboarding. It is also an excellent timber for high-grade flooring for both light and heavy pedestrian traffic. Other uses include furniture-making, panelling, stairs, handrails, shopfittings, truck bodies, turnery, poles, fence posts, musical instruments and carving. Merbau is also particularly useful for waterwork constructions, such as bridges, wharves, sluices and sheet piles, and it is generally free of ship worm. The timber is suitable for making decorative veneer but is generally too hard for plywood manufacture. In Europe, merbau can be mistaken for doussié *Afzelia* spp. from Africa and vice-versa. Merbau is also sometimes mistaken as "Asian doussié" (see **section 6** for further details).



Alex C. Wiedenhoeft

The transverse section of *Instia bijuga*. The black scale at the lower right corner is 500µm

2.3 Growth and development

Initial growth of the seedlings is fast, and they reach an average height of 40–55 cm after three months. Then growth will slow down, and in the period from three to 10 months after germination it averages only five to six centimetres. Merbau seedlings need high light intensity for optimal growth and, in the open, growth is much faster than under canopy—experiments in Indonesia showed that growth of seedlings under shelter or under shade trees is slower in comparison to under sunlight. The maximum diameter which may be reached in 40 years is 43 cm for *Intsia palembanica.*

Whitmore (1972) documented that growth was slow and poor until about nine metres high, but details such as environmental conditions were not recorded.

Intsia bijuga was reported as having a moderate growth rate of <1.5 m per year and slow regeneration (Thaman *et al.*, 2006). Maturity takes up to 75 to 80 years. At Bogor, Indonesia, an eight-year-old stand of *I. bijuga* had an average height of 10.7 m and an average diameter of 15 cm.

2.4 Abundance, preferred climatic conditions and habitat

Merbau prefers a rainfall of more than 2000 mm a year and grows in primary or secondary forests on a wide variety of soil but usually not on peat. It is sometimes found growing gregariously, and occasionally dominantly.

Stocking of merbau in eastern New Guinea (PNG) varies greatly between different forest areas. Highest densities occur on the northern regions of the country in Madang and the East and West Sepik provinces. In the forests of Vanimo, a stocking of 7–10 stems per ha of trees 15 cm diameter at breast height (dbh) and above was reported by White (1976). Stocking in Gogol, Madang province, would be much higher. The high densities observed in Gogol were probably established after the droughts of 1918–1920 (Johns, *et al.* 1994). Logging similarly encourages high germination of seedlings, as observed in the Oomsis area of province of Morobe. Although merbau was not dominant in the original forest, the opening of the canopy resulted in abundant growth of seedlings of the species. Pockets of reasonably good stands also occur along the eastern coast line, from Ioma in the province of Oro, right around to Abau/Magarida in Central province in the south. It commonly occurs on lowland hill forest in association with species like Taun *Pometia piñata, Anisoptera* and *Hopea*. In these pockets, merbau may be a common constituent of the main forest canopy but rarely the dominant species. Stocking is slightly lower compared to the Madang and Vanimo areas. Seedling germination can be high particularly in natural or man-made gaps but only a small proportion reach sapling stage (Johns *et al,.* 1994). In all other lowland forests of PNG, stocking of commercial-sized trees (50 cm at dbh) is much lower, sometimes with one or two stems per hectare or only one stem within several hectares.

In western New Guinea (Indonesia), the stockings are comparatively high (**Table 2**). A good stock of merbau occurs in all the forest areas. This would indicate a typical merbau monoculture stand.

Forest inventories in Peninsular Malaysia 1970–72 and 1981–82 showed that there was still sufficient merbau timber in natural forests. From those inventories, the standing stock in Peninsular Malaysia was estimated at 2.8 trees/ha over 15 cm diameter and 1.9 trees/ha over 45 cm diameter (Johns *et al*., 1994)

Table 2
Density of merbau trees per hectare in unlogged forest and logged-over areas in selected regions of western New Guinea (Indonesia)

No.	Forest area	Unlogged forest			Logged-over area		
		Seedling	Sapling	Pole	Seedling	Sapling	Pole
	Manokwari						
1	Oransbari	14 337	1274	155	-	-	-
2	Bintumi	7850	1150	120	7260	991	28
	Sorong						
3	Klamono	17 200	3150	130	8670	1690	85
	Yapen-Waropen						
4	Sumuta-Barapasi	8230	964	165	7012	717	106
	Nabire						
5	Kwatisore	9725	1080	144	9665	875	98

Source: Directorate General of Forestry Production Management (Ditjen BPK) Manokwari (1993–2001)

2.5 Silviculture and management

Extensive stands of merbau occur in northern PNG on sites destroyed by fire during natural droughts and, as mentioned, the stands in the Gogol River valley were probably established after the 1918–1920 droughts. After logging, dormant seeds in the soil can germinate abundantly in gaps around the stumps. Merbau is apparently a successful secondary forest tree.

In PNG, a 50-year rotation for natural stands has been reported as suitable, but in Malaysia it has been estimated that a rotation of some 120 years would be required for merbau in plantations.

2.6 Conservation status

The *2008 IUCN Red List of Threatened Species* classes *Intsia bijuga* and *I. acuminate* as Vulnerable, based on assessments made in 1998 (IUCN, 2008). A listing of Vulnerable means that a taxon, although not Critically Endangered or Endangered, is considered to be facing a high risk of extinction in the wild in the medium-term future, as defined by various criteria described. Other species of merbau are not classified.

2.7 Presence in protected areas

According to the UNEP-WCMC Tree Conservation Information database, *Intsia bijuga* is protected in the Ujung Kulon National Park, Java, Manusela Wai Nua/Wai Mual National Park, Moluccas of Indonesia, as well as the St Paul Subterranean River National Park, Quezon National Park, and Calauit Island National Park of Philippines (UNEP-WCMC, 2006). Since *I. bijuga* is found in coastal areas, it stands to reason that any coastal protected areas in Indo-Pacific where this species is widespread will include this species. *I. palembanica* is found inland up to 1000 m altitude and therefore lowland tropical rainforest protected areas would have a high likelihood of including this species under protection. However, no direct information on the specific protected areas where the species is found is available at present.

3.0 METHODOLOGY

Research for this study took the form of literature review, internet research and analysis of trade statistics, as well as consultation with experts, including staff of national authorities; importers and exporters; staff of international organizations, including IUCN, the International Tropical Timber Organization (ITTO) and the *Association Technique Internationale des Bois Tropicaux* (ATITB); civil society in few key range and importing countries; other scientists; and participants in three workshops (see below). In addition, field visits were conducted in PNG and Papua, Indonesia.

Customs data were reviewed where available. However, published Customs statistics following the classification of the Harmonized Commodity Description and Coding System (HS) only have limited usefulness as a tool to facilitate assessment of trade in particular tree species, including merbau. The HS was established by the United Nations World Customs Organization to describe and code goods in trade, but HS codes for timber products tend not to be provided at species level. The trade statistics used in the European Union (EU) section of this study were derived from Eurostat, a database accessible over the internet. The Chinese data were obtained from Chinese Customs, China being the only country in this study which has specific HS codes for merbau.

An initial review of the data available indicated that, although the quantity of merbau entering the EU had not previously been estimated, tentative estimates could be made in a number of ways. These included analysis of trade statistics, assessment of other published information and direct contact ,not only with the trade (trade associations, importers, manufacturers and retailers), but also with non-governmental organizations (NGOs), Customs officials, CITES Management Authorities and others.

An analysis of official EU import statistics[1] served to identify, for a range of products, which exporting countries, and which EU Member States, are probably amongst the leading suppliers and leading initial destinations of the merbau imported into the EU, respectively. Data for a number of years (2001–2005) were assessed in order to indicate possible trends in those exports and imports. Because such trade statistics do not provide data by species[2], assumptions (based on knowledge of the supply chain) were made about the proportion of merbau in the imports of a given product from a given country—see **Annex 1**.

Initial consultations with relevant trade associations indicated that parquet flooring was one of the leading end-uses for the merbau which enters the EU. Statistics and other information published by the European Federation of the Parquet Industry[3] (FEP) provided a basis for estimates of the volume of merbau being supplied in the EU's parquet market (see **Annex 2**).

Corporate information in Europe available from the internet, brochures, trade journals and visits to trade fairs—notably Domotex (Hanover)—helped establish a view not only of which companies were likely to be amongst the leading importers, manufacturers, and merchants of merbau-containing products, but also of the probable scale of their sales of merbau by product and relative to each other. This helped determine the list of companies to which a short questionnaire should be sent.

---

1 http://fd.comext.eurostat.cec.eu.int/xtweb/setupdimselection.do

2 The species name is likely to be known both by the exporter and importer (as are related product details-e.g. multi-layer flooring for which merbau would tend to comprise only the uppermost layer of wood).

3 http://www.parquet.net/

The questionnaire (see **Annex 3**) was sent to a total of approximately 150 trade associations and companies across the EU. The responses to the questionnaire were helpful, not least in refining the assessment of similar companies' merbau deliveries.

A schedule of estimates for each EU Member State's imports, exports and apparent end-use of merbau was compiled based on the above. This was then sent to relevant individuals, particularly those representing trade associations, for comment. The final version of that schedule (see **Annex 4**) takes into account those comments.

The Japanese part of this study used a similar set of questionnaires but on a much smaller scale, mainly using internet searches of potential companies buying merbau, and also limited telephone interviews to obtain further guidance of companies to interview. These interviews were a useful exercise and sometimes corroborated data from other sources. Limited data from range countries were available to start with.

Singapore and the USA were not included in the study. Neither country has specific HS codes for merbau, so their importance in the merbau trade is not known but, owing to limited funding, they were not included in the field visits.

Researchers organized and conducted three workshops to present the data and results of the study which were funded by Keidanren Foundation of Japan. One workshop was organized in Yokohama, on 10 November 2006, to coincide with the ITTO Council meeting, bringing together about 15 persons from selected producer and consumer countries, participants from governments, industry and NGOs who were already present at the ITTO Council session (see **Annex 5**). Another workshop was conducted in Jayapura, in Papua, Indonesia, on 11 January 2007, bringing together around 30 persons from government, industry and NGOs (see **Annex 6**). The third workshop was conducted in Singapore, on 17 to 18 November, 2008 (**Annex 7**)

4.0 RESULTS BY COUNTRY

PRODUCER COUNTRIES

4.1 Indonesia

An Indonesian presidential decree in 2003, which became effective in 2005, declared the Indonesian (western) part of the island of New Guinea, previously called Irian Jaya, as two provinces, namely:

- Papua, with the provincial capital city of Jayapura, and
- West Papua, formerly West Irian Jaya, with the provincial capital city of Manokwari.

The former *Dinas Kehutanan* (Provincial Forestry Service), therefore, became divided into two separate entities, one for each province.

Map 1

Papua and West Papua Provinces, formerly known as Irian Jaya

4.1.1 *Forest inventories*

The Ministry of Forestry, Indonesia is responsible for carrying out national forest inventories. Unfortunately, merbau is included in the "other species" list and cannot be teased out separately to ascertain the standing stock (A. Mardiastuti, *in litt*., April 2006). In Indonesia, governance is at two levels: central and provincial. The central government retains responsibility for strategic affairs, including those related to foreign affairs, security, justice, monetary policy, and religion. Some tasks that were carried out under vertical line management by central government agencies are now handled directly by the provinces' administrations and indeed forestry affairs at the regional level in Papua and West Papua are now largely conducted autonomously within the governorship of the provinces.

Total forest cover in Papua and West Papua has been reported as 42 224 840 ha (Papua Province Forest Service, 2001). Areas according to different forest categories are shown in **Table 3**. Merbau grows naturally in nine districts (*kabupaten)* in Papua (Mahfudz *et al.*, 2006). However, total land area for Papua and West Papua is around 42 million ha.

Table 3

Forest categories in Papua and West Papua

Forest	Area size (ha)	Percentage (%)
Conservation forest	9 704 300	23
Protected forest	10 619 090	25.1
Limited production forest	2 054 110	4.9
Permanent production forest	10 585 210	25.1
Conversion forest	9 262 130	21.9

Source: Papua Province Forest Service, Jayapura

According to a study by UNCEN (Cenderawasih University, Jayapura) in 1999 (cited in Anggraeni, 2007), the number of harvestable trees varied between 16 and 42/ha in Papua. The commercial trees in Papua's forests produce about 25–40 m^3/ha, with a diameter between 20 and 49 cm. Commercial trees in Papua and West Papua are dominated *by Intsia bijuga* (merbau), *Pometia pinnata* (matoa), *Pterocarpus indicus* (rosewood) and *Drancontomelon* (black walnut) among others (Beehler, 2007). Mafudz *et al.* (2006) cite existing research relating to merbau in Indonesia, including 27 publications on forest production, 10 on seed and seedling technology, nine on forest management, eight on biology and botany, and one on forest conservation and economic aspects.

4.1.2 *Forest management—the legal framework*

The following legal section is adapted from a draft WWF timber trade report *Keep It Legal Country Guide: Indonesia*.

Indonesia's forestry regulatory system is a disorientating set of laws, regulations, ministerial decrees and instructions. There are thought to be over 900 laws and regulations governing the State-owned forest estate alone. The Ministry of Forestry has issued some of these legal provisions, while other central government ministries, such as the Ministry of Industry and Trade, the Ministry of Internal Affairs, the Ministry of Industrial Affairs, and the Ministry of Finance, have issued others. District governments also may have issued district regulations (*Peraturan Daerah*) on a range of issues, such as forest management, taxation obligations and permits.

A legal hierarchy, stipulated in an Act passed by the People's Consultative Assembly (*MPR TAP III/2000*) guides this vast corpus of legal provisions. This Act specifies that the Indonesian Constitution is the highest legal regulation in Indonesia. The Constitution is followed by:

- Acts of Parliament (*TAP MPR*)
- Laws (*Undang-Undang—UU*)
- Government regulations (*Peraturan Pemerintah—PP*)
- Presidential decrees (*Keputusan Presiden—Keppres*)
- Ministerial decrees (*Keputusan Menteri*)
- Regional regulations (*Peraturan Daerah—PERDA*).

Lower hierarchy legal provisions, such as *Peraturan Daerah* (PERDA), cannot conflict with higher legal provisions, such as Laws *(Undang-Undang)*. This is important, because it means that district regulations on timber harvesting, permits and taxation cannot contradict higher laws and regulations and cannot legitimatize timber felling deemed illegal by the Ministry of Forestry, or any other central government department. In practice, however, PERDA often do conflict with the regulations because the higher order regulations are too broad and have too many loop-holes (Barr *et al*., 2006)

In Papua, according to *Keputusan Gubernur Provinsi Papua Nomor 184 Tahun 2004* (Papua Decision Number 184, 2004), IDR 50 000 (USD5.54) is charged for every m^3 of merbau cut as compensation to the local community, while in Irian Jaya, according to *Keputusan Gubernur Propinsi Irian Jaya Nomor 50 Tahun 2001* (Irian Jaya Decision Number 50, 2001), IDR 25 000 (USD2.75) was charged for every m^3 of merbau cut.

4.1.3 *Trade and export laws*

Decentralization in Indonesia empowered Papua to decide on a quota of 350 000 m^3 of merbau round logs for export, from its province only, authorized in 2002 for export the same year. The merbau round logs were expected to come from all logging companies (Indonesian forest concessions—*Hak Penguasaan Hutan* (HPH)—in Papua. However, a log export ban by central government in 2001 effectively meant that the annual export quota of 350 000 m^3 from Papua was never made operational nor implemented (J. Susilo, Papua Province Forest Service, pers. comm., January 2007). This incident demonstrates that a good communication system should be in place between the central government in Jakarta and the provincial governments.

All organizations engaged in the trading of forest products must be registered with the Ministry of Industry and Ministry of Trade[4] and, if exporting processed wood products, have a registration number issued confirming their status as a Registered Exporter for Forest Products (*Ekspotir Terdaftar Produk Industri Kehutanan* (ETPIK)).

Logs and woodchips cannot be exported according to a Joint Ministerial Decree from Forestry *1132/Kpts-II/2001* and Industry and Trade *No 292/Kep/2001* and *PP 34/2002*. This ban was put in place in 1985, but lifted temporarily after the 1997 economic crisis. It was re-enforced in 2001. Indonesia's wood-processing industry reportedly lobbied for the ban to be imposed because it was running out of raw material to process.

Sawn timber and railway sleepers over six metres in length cannot be exported (*Decree No. 250/Menhut-VI* and *598/MPP/Kep/9/2004*). The official rationale for this ban is to increase the added value of forest products and to create more jobs. Effective 29 July 2008, a revised regulation on forestry product export (*Decree No. 20/M-DAG/PER/5/2008*) allows merbau exports in the forms S4S (square on four sides) and E2E or E4E (simple mouldings with different degrees of rounding or bevelling) with a thickness x width of maximum 10 000 mm^2. Exports of other species are permitted in the same forms with a thickness x width maximum of 4000 mm^2.

---

4 Previously under a single Ministry of Trade and Industry, prior to 2004.

Registered exporters of all solid wood products must obtain letters of recommendation for their export plans from the *Badan Revitalisasi Industri Kehutanan* (Forest Industry Revitalisation Body, BRIK)—a government-sanctioned body run by industry officials. Some interpret the BRIK process as guaranteeing the legality of timber exported. Others disagree, pointing to the fact that Indonesia exports around 42 million m^3 per annum (in round wood equivalent) while the Ministry of Forestry has set the total annual allowable cut from permanent production forests at just 5.74 million m^3. This would mean that the balance of timber for export has to come from imported logs, plantations, estate crops, community forestry, conversion forests and illegal logging, as alleged by some civil society.

As mandated by Regulation of the Minister of Trade Number *09/M-DAG/PER/2/2007* dated 14 February 2007, the export of wood panelling and other wood in HS 4407, 4408, 4410, 4411, 4412, 4413, 4415, 4418, 4421.90.99.00 and 9406.00.92.00 must be endorsed by BRIK. BRIK assessment is a paper-based exercise, a verification of validity and correctness of the paperwork submitted by exporters, carried out by comparing the transport permit (*Surat Keterangan Sahnya Hasil Hutan* SKSHH), i.e. log flows to a mill, and the yearly production. The assessments are wholly dependent on the submissions of forestry documents and other paperwork by exporters. Random cross-check field audits or assessments appear to be made currently. At the time of writing, 2000 of the 4400 ETPIK members had been verified in terms of their legality, production and export activities (BRIK, pers. comm., 2008).

Timber originating from district-sanctioned small-scale concessions (*Hak Pemungutan Hasil Hutan* (HPHH) or *Ijin Penmanfaaatan and Pemungutan Kayu* (IPPK) is now considered to be illegal, except in rare cases where these concessions are endorsed by the Ministry of Forestry. In June 2000, the Indonesian Government announced a moratorium on forest conversion and, thus, timber originating from "IPKs" (permits allowing clear-felling of forests) may also be illegal. Only permits issued before this date or applications that had advanced to the stage of *izin prinsip* (permit in principle) are still considered valid. New IPK permits cannot be issued by district governments. Claims that timber originating from district concessions and clearing permits is legal should be considered with scepticism. However, Colchester (2006) considers that the Indonesian Government's commitment not to convert forest to other uses is not legally binding as it is in the form of a *Surat Edaran* or circular by the Ministry of Forestry. The local government issues a recommendation for the IPK while Jakarta issues the final permit. The local governments revise their regional spatial plans to re-allocate forests to be cleared.

4.1.4 *Merbau production*

There are three species of merbau recorded on New Guinea, but only two species are commercially exploited—*Intsia palembanica* and *I. bijuga*. Merbau coverage in Indonesia was almost 33 000 000 ha. with an estimated volume of 6.17 m^3 per hectare, in the 1980s (**Table 4**). The survey in 1987, the source of this information, was conducted for merbau trees with a diameter of more than 35 cm by *Badan Planologi Kehutanan* (Directorate General of National Forest Planning Programme), previously known as *Badan Inventarisasi dan Tata Guna Hutan* (Body for Inventory and Forest Land Use). The Indonesian portion of New Guinea alone had 49.5% of the total merbau area and 37.5% of the total merbau volume per hectare in Indonesia. Papua has 84.4% of Indonesia's total merbau production potential. Papua Province Forest Service (2003a) recorded a potential volume of 60.4 m^3/ha. for trees with 20 cm-and-above dbh. It cannot be independently confirmed if this potential volume is for all species and not only for merbau as it differs from the HPH inventory figure given below. These two sets of data on merbau volume per hectare have a 46.0% difference. The reason for the difference between the data of the

Directorate General for National Forest Planning Programme and Papua Province Forest Service could not be positively identified. According to the Papua Province Forest Service, Jayapura, an average of 10 m^3/ha merbau is recorded from the HPH inventory.

Table 4
Area ('000 ha) and estimated volume ('000 m^3) of merbau more than 35 cm dbh in Indonesia (during the 1980's)

Location	Area size ('000 ha)	Estimated volume ('000 m3)
Aceh	2 008	4 430
Sumatera	3 962	7 232
Kalimantan	4 552	3 813
Sulawesi	2 235	2 924
Maluku	3 956	13 182
Irian Jaya	16 107	170 795
Total	**32 821**	**202 478**

Source: Directorate General of National Forest Planning Programme, 1987

Enrichment planting of merbau has been carried out in Papua and West Papua (**Table 5**).

Table 5
Number of planted merbau seedlings in Papua and West Papua

No.	District	Total number of merbau seedlings planted	
		Year 2004	Year 2005
Papua			
1	Asmat	-	107 600
2	Biak	50 500	504 400
3	Boven Digul	-	49 200
4	Jayapura	6050	98 182
5	Yapen	-	148 000
6	Sarmi	-	68 600
7	Waropen	-	496 000
8	Jayapura town	61 000	131 000
Subtotal		117 550	1 602 982
West Papua			
1	Teluk Bintuni	-	81 000
2	Teluk Wondama	-	120 000
3	Manokwari	62 212	316 380
4	Sorong	20 116	-
Subtotal		82 238	517 380
Total		199 878	2 120 362

Source: Papua Province Forest Service, Jayapura

Merbau harvest and products in trade were less important in Indonesia before 2000 (M. Kayoi, Papua Province Forest Service, pers. comm, January 2007). The total official production of merbau in 1992 in Indonesia was about 137 000 m^3. The main production areas are Aceh and the Moluccas (each about 8000 m^3/year), and particularly Papua, West Papua and surrounding islands (about 121 000 m^3/year). In Papua, there was an unabated increase in merbau production from 1995 to 2002, production reaching 252 000 m^3 in 2002 (**Table 6**). Based on a Free on Board (FOB) price of USD400/m^3, the total value for the 2002 production would be around USD1 billion. This far exceeds the total volume produced in the neighbouring country, PNG, which only exported just over 23 000 m^3 of merbau products in 2002, according to official statistics.

Average log production, 1995–2000, was at 38% of the government's target (Anggraeni, 2007). Merbau log production comprised 30% of total log production, 1994–2001, but increased to 52% in 2003. However, merbau log production volume calculated by Papua Province Forest Service in **Table 6** is different to the volume recorded by *Badan Pusat Statistik* (Forest Concession Estate Statistics) in **Table 7**.

Table 6
Total log production (m^3) and estimated merbau log production (m^3) from HPH*, IPK and IPKMA*** from 1995 to 2002 in Papua**

Year	Total log production (m^3)	Merbau log production (m^3)	Percentage (%)
1995/1996	1 640 662	492 198	30
1996/1997	1 899 614	569 884	30
1997/1998	2 180 655	654 196	30
1998/1999	1 506 756	452 027	30
1999/2000	762 325	228 698	30
2001	828 042	248 412	30
2002#	484 293	251 817	52

Source: Papua Province Forest Service, 2003b

* Forest concession
** Licence for timber use
*** Permit for local people on cutting
\# Total represents production from 27 productive logging companies out of 42 companies operating in 2002

With one exception, the merbau log production volumes shown in **Table 7** are 3 to 10 % of the volume production in **Table** 6. Only in 2002 is the reported merbau log production for whole Indonesia equals to 25% of the reported merbau log production for Papua. This discrepancy is so huge that it puts the data in both **Table 6** and **Table 7** into serious doubt. The reason for this variance cannot be determined, although K. Obidzinski's experience in Kalimantan suggests that the forest service is likely to stretch the timber royalty collection while the concessionaires' association statistics would under-report the production to minimize the timber tax burden (K. Obidzinski, CIFOR, *in litt*., February 2007).

Table 7
Total log production (m^3) and merbau log production (m^3) from 1998 to 2002 in Indonesia

Year	Total log production (m^3)	Merbau log production (m^3)	Percentage (%)
1998	14 074 402	15 943	0.11
1999	15 198 294	21 643	0.14
2000	13 059 808	20 988	0.16
2001	10 960 188	4 732	0.04
2002	11 544 617	64 380	0.56

Source: *Badan Pusat Statistik*, 1998, 1999, 2000, 2001 and 2002

4.1.5 *Trade and export*

Merbau production and use by forest concessionaires from 2000 to 2005 is shown in **Table 8**. In Indonesia, production comprises last year's stock, production in concessions and purchases. Use includes use by concessionaires, domestic trade and exports. From 2000 to 2005, concessionaires seem neither to have purchased nor to have exported merbau themselves.

Table 8
Volume (m^3) of merbau production and use by concession from 2000 to 2005

Year	Production (m^3)	Use (m^3)	Stock at the end of the year (m^3)
2002	82 540	66 101	16 439
2003	115 988	89 453	26 533
2004	92 182	72 497	18 685
2005	32 907	23 472	9 435

Source: Badan Pusat Statistik, 2002, 2003, 2004 and 2005

The trade statistics on processed products of merbau exported by Indonesia for those companies registered with BRIK are tabulated in **Table 9**. Data on total export volume of processed products for all companies from Indonesia are not available. However, it is noted that all exports of timber products, including up to species level, from Indonesia have to be notified to the Ministry of Trade. BRIK data showed Australia was the leading importer of Indonesian industrial merbau products from 2004 to 2007.

Table 9
Indonesian exports of merbau, processed products (m^3) from companies registered with BRIK, 2004–2008

Year	BRIK-registered exports	Volume (m3)
2004	146	106 652
2005	151	140 937
2006	171	171 626
2007	195	246 541
2008*	122	99 533

Source: BRIK. **Note**: * until 6 June 2008

In 1990, the export of sawn merbau timber was 1700 m^3 with a value of USD825 000. In 1991, the export was much larger, amounting to 17 000 m^3 with a value of USD7.8 million. Since merbau is not classified separately under HS codes for Indonesia, there is no specific information on the volume of merbau exported except for information on processed products from BRIK.

Merbau round logs have been traded in Papua and West Papua, as well as between islands within Indonesia, with a total volume of 257 000 m^3 for 2005 and 151 000 m^3, January–July 2006 (**Table 10**). Merbau round logs are mostly exported from Papua and West Papua. It was found that 91.22% and 93.59% of the total merbau round log volume was exported to other parts of Indonesia in 2005 and 2006, respectively, with East Java the largest importing district, accounting for at least 68% of Papua and West Papua's merbau trade to Indonesian islands. Kaimana, Teluk Bintuni and Sarmi Districts are the three major districts producing merbau logs in Papua and West Papua.

Table 10
Papua and West Papua: merbau round logs (m^3) by destination in Indonesia for 2005 and 2006 (January–July)

No.	Destination	Volume (m^3)	
		2005	2006 (Jan.-July)
1	Papua	16 377	6 964
2	West Papua	6 194	2 715
	Subtotal	22 572	9 679
1	Jakarta	-	15 683
2	Central Java	30 122	13 290
3	East Java	177 474	103 076
4	Central Kalimantan	4 563	-
5	Maluku	13 486	-
6	North Maluku	-	625
7	South Sulawesi	7 453	2 988
8	North Sulawesi	1 452	5 748
	Subtotal	234 523	141 411
	Total	257 094	151 090

Source: *Balai Sertifikasi Penguji Hasil Hutan Wilayah XVII*, Jayapura (Forest Concession Estate Statistics, unpubl.)

Table 11 shows merbau products traded from Papua and West Papua to other Indonesian destinations. However, Papua and West Papua processed 37 379.83 m^3 and 11 313.19 m^3 of merbau for 2005 and 2006, respectively, but the available round merbau logs in those two provinces were 22 571.71 m^3 for 2005 and 9679.61 m^3 for 2006, according to official statistics. It is not known where the difference in supply of round logs came from, but it is conceivable that local communities supplied the balance as district authorities are allowed to issue IPKR (*Izin Pemanfaatan Kayu Rakyat*) or local community permits to harvest timber up to 20m^3 per family.

Sorong and Biak Numfor District are the main districts processing merbau logs and Central Java province is the largest importer for processed merbau products from Papua.

Table 11
Papua and West Papua: merbau products traded by destination in Indonesia for 2005 and 2006 (January–July)

No.	Destination	Volume (m^3)	
		2005	2006 (Jan.–July)
1	Papua	369	-
2	West Papua	20	112
	Subtotal	389	112
1	Bali	-	16
2	Banten	2 703	1 937
3	Jakarta	1 494	992
4	Central Java	17 218	885
5	East Java	10 129	6 286
6	West Java	5 448	-
7	South Sulawesi	-	1 085
	Subtotal	36 991	11 201
	Total	**37 380**	**11 313**

Source: *Balai Sertifikasi Penguji Hasil Hutan Wilayah XVII*, Jayapura (Forest Concession Estate Statistics, unpubl.)

EIA (2005) alleged that Indonesia's merbau log export volumes increased from 50 000 m^3 in 1998 to 660 000 m^3 in 2001, more than a ten-fold increase in less than four years although this could not be independently confirmed. According to Customs data from China obtained by Greenpeace (2006), in 2004, China Customs imported almost 900 000 m^3 of merbau logs, of which 870 000 m^3 were recorded as coming from Malaysia, a country which does not appear to have a large standing stock of merbau (see **Malaysia** section). The Government of China, in a letter to the Government of Indonesia in 2005, clarified that in 2004 China imported 894 000m^3 of merbau mostly from Malaysia and PNG. Since 2003, China has ceased importing merbau from Indonesia.

The assumption is that the merbau round logs in transit between islands are diverted to China using falsified Malaysian documents. However, from January 2008, only semi-processed merbau products have been allowed to be exported from Papua and West Papua. The advantages of having an expanding timber industry in those two provinces is obvious—it generates jobs, revenue and income—but it could also worsen the already acute supply-demand disparity in Indonesia's forestry sector and has the potential to contribute to illegal logging.

A new technology that addresses the potential for merbau traded under false documentation is the commercially viable DNA verification of origin system provided by the Singapore-based Certisource. This approach supports existing supply chain management systems, guarding them against forgery. DNA

verification can significantly strengthen the legal merbau trade (Shankar Iyerh, pers. comm., 2008). Additionally, trade data on merbau from other provinces is important for a better understanding of merbau's status in Indonesia. Merbau logs and processed products from provinces other than Papua and West Papua enter the trade flow from Indonesia as a whole, even if the volume they contribute is much smaller than that from those provinces.

4.1.6 *Illegal logging*

Recent investigations alluded to large-scale illegal logging of forests in Papua and West Papua (EIA and Telapak, 2005), prompting the Indonesian Government to increase action to combat illegal logging and timber trade coming out of the area. A number of seizures of logs, mostly merbau, equipment and ships were undertaken following the release of the report in 2005. A sample list of seizures is included in **Annex 8**. As a result, logging and processing of timber in Papua and West Papua virtually stopped for the first half of 2006, owing to the security sweeps, arrests and court proceedings. However, there has been no major conviction and this raises the question about the effectiveness of the forest law enforcement in Papua and West Papua.

According to the *Forest Service (Dinas) Papua Province Circular No. 661, 2004*, log production from Papua and West Papua during that period was legal and had a legitimate log delivery pass. More often than not, these logs have been treated illegally for two reasons: the log shipment carrying legal logs from Papua and West Papua had picked up illegal logs from somewhere else or the log shipment has been channelled to destinations other than its supposed destinations within Indonesia (M. Kayoi, Papua Province Forest Service, pers. comm., January 2007).

Some additional problems relating to illegal logging issues in Indonesia are the lack of good co-ordination between departments, unclear responsibilities for departments, unclear explanations of what constitute illegal logging/exploitation, relatively weak and inconsistent enforcement on the ground, forest policy tilted towards large-scale logging production, instead of community-based logging, and a high capacity for wood-processing industries.

Production figures and values for Indonesia, 2003–2005, were not sufficiently comprehensive. According to Zhu *et al.* (2004), Indonesia exported up to four million m^3 of downstream-processed products to China (fibreboard, plywood, sawn wood). Round logs only contributed a small fraction of the total export. Zhu's study results differ from the findings regarding illegal shipments reported by EIA and Telapak.

Major logging concessions in natural production forest in 2006 should account for less than 20% of official log production if annual work plans were followed (Bromokusumo, 2006). According to Colchester *et al.* (2006), the great majority of these concessions are probably illegal given that they are unlikely to have been gazetted. Most concessions in conversion forest (which account for almost 30% of official log production) are likely to have been granted improperly (Barr *et al*., 2006). Economic crime, including by leading timber enterprises, is particularly entrenched (Setiono and Husein, 2005). Such conclusions appear to be quite consistently applied for the whole of Indonesia.

In Papua and West Papua, currently, there appear to be only seven active HPH out of the 11 companies which have been issued logging licences, with an estimated total production of 380 000 m^3 in 2006 (Papua Province Forest Service). Licences will be withdrawn when companies fail to meet the forestry

department's requirements, relating, for example, to logging activities and cutting volume. The problem, as reflected in Barr *et al*. (2006) and Setiono and Husein (2005), differs from that expressed in official information provided by the Papua Province Forest Service, possibly indicating that the situation in Papua and West Papua after 2004 may have changed relative to when NGO pressure was very significant in forcing change.

4.2 Papua New Guinea

4.2.1 *Forest inventories*

There is no detailed baseline information on the forest resources of Papua New Guinea (PNG). A National Forest Inventory has not been carried out as stipulated in the National Forest Policy (1991). All existing national and provincial level plans are not based on comprehensive forest inventories but are based on "guestimates" of the timber stand density, the area, species and growing volume, which vary tremendously from province to province (ITTO, 2007a).

The draft National Forest Plan (Papua New Guinea Forest Association (PNGFA), May 2006) summarizes several functional classifications of forests[5]: 13.75 million ha. as Production Forests (of which 11.34 million ha. are under concession); 15.55 million ha. as Reserve Forests; 3.91 million ha. as Salvage Forests; 546 700 ha. as Protection Forests; 3.24 million ha. with afforestation potential; and a remaining area of 9.41 million ha. classified as "Others". Under the present customary ownership of land and forests, it is challenging for PNG to determine the exact area under Permanent Forest Reserve, given the fact that 97% of the country (99% of forest lands) is held under native customary ownership.

The resource data upon which sustainable yields and therefore harvesting levels should be calculated are not of great quality and it is likely that annual allowable harvesting levels in individual concessions have been set too high (K. Canby, Forest Trends, *in litt*., February 2007). Information on commercial timber stands, species, density, volume and characteristics of forest type is scanty and the available information is extracted from inventory studies conducted by forest developers themselves as part of the requirement under the Environmental Plan of PNG. Therefore, data on stand densities/volumes may not represent actual timber stands. For instance, commercial volume of merbau is not recorded in North Solomons, Manus and Western provinces, although its occurrence had been observed (P. Piskaut, WWF PNG, pers. comm., January 2006).

Although merbau is common throughout the country, relatively good stands occur in few provinces. It occupies an estimated five per cent of the total forest production land. The commercially extractable volume of merbau timber on average has been estimated at 26 million m^3 or roughly six per cent of all potential timber species in PNG (**Table 12**). This equates, on average, to two to five stems greater than 50 cm dbh (the minimum allowable size) per hectare, which Johns *et al.* (1994) estimated to be comparable to stocking in Malaysia. However, these figures presented here are based on selected timber concession areas and may not represent the absolute volume of merbau for the whole country.

---

5 In the National Forest Policy (1991), forests are classified according as (i) Production Forests-identified as timber production areas in the long term; (ii) Protection Forests-protected by virtue of their location, topographic constraints, and ecological, cultural or environmental considerations; (iii) Reserve Forests-not yet otherwise classified, but upon which a decision will be made later; (iv) Salvage Forests-forests to be cleared for other users; (v) land suitable for afforestation.

4.2.2 *Forest management—the legal framework*

Papua New Guinea has extensive legislation related to forest management and protection of timber resources (Schloenhardt, 2008). It provides a detailed framework for the planning and conduct of harvesting operations and post-harvest assessments. The framework includes requirements for detailed five-year and annual working plans; compliance with the PNG Logging Code of Practice (1996) and key standards governing harvesting operations, roading and post-harvest treatments; and approved Environmental Plans Other specific instruments for setting industry standards for domestic logging practices include the Planning, Monitoring and Control Procedures for Natural Forest Logging Operations (1995) and the Key Standards for Selection Logging in Papua New Guinea (1995).

The management and regulation of merbau falls under the *Forestry Act 1991,* the first comprehensive law to be passed affecting forests after independence. The Act became operational in 1992. Since then, the Act has been amended in 1993, 1996, 2000 and 2005. Associated with this Act, is the National Forest Policy (1991). It was introduced in response to the findings of a Commission of Inquiry in 1989 led by Justice Thomas Barnett, which concluded that logging practices in PNG were detrimental to forest resources, caused irreversible loss of biodiversity and deterioration of other environmental values and did not benefit local communities. The *Forestry Act 1991* introduced a completely new statutory framework for the management and control of forest harvesting operations and established the PNG FA as the principle regulatory agency. Key requirements in the Act are:

- conservation and renewal of forest resources as an asset for succeeding generations;
- administration of the management, development and protection of forest resources by the PNGFA;
- development of forest resources only in accordance with the *National Forest Plan*;
- timber harvesting allowed only under a permit or authority issued under the Act;
- other forest industry activities to be regulated by licences; and
- registration of all forest industry participants

The Act also provides a detailed framework for the development and allocation of timber harvesting rights and gives powers to enforce the Act against defaulting companies and individuals. Compliance with harvesting regulations and other requirements relating to the planning and management of field operations is a key parameter in the assessment of the legality of forestry projects.

Forest management in general and timber harvesting operations in particular are underpinned by a series of contractual relationships between the key stakeholders: resource owners, the State, the licensed holder of the timber harvesting rights and the logging company. Sustainable timber volumes are not well defined in the *Forestry Act 1991* or other legal instruments.

However, whatever the exact form of the contractual relationship, there is always at the core, a series of obligations that the logging company owes to the resource owners, whether directly or indirectly, that are to be implemented in return for the right to harvest and remove timber. These obligations invariably include three key elements:

1. direct financial payments (royalties)
2. construction of infrastructure
3. installation of timber-processing facilities

To support the *Forestry Act 1991*, the government has developed the National Forestry Development Guidelines (1993) and National Forestry Plan (1996).

For the protection of the environment, several laws were enacted since independence including the *Environmental Planning Act 1978*, *Environmental Contaminants Act 1978*, the *Water Resources Act 1982* and a new *Environment Act*, which was adopted in 2001. A valid Environmental Plan for all timber-harvesting operations is a legal requirement under the *Environment Act* and a legal prerequisite to the issuing of a Timber Permit under the *Forestry Act.* However, it is clear that the Department of Environment and Conservation (DEC), the implementing agency of the *Environment Act*, is underfunded and lacks the capacity to carry out the various assigned responsibilities—at least with regards to environmental and social aspects of forest management.

PNG's legislative obligations under CITES are met through the *International Trade (Fauna and Flora) Act 1979*.

4.2.3 *Merbau production*

The total land area that is accessible for timber production area in the long term in PNG is estimated at 13.75 million ha., out of 39.3 million ha. of forest lands (ITTO, 2005) An estimated five per cent of total production forests contain merbau, of which commercial standing stocks amounted to 26 million m^3, or six per cent of total potential volume, in the 1990s (**Table 12**).

Efforts to establish hardwood plantations in PNG started in 1955, with trials with various species in highland, coastal and lowland areas (Hammond, 1998). More extensive plantation development took place during the 1960s and 1970s, largely through the efforts of government, and with limited private involvement. Teak, *Eucalyptus deglupta*, *Eucalyptus grandis, Acacia mangium, Terminalia brassii, Pinus carribaea, Pinus patula, Ochroma lagopus* and *Octomeles sumatrana* are the major species in plantation forestry, but not merbau (ITTO, 2006). Typical of many secondary species, merbau seedlings require canopy opening for rapid initial growth and once established they need partial shade to grow (Johns *et al*., 1994).

4.2.4 *Trade and export*

PNG, together with Malaysia, Gabon and Myanmar, was one of the top log exporters of the ITTO producer countries in 2006 (ITTO, 2007b). It exported 1.5 to 2.0 million m^3 of logs from 2000 to 2005, annually, making it the world's second-largest exporter of tropical logs after Malaysia (PNG Forest Industry Association, 2006). However, log export data were not categorized by species. Some commonly harvested timber species for industrial round wood from 2001 to 2002 were *Pometia pinnata, Intsia bijuga, Eucalyptus deglupta, Callophyllum* spp., *Pterocarpus indicus, Celtis* spp., *Canarium indicum, Palaqium* spp., *Homalium foetidum* and *Anisoptera thurifera* (ITTO, 2006). PNG earned USD177 million from exports of tropical timber in 2005, USD138 million of which were from logs (ITTO, 2007a).

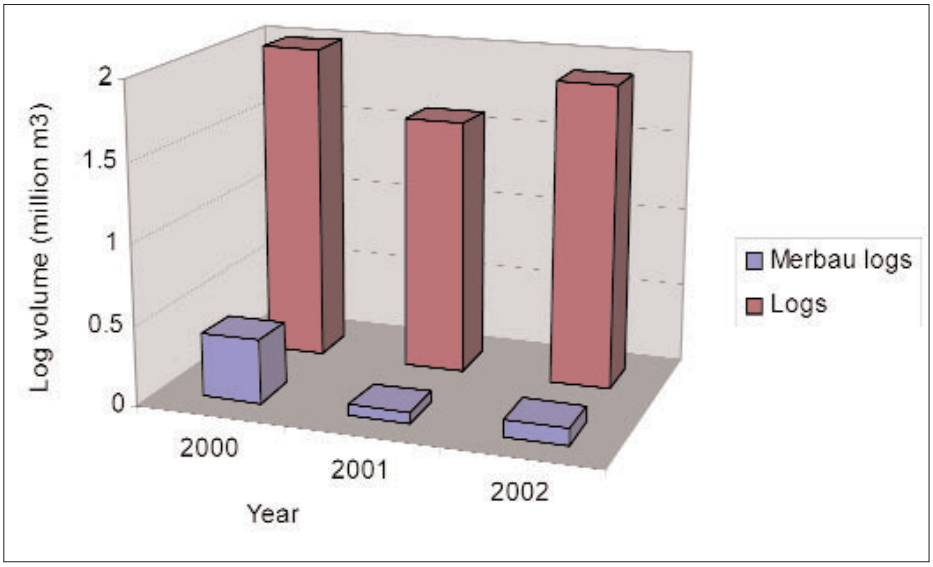
Total exports of wood products amounted to 208 328 m^3, 215 305 m^3 and 165 471 m^3 for 2001, 2002 and 2004, respectively. Merbau-related products were 18 357 m^3 in 2001, 23 468 m^3 in 2002 and 10 562 m^3 in 2004. They represented 6.4% to 10.9% of all wood products exported by PNG.

Table 12
Estimated mean volume of all commercial trees (m^3) and composition of merbau (%) in PNG

Province	Forest region	Mean volume* (m3/ha)		Merbau composition (%)
New Ireland	Southern New Ireland	31		3
	Central New Ireland	32		6
	Northern New Ireland	23		5
	New Hanover			1
East New Britain	Gazelle	44		1
West New Britain	Central New Britain	44		2
	West New Britain	41		1
Milne Bay	D'Entrecasteaux	36		6
	Luoisiade	28		1
	Milne Bay	39		7
Central	Central South	40		4
	Central North	51		2
Gulf	Kerema	33		3
West Sepik	Oenake	35		10
	Pual River	35		22
	Aitape	44		5
	Bevani-Sepik	30		23
	Sepik South	30		10
East Sepik	Sepik Coastal	35		9
	Sepik Plains	22		20
	Bewani Sepik	29		23
	Sepik South	30		4
Madang	Madang-Bogia	50		3
	Gogol-Ramu	49		8
	Ramu-Bismarck	50		6
Morobe	Finisterre-Huon	50		5
	Finisterre-Huon	55		4
	Lae	55		2
	Watut	60		3
	Morobe	70		1
Oro		32		7

Source: Hammermaster and Saunders, 1995, cited in Piskaut, 2006
Note: * mean volume of all commercial trees

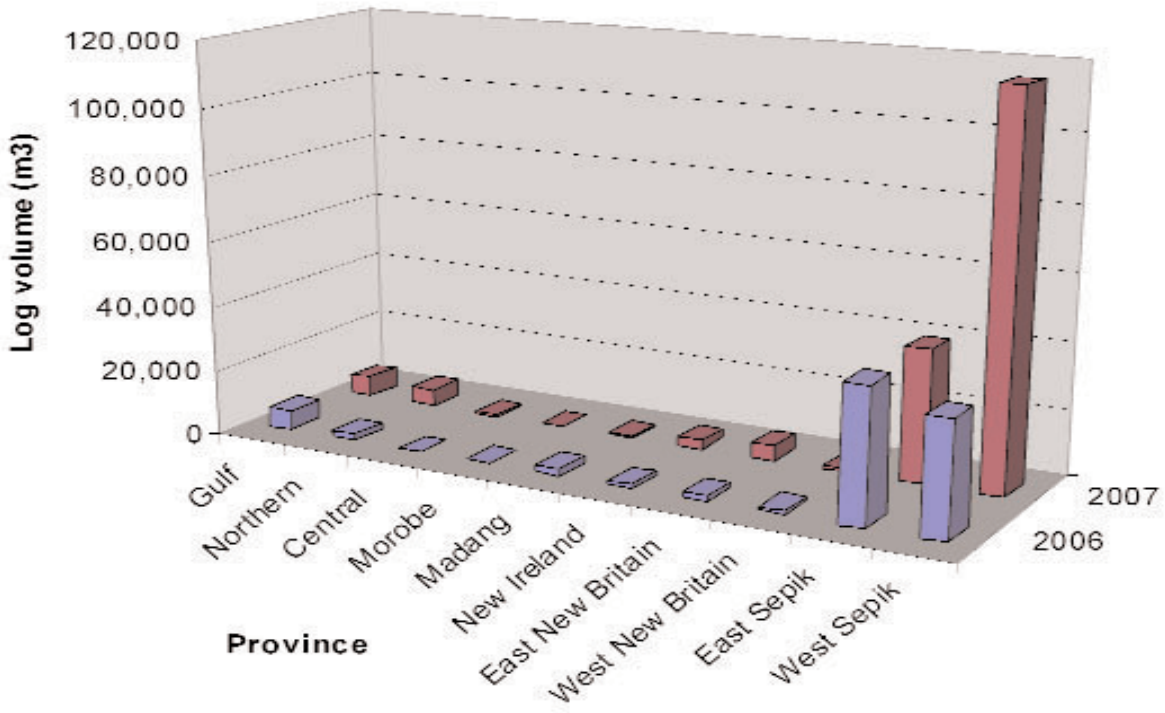
Figure 1
Exports of wood products by PNG



Source: Papua New Guinea Forest Industries Association, 2006

Data from the provincial level show that East Sepik and West Sepik, located adjacent to Papua, accounted for more than 80% of the merbau round log export for PNG (**Figure 2**).

Figure 2
Merbau round log production by province in PNG for 2006 and 2007



Source: PNG Forest Authority, *in litt*., 2008

Merbau round log exports amounted to 13 800 m^3, 9000 m^3 and 22 000 m^3 , for 2002, 2003 and 2004, respectively, and increased to 52 500 m^3 and 89 000 m^3 in 2005 and 2006, respectively (**Table 13**).

Table 13

Export of merbau logs (m^3) from 2002 to 2006, by destination, from PNG

Countries	m^3/Year				
	2002	**2003**	**2004**	**2005**	**2006**
China	12 249	7 532	18 859	51 344	51 667
Hong Kong	-	307	-	-	-
India	-	-	-	-	36 727
Japan	214	439	1 442	92	428
Rep. of Korea	1 270	917	1 594	726	295
Taiwan	119	-	59	1 143	-
Viet Nam	-	-	412	-	-
TOTAL	**13 852**	**9 195**	**22 366**	**53 305**	**89 117**

Source: *Société Générale de Surveillance*, PNG, *in litt.*

Greenpeace China

Merbau logs entered through the Guangzhou Yuzhu Port on March 2006

There were 19 countries and territories importing merbau products from PNG in 2001, 2002 and 2004, with totals of 18 000 m^3, 23 000 m^3 and 10 000 m^3 for each year, respectively, according to SGS records (**Table 14**). Of these, half were consistently importing merbau products for the three years: Australia, Belgium, Denmark, Germany, Malaysia, New Caledonia, New Zealand, Singapore and Tahiti. Australia was importing the highest volume of merbau products from PNG during these years.

Table 14
Export of merbau products (other than logs) from PNG (m^3) by destination

Country		Year	
	2001	2002	2004
Australia	2107	9653	4933
Belgium	6271	1537	592
China	283	29	-
Denmark	55	396	429
Europe	-	-	47
Germany	1375	928	941
Indonesia	71	-	-
Japan	-	-	300
Korea	310	510	-
Malaysia	215	233	608
Netherlands	-	-	281
New Caledonia	1561	657	630
New Zealand	37	7532	989
Nomea	-	-	64
Singapore	2059	985	121
Spain	88	105	-
Tahiti	718	799	432
USA	1	-	-
Vanuatu	-	49	195
Total	**18 357**	**23 468**	**10 562**

Source: *Société Générale de Surveillance*, PNG, *in litt*.

Data show that the Philippines last imported merbau logs from PNG in 1998; Singapore in 1996; and Thailand in 2000. Imported merbau logs by each country was under 3000 m^3.

4.2.5 *Illegal logging*

There had been no illegal seizure of timbers in PNG up until the end of 2006 (T. Mamu, WWF PNG, *in litt.,* November 2006). This is partly due to log export monitoring, developed by an independent entity, the

Société Générale de Surveillance (SGS) and in use since 1994. SGS has been contracted to inspect two to 2.5 million m^3 per year at 42 active export sites, provide real-time statistics to government agents, and ensure all taxes and duties are collected for the PNG Government. However, the monitoring is done at the tail end of the chain of custody and not from the stump in the forest to the point of export. Therefore, the current tracking system does not provide the basis for assessing information on sustainable levels of practice by the timber permit holder.

Independent audits commissioned by the Government of PNG and funded by the World Bank between 2000 and 2005 confirmed that the great majority of timber harvested in PNG did not comply with national laws and regulations, particularly concerning the (re-) allocation of concessions (Forest Trends, 2006). However, according to Masalai (2006) and others, there is a wealth of well-documented evidence indicating persistent gross corruption between politicians at the highest levels and certain logging groups (particularly Rimbunan Hijau, which accounts for a large majority of the country's timber exports). However this has yet to be used to convict or sanction those involved—either in PNG, Malaysia (home to the Rimbunan Hijau group), or in an international court.

4.3 Malaysia

Malaysia has effectively placed an export moratorium on round logs for Peninsular Malaysia; a partial ban for Sabah (subject to a quota of one million m^3 per year, dropping to 800 000 m^3 in 2007); and, since 1995, a quota system in Sarawak. The Sabah and Sarawak State governments maintain a high level of autonomy in their logging policy and management. The constitution of Malaysia grants legislative and executive authority over resources to the States. The role of the federal government is mainly confined to research and development, maintenance of experimental forest industries, development and technical assistance to the States.

The Malaysian Timber Industry Board (MTIB) reports that exports of timber products reached MYR15.26 billion ([6]USD4.12 billion) in 2003, and MYR16.63 billion (USD4.49 billion) in 2004. The Malaysian Government will strive to develop more downstream activities to increase value-added products, mainly in furniture and joinery. Under the Third Industrial Master Plan (2006–2020), the government has targeted an investment of MYR1.7 billion (USD0.459 billion) per year in the wood-based industry (*News Straits Times*, 15 September 2006).

No tariffs are imposed on imported timber products except for a minimal administrative fee. Malaysia announced, on 25 June 2002, a ban on imports of round logs from Indonesia. With effect from 1 June 2003, Malaysia strengthened its import ban to include a ban on the import of squared logs (flitches, baulks, large scantlings and squares) of a cross sectional area greater than 60 square inches (375 cm^2), as a result of the circumvention of the round log import ban (Lim, 2003). Malaysia also requires proof of a valid CITES export permit to accompany imports of CITES-listed timber species, in particular ramin, listed in CITES Appendix II.

There is no plan to expand the processing capacity of domestic mills, since the current capacity is already excessive. In future, it is expected that the lesser used species may increase to supplement the need for tropical timber, especially in finger-jointing and blockboard manufacturing in Malaysia.

---

6 Average conversion rate used MYR 1 = USD0.27

Malaysia's timber milling sector is widely understood to have considerable excess capacity. Malaysia's log exports are rising in relation to previous years, possibly because of price increases, with more logs being exported instead of being processed locally. Reports have raised the question of whether illegal timber imports may form part of timber exports from Malaysia and only if scrutiny of chains of custody back to tree stump can be extended to the whole country can the likelihood of such mixing be minimized (Illegal-logging info(b), 2006).

4.3.1 Forest inventories

Peninsular Malaysia's National Forestry Inventories were last conducted in 2002, and the report by the Forestry Department of Peninsular Malaysia was expected by 2006. According to this Department, there are 1.1 million merbau trees with a dbh of more than 45 cm, at an estimated volume of 5.1 million m^3.

Merbau inventory data are not available for Sabah and Sarawak.

4.3.2 *Forest management—the legal framework*

The practice of Selective Management System (SMS) was introduced in 1978 after the Malayan Uniform System (MUS) was found to be only successfully applied to the lowland dipterocarp forest, not in hill dipterocarp forest. In SMS practice, the next cut is expected 25–30 years after the first logging with an expected net economic out-turn of 30–40 m^3/ha, enriched with dipterocarp species, and with the following prescriptions:

i. the cutting limit prescribed for the group of dipterocarp species should not be less than 50 cm dbh, except for *Neobalanocarpus hemii* (chengal), where the cutting limit prescribed should not be less than 60 cm dbh;
ii. the cutting limit prescribed for the group of non-dipterocarp species should not be less than 45 cm dbh;
iii. the residual stocking should have at least 32 sound commercial trees per hectare for diameter class 30–45 cm or its equivalent;
iv. the difference in the cutting limits prescribed between the dipterocarp species and those of the non-dipterocarp species should be at least five centimetres;
v. the percentage of dipterocarp species in the residual stand for trees having 30 cm dbh and above should not be less than in the original stand.

Reduced impact logging is implemented in several forests in Peninsular Malaysia and in the State of Sabah, while low impact logging (helicopter logging) is implemented in selected sites in the State of Sabah and Sarawak.

4.3.3 *Peninsular Malaysia*

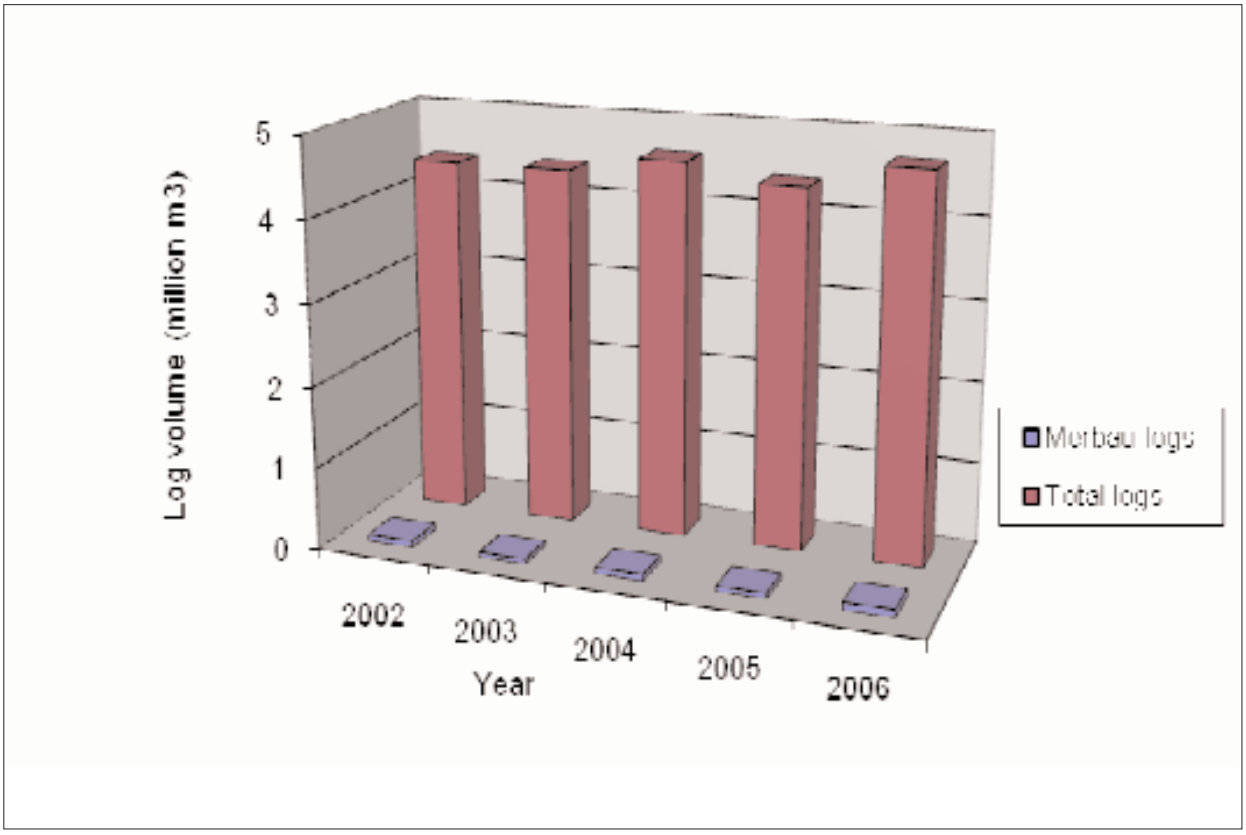
There are two commercial merbau species naturally occurring in Peninsular Malaysia: *Intsia palembanica* and *I. bijuga*. The habitat for the former species was found throughout the peninsula, except in the Perlis State, in the north, bordering with Thailand (Wyatt-Smith, 1952). The latter species was commonly found in the States of Johor, Kelantan, Negeri Sembilan, Pahang, Penang and Selangor. Both species are widespread in Sabah and Sarawak (Soepadmo and Saw, 2000).

4.3.3.1 Merbau production

Merbau log production in Peninsular Malaysia ranged from 76 617 m^3 to 97 375 m^3 in 2002 to 2006 (**Figure 3**). The total log volume (including for heavy hardwood, medium hardwood and light hardwood) for Peninsular Malaysia ranged from 4 358 290 m^3 to 4 693 447 m^3 in the same five-year period. The percentage of merbau log production as compared to total log production was less than 2% for the years 2002 to 2005, except 2.1% in 2006.

Figure 3

Production of merbau logs relative to total log production from 2002 to 2006 in Peninsular Malaysia

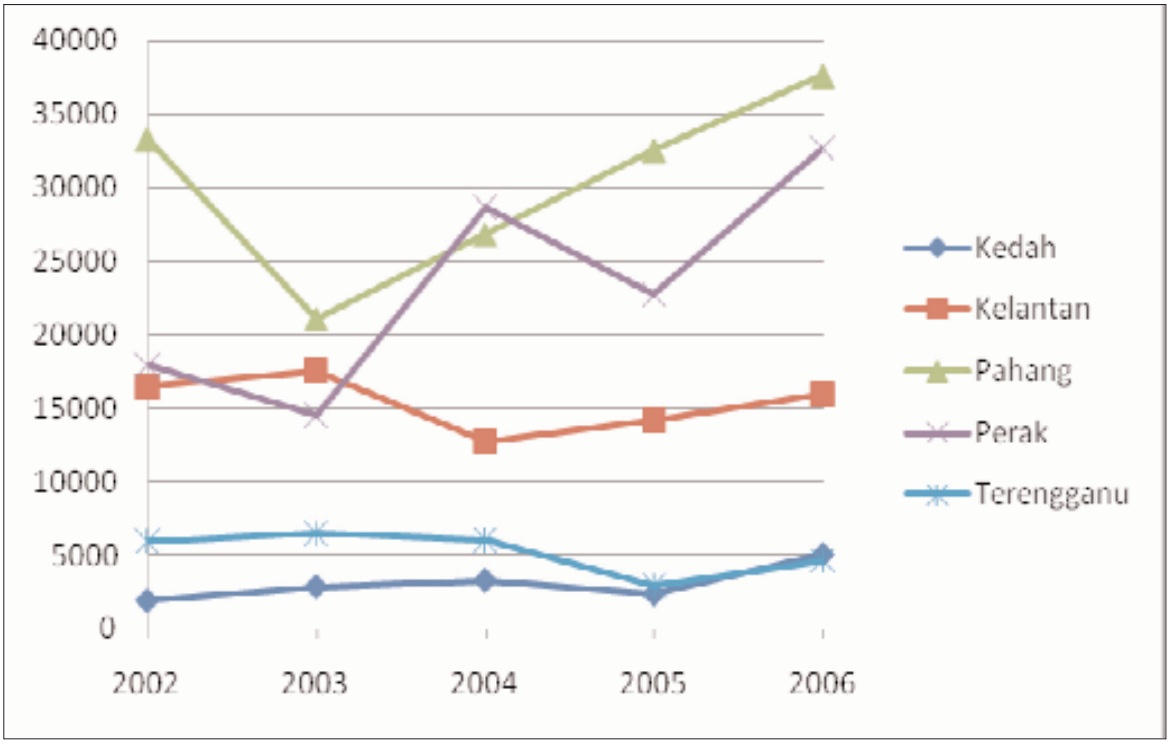


Source: Forestry Statistics Peninsular Malaysia, 2002, 2003, 2004, 2005 and 2006

Major States producing merbau logs in Peninsular Malaysia were Kedah, Kelantan, Pahang and Perak (**Figure 4**). Other States—Johor, Melaka, Negeri Sembilan, Perlis, Pulau Pinang and Selangor—had annual merbau log production less than 1000 m^3 or were not producing any merbau logs.

Figure 4

Production of merbau logs by main producer States in Peninsular Malaysia from 2002 to 2006



Source: Forestry Statistics Peninsular Malaysia 2002, 2003, 2004, 2005 and 2006

The royalty rates on merbau logs in 2004 and 2006 are tabulated in **Table 15**. The two States producing most merbau logs have relatively low royalty rates compared with those of other States. The royalty rates on merbau stayed unchanged.

Table 15

Royalty rates on merbau logs for states in Peninsular Malaysia in 2004, 2005 and 2006 (MYR (USD)/m^3)

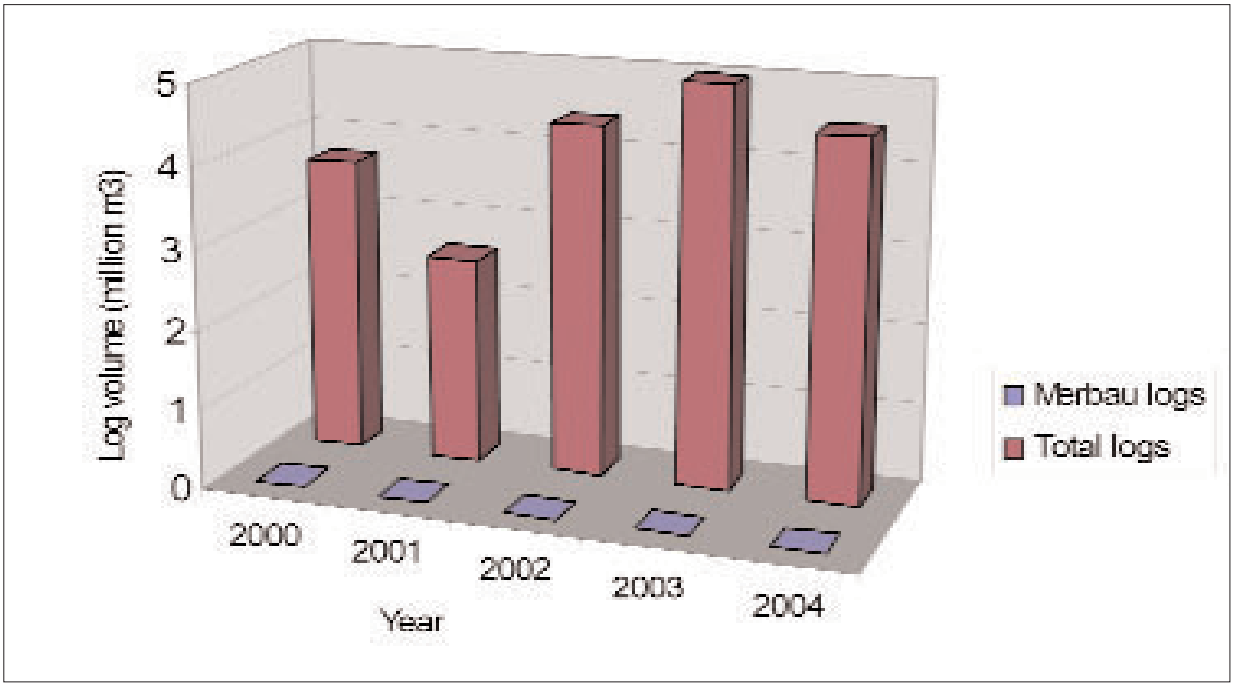
States	Royalty rates (MYR(USD)/m^3)
Johor	89 (24.00)
Kedah	20 (5.40)
Kelantan	49.5 (13.36)
Melaka	25 (6.75)
N. Sembilan	89 (24.00)
Pahang	19 (5.13)
Perak	25 (6.75)
Perlis	89 (24.00)
P. Pinang	89 (24.00)
Selangor	25 (6.75)
Terengganu	18 (4.86)

Source: Forestry Statistics Peninsular Malaysia, 2004, 2005 and 2006

Merbau sawn timber production ranged from 37 104 m^3 to 64 779 m^3 from 2004 to 2006 (**Figure 5**). Total sawn timber produced in Peninsular Malaysia was from 2 928 413 m^3 to 3 235 774 m^3. Reflecting the pattern for log production, the percentage of merbau sawn timber produced as compared to total sawn timber produced is less than 2%.

Figure 5

Production of sawn timber from 2004 to 2006 in Peninsular Malaysia



Source: Forestry Statistics Peninsular Malaysia 2004, 2005 and 2006

4.3.3.2 Trade and export

Merbau is mainly exported as sawn timber by Peninsular Malaysia. In 2004, major species being processed as sawn timber were *Shorea* spp. (including meranti, red seraya and yellow seraya), *Shorea guiso* (red selangan batu), *Shorea albida* (alan), *Dipterocarpus* spp. (keruing), *Parashorea* spp. (white seraya), *Pseudosindora palustris* (sepetir), *Dactylocladus stenotachys* (jongkong), *Anisoptera* spp. (mersawa) and *Palaquium hexandrum* (nyatoh), but not merbau (ITTO, 2005).

In 2006, MTIB estimated that there were 20 sawmills producing sawn timber, 22 moulding manufacturers, 18 dressed timber producers and 12 flooring makers using merbau species in Peninsular Malaysia (N. Hashim, MTIB, *in litt.,* October 2006).

According to MTIB, the main merbau products being exported are sawn timber (45%), moulding (20%), dressed timber (15%), flooring (10%) and other household items (10%). Merbau accounted for between 0.1% and 2.9% of the volume of sawn timber exported from Peninsular Malaysia between 2002 and 2006. Total sawn timber exported ranged from 562 030 m^3 to 1 030 027m^3 in these same five years.

For Peninsular Malaysia, the merbau consumption volume combined with the export volume of merbau sawn timber do not exceed reported merbau log production from 2000 to 2004 (**Table 16**).

Table 16
Merbau log production (m^3), merbau consumption by sawmills (m^3) and export of merbau sawn timber (m^3) from 2002 to 2006 in Peninsular Malaysia

Year	Merbau log production (m^3)	Merbau consumption by sawmills (m^3)	Export of merbau sawn timber (m^3)
2002	76 617	15 752	26 234
2003	63 497	62 117	27 258
2004	79 202	74 761	25 908
2005	76 218	70 466	4 976
2006	97 735	85 003	21 503

Source: Forestry Statistics Peninsular Malaysia 2002, 2003, 2004, 2005 and 2006

The average local prices of merbau logs and sawn timber and average export prices of merbau sawn timber are shown in **Table 17**.

Table 17
Average local prices of merbau logs and sawn timber (MYR/m^3) and average export prices of merbau sawn timber (MYR FOB/m^3) in Peninsular Malaysia

Year	Average local price of merbau logs (MYR(USD)/m^3)	Average local price of merbau sawn timber (MYR(USD)/m^3)			Average export price of merbau sawn timbers (MYR(USD) FOB/m^3)
		GMS*	Strips**	Scantlings***	
2002	794 (214)	1 759 (474)	1 413 (381)	1 912 (516)	1 514 (408)
2003	788 (212)	1 694 (457)	1 337 (360)	1 956 (528)	1 533 (413)
2004	800 (216)	1 700 (459)	1 310 (353)	1 950 (526)	1 660 (448)
2005	927(250)	1 902 (513)	1 506 (406)	2 067 (558)	2 316(625)
2006	1 175(317)	2 400 (648)	1 795 (484)	2 363 (638)	2 458(663)

Source: Forestry Statistics Peninsular Malaysia 2002, 2003, 2004, 2005 and 2006
Notes: * General marketing specification (size 25 mm–50 mm x 150 mm); ** Strips (size 12 mm–19 mm x 50 mm–125 mm); *** Scantlings (size 50 mm–75 mm x 75 mm–150 mm)

Merbau logs or sawn timber prices are always slightly above median price in comparison to other log species. The average local price of merbau logs in 2004 was MYR800 (USD216) as compared with a price of less than MYR130 (USD35) for *Hevea brasiliensis* (rubber) logs and more than MYR1000 (USD270) for *Neobalanopcarpus hemii*. The average local price of merbau sawn timber ranged from MYR1310 (USD353) to MYR1950 (526) in 2004 against MYR700 (USD189) for mixed hardwood, mixed medium hardwood and mixed light hardwood and more than MYR2000 (USD540) for *Neobalanopcarpus hemii*. The average FOB export price of merbau sawn timber was MYR1660 (USD448) in 2004 compared to less than MYR700 (189) for mixed medium hardwood and mixed light hardwood and MYR1900 (USD513) for *Dyera costulata* (jelutong).

4.3.3.3 Illegal logs

According to MTIB (N. Hashim, MTIB, pers. comm., October 2006), it had not, as of 2006, detected illegal imports of merbau logs, including via border trading points (e.g. Linggi, Batu Pahat and Klang ports), into Peninsular Malaysia and Sabah. The common log species being seized are *Calophyllum* spp. (bintangor), *Koompassia malaccensis* (kempas) and *Alstonia* spp. (pulai).

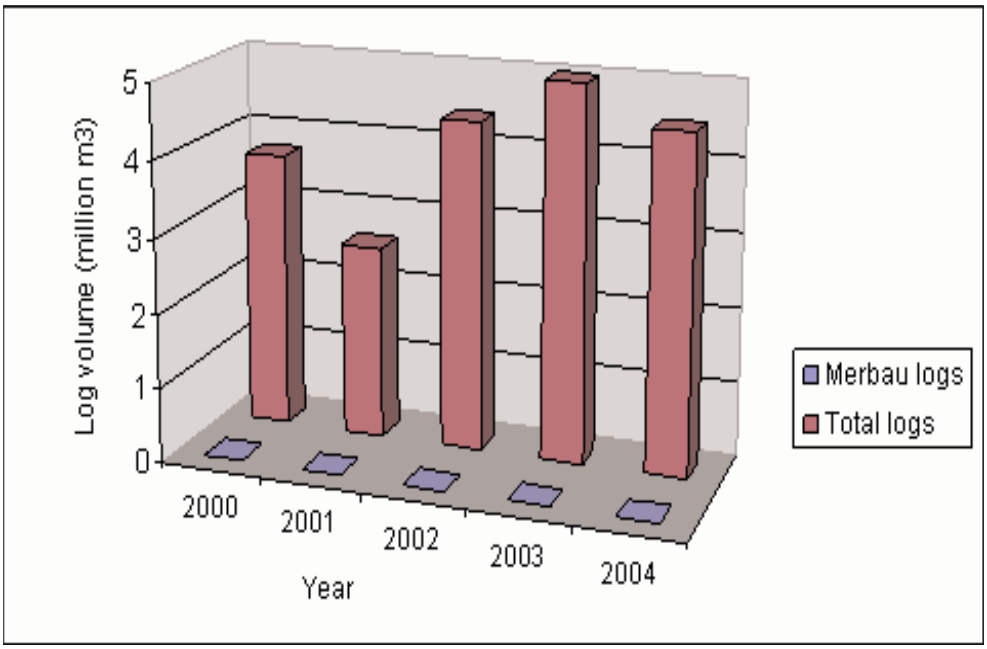
4.3.4 Sabah

4.3.4.1 Merbau production

Merbau log production in Sabah ranged from 5893 m^3 to 12 586 m^3 in 2000 to 2004 (**Figure 6**). The total log volume (which includes heavy hardwood, medium hardwood and light hardwood) for Sabah, ranged from 2 588 000 m^3 to 4 959 000 m^3 in the same five-year period. The percentage of merbau log production as compared to total log production was less than 0.5%, 2000–2004.

Total log production in 2004 recorded by both the Institute for Development Studies and Sabah Forestry Department is different. The former recorded 4 472 000 m^3 while Sabah Forestry Department recorded 5 415 796 m^3. The difference is 17% or 943 796 m^3. The reason for the data discrepancy is not known.

Figure 6
Production of merbau logs relative to total logs (m^3) produced in Sabah from 2000 to 2004



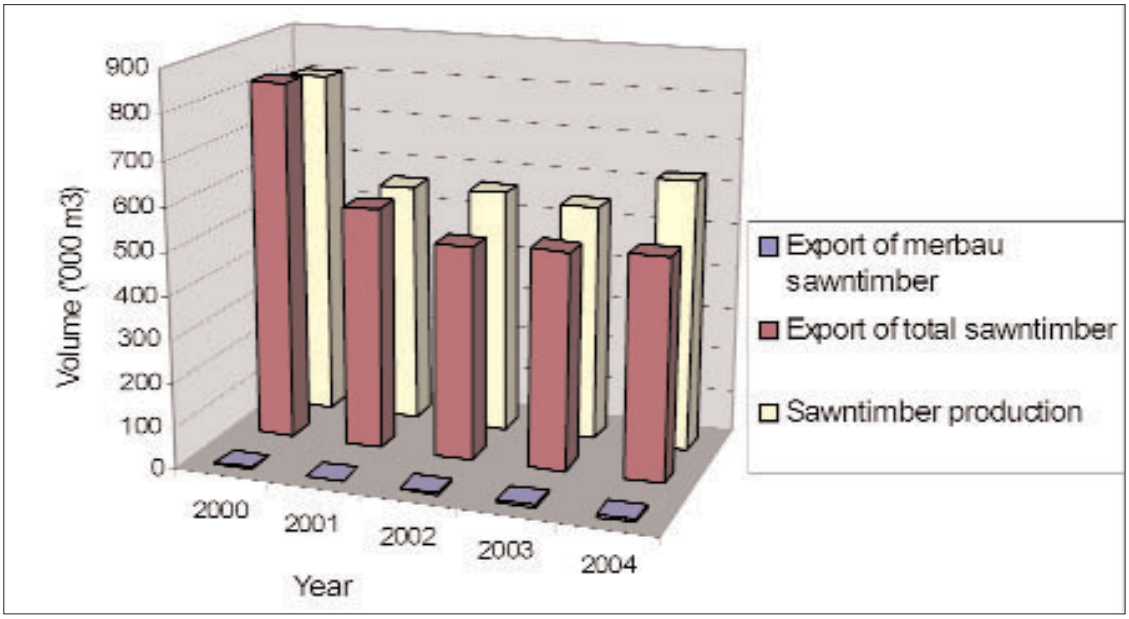
Source: Sabah Forestry Department Annual Report 2002, 2004 and Institute of Development Studies, 2005

In 2004, the Sabah Forestry Department charged a royalty rate for merbau round logs of MYR250 (USD67.50) per m^3 for all logs, regardless of size, from natural reserves and logs >60 cm from State land, alienated land and industrial tree plantation area; MYR100 (USD27) per m^3 for logs between 45 to 59 cm; MYR80 (USD21.60) per m^3 for logs between 30 to 44 cm and; MYR30 (USD8.10) per m^3 for logs of 29 cm and below.

4.3.4.2 Trade and export

Sabah produced 550 000 m^3 to 806 000 m^3 of sawn timber from 2000 to 2004, annually. Sabah exports at least 80% of the sawn timber produced every year. Of the sawn timber exports, less than 1% is merbau sawn timber (**Figure 7**).

Figure 7
Sawn timber production (m^3) and exports of merbau and total sawn timber volumes (m^3) in Sabah from 2000 to 2004



Source: Sabah Forestry Department

For Sabah, the export volumes of merbau logs and sawn timber do not exceed recorded merbau log production from 2000 to 2004 (**Table 18**).

Export prices for merbau logs increased from MYR304 (USD82) per m^3 in 2002 to MYR723 (USD195) per m^3 in 2004, an increment of 58% over a three-year period. Merbau sawn timber export prices ranged from MYR1466 (USD395.82) per m^3 to MYR1774 (USD478.98) per m^3 from 2000 to 2004.

Table 18
Merbau log production (m^3) and exports of merbau logs and sawn timber (m^3) from 2000 to 2004 in Sabah

Year	Merbau log production (m^3)	Export of merbau logs (m^3)	Export of merbau sawn timber (m^3)
2000	7 641	-	3 128
2001	5 893	-	2 368
2002	6 509	9	1 761
2003	12 586	2 215	4 367
2004	10 234	1 581	4 236

Source: Sabah Forestry Department

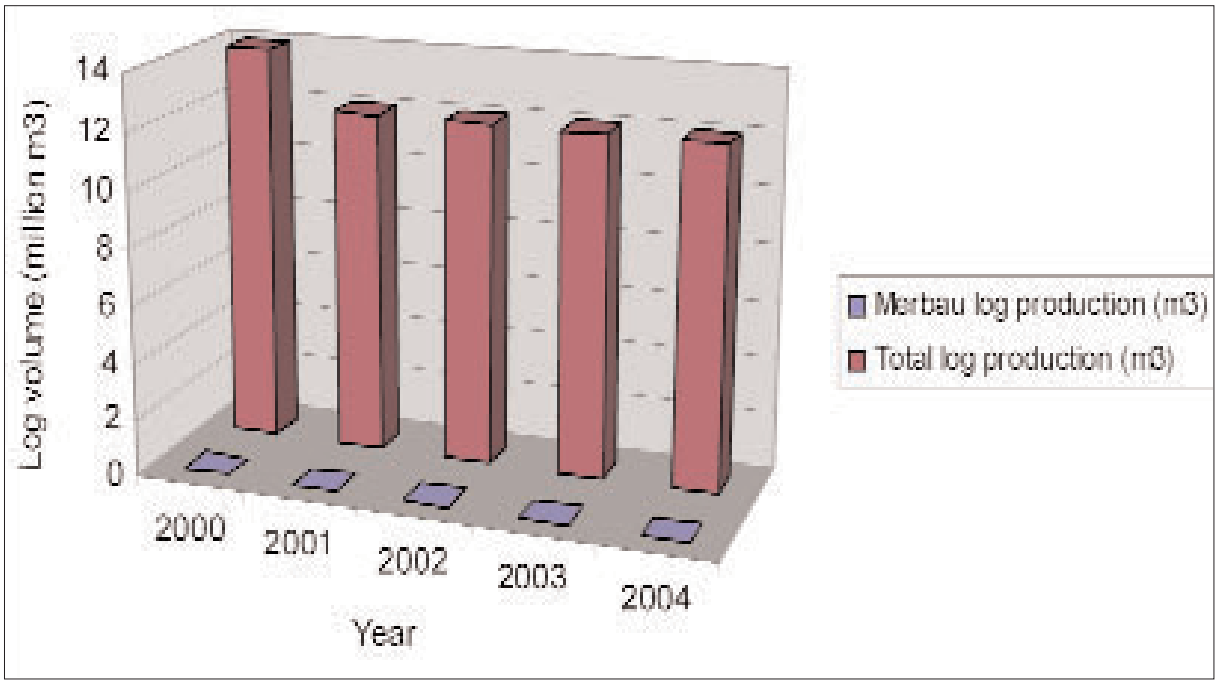
4.3.5 Sarawak

4.3.5.1 Merbau production

The occurrence of merbau is rare in Sarawak (J. Lim, SFC, pers. comm., 2006). Merbau log production in Sarawak increased from 335 m^3 to 1955 m^3 from 2000 and 2004, an increment of 82.9%, although the volume is still very small.

Sarawak produced an average of 12 589 811 m^3 of logs from 2000 to 2004 (**Figure 8**). Merbau log production is less than 0.1% of the total log production. It ranged from 335 m^3 to 1668 m^3, an average of 1006.2 m^3 annually, 2000–2004.

Figure 8
Production of merbau logs relative to total log production in Sarawak, from 2000 to 2004



Source: Sarawak Forestry Corporation

4.3.5.2 Trade and export

Generally, merbau is processed locally and traded in local markets for housing, furniture, woodworking, flooring, window frames and solid panel doors. Merbau is also exported in the form of logs, sawn timber and mouldings. Quantities are shown in **Table 19**. Since the merbau volumes in trade are very small, the Sarawak government does not compile statistics or differentiate to species level for timber products.

Table 19
Exports of merbau logs (m^3), sawn timber (m^3) and mouldings (m^3) from 2000 to 2005 by Sarawak

Year	Logs (m^3)	Sawn timber (m^3)	Mouldings (m^3)
2000	NA	120.1	NA
2001	NA	0	NA
2002	25.4	36.7	NA
2003	NA	16.1	6.3
2004	NA	13.7	NA
2005	NA	NA	NA

Source: Sarawak Timber Industry Development Corporation

4.3.6 *Illegal logging*

The effectiveness of Malaysia's existing controls to eradicate illegal logging within the country were made apparent in two reports by WWF Malaysia and the World Bank published in 2001 on forest law enforcement, respectively in Peninsular Malaysia and East Malaysia.

The report on Peninsular Malaysia concluded that: "Offences such as illegal logging and forest encroachment are treated seriously by the law. The maximum punishments for such offences are quite severe. In addition to heavy penalties, the authorities have instituted other measures to curb the problems and these include conducting spot checks, helicopter surveillance, regular training programmes for their officers to equip them with the necessary knowledge and skills on forest law enforcement, and running public awareness campaigns. Realising the significance of the problems and the need for combined efforts in eliminating them, the Forestry Department often works together with other government agencies, including the police and the army, in their enforcement operations. Partly due to the strategies mentioned above, the incidence of forest crimes over the last several years shows a declining trend. The average number of illegal logging cases dropped from 223 for the period of 1987–1993 to about 28 for the 1994–1999 period." (Rusli and Amat, 2001).

The report on East Malaysia concluded that: "The dimensions of forestry offences in Sabah and Sarawak are relatively small compared to the magnitude of the legal timber trade. In each of the two States about 300 cases of forest law infractions are detected annually—an average of one case per day. The annual volume of illegal timber seized in each of the East Malaysian States range from twenty to fifty thousand cubic meters. The report highlighted that cases of illegal logging are dealt with severely in the courts, and also noted that "The Forest Departments of East Malaysia have sufficient personnel, financial resources and the legislative framework is adequate to reduce illegal forestry activity to an acceptable level." (Blakeney, 2001).

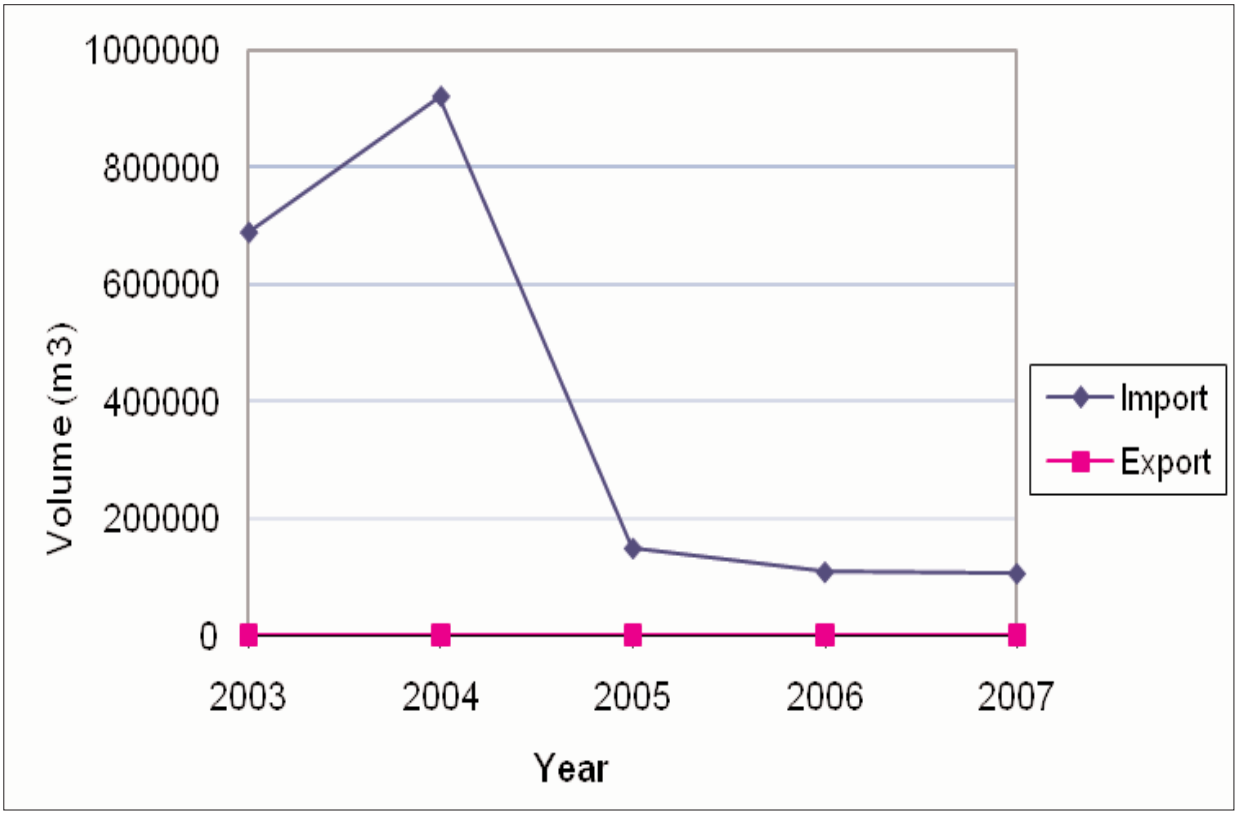
However, since the reports were published, the Sarawak Forestry Corporation Sdn. Bhd, a private company owned by the Sarawak government, has been given the mandate to manage, control and enforce the forestry resources of Sarawak. The factors outlined in the 2001 report would need to be reviewed in the light of this new institutional change.

IMPORTING COUNTRIES

4.4 China

China declares imports of merbau under HS codes 44034950 and 44072930 for rough wood and sawn wood, respectively. Merbau might also be included under HS codes 44039990 and 44079990. A steep drop (of 88%) in merbau imports was observed between 2004 and 2005, from 893 911 m^3 to 105 836 m^3 in 2007 (**Figure 9**). During the period 2003–2007, China exported merbau sawn wood in very small volumes between 23 m^3 to 296 m^3. Although these statistics indicate that China is predominantly a consumer country for merbau, they do not reflect the volume (probably substantial) of merbau which is used in the wooden flooring and other manufactured products which China exports.

Figure 9
Total imports of rough and sawn woods and exports of sawn wood (m^3) from China from 2003 to 2007



Source: China Customs Department

Imports by China of merbau rough wood by country of origin is shown in **Table 20**. The importation of merbau rough wood from Malaysia is decreasing and fell from 98% of total merbau imports by China in 2003, to 10% in 2007, whilst merbau rough woods from PNG increased from 1% of China' total merbau imports in 2003, to 79% in 2005.

Table 20
Imports of merbau rough wood (in m^3) by country of origin by China from 2003 to 2007.

Country	Year				
	2003	2004	2005	2006	2007
	m^3	m^3	m^3	m^3	m^3
Congo	-	-	6	151	
Guyana	436	-	-	-	-
Indonesia	112	-	-	7 736	6 956
Lao PDR	160	3	-	-	30
Madagascar					247
Malaysia	666 677	871 215	79 212	5 728	7 350
Mozambique	472				
Papua New Guinea	9 697	22 678	42 245	48 405	57 098
Solomon Islands		15	15		325
Samoa					80
Total	**677 554**	**893 911**	**121 478**	**62 020**	**72 086**

Source: China Customs statistics

Imports of merbau sawn wood by China increased at around 200% from 2003 to 2007, from 10 993 m^3 in 2003 to 33 750 m^3 in 2007. Indonesia is the major country exporting merbau sawn woods to China. It exports approximately 93% of the annual volume of merbau arriving in China from 2003 to 2007.

Malaysia was the only country recorded consistently as supplying both rough and sawn woods to China each year from 2003 to 2005. PNG has shown a preference for exporting merbau in rough wood form to China (over sawn woods). The other countries are inconsistent in their merbau supply to China. Statistics declared for merbau imports from countries which are not range States probably reflect species being misclassified as merbau.

China imported 634 000 m^3 of merbau logs/rough wood in 2004 and 56 000 m^3 in 2005 through Zhangjiagang port alone (ITTO Tropical Timber Market Report, 2006). This represented over 70% of total merbau imports as recorded by Customs in China for 2004, for the same product category.

According to EIA and Telepak (2005), an estimated 300 000 m^3 of merbau logs were smuggled from Papua to China monthly. This gives a total estimate of 3 600 000 m^3 annually, which is 96.7% more than an estimate for the same time period calculated from China's Customs statistics. The EIA/Telepak report appears to highlight the Zhangjiagang area.

Greenpeace China

Merbau floorings selling at the Oriental Homes, Lizeqiao store in 2006.

4.5 The EU

Annex 4 indicates that the roundwood equivalent "RWE" volume of merbau which entered end-use within the EU during 2005 was in the order of 50 000 m^3 (i.e. an imported wood volume of approximately 25 000 m^3). It also indicates that parquet flooring probably accounted for some 60% of that total and that doors accounted for a further 25%. The market seems to have changed insufficiently to warrant an estimate for 2006 differing from that for 2005. **Annex 4** also shows that the Netherlands, Belgium and Germany are likely to have accounted for approximately 30%, 20% and 10% of the RWE volume of merbau which was imported into the EU. Italy, Denmark, France and the UK each probably accounted for a further 5%.

Annex 4 indicates that the country of end-use might not be the country through which the merbau was initially imported into the EU—there is much intra-EU trade in merbau products.

More than 50% of the RWE volume of merbau imported into the EU probably derives from forest in Indonesia. Indonesia's direct supplies to the EU are likely primarily to have comprised parquet and (to a lesser extent) doors—both as finished and unfinished products. Sawn wood and parquet probably accounted for most of the merbau which Malaysia and China supplied to the EU. The RWE volume of

merbau being supplied to the EU from Indonesia and China is likely to have risen between 2000 and 2005, whereas that supplied from Malaysia has probably changed little. Together, supplies imported into the EU directly from other range States (primarily PNG) or indirectly (primarily from North America) are unlikely to have accounted for more than 5% of the RWE volume of merbau entering the EU.

4.6 Japan

As mentioned in the **Methodology**, a similar questionnaire to that used in Europe was used to assess merbau use in Japan for the period November–December 2006. Japanese timber importing tends to be dominated by several major trading companies knows as *shosha*. Usually companies that trade in merbau are small companies. Big timber trade companies are more sensitive about rare species trade that may possibly violate the law or threaten the natural resources.

Merbau is not such a popular timber species in Japan. According to Japanese timber dealers and the construction industry, cultural traditions, such as taking off shoes when entering the home, are believed to affect the preference for flooring material and colour of the flooring. At the same time, some Japanese dealers realize the shortcomings of merbau. When it gets wet, merbau floorings are claimed to stain.

However, one of the bigger merbau-consuming areas in Japan is Okinawa, an island in the southern part of Japan's archipelago. The tropical climate in Okinawa brings more demands than the main island for outside wood decking, as well as for timber that has resistance to erosion and termites.

Interviews were conducted with 11 big trading companies and only seven companies responded. Four out of the seven respondent companies said they did not trade in merbau. The other three *shosha* companies said they traded merbau as follows:

- Company A: Previously imported one container of merbau timbers annually, stopped three years ago
- Company B: six-seven containers (126-147 m^3) a year at Okinawa (one container is 21 m^3)
- Company C: 100m^3 of merbau (from PNG) a year

Internet research has shown that there were 19 direct import and retail companies dealing with merbau: 16 companies replied to the questionnaire enquiry. The results only give an indication of what could be happening in Japan but are not conclusive, given the small sample size and the possibility that the responses may have some inaccuracies. The results are shown in **Table 21** below:

Most imported merbau is traded for flooring and outdoor wood decking. The average prices for flooring of thickness 15 mm–18 mm are USD70.7 /m^2, with a range of USD37.4 to USD211.8 /m^2.

Imports of merbau declined in Japan owing to raw material availability from the producer countries and long delivery periods. The Japanese Customs agency does not have a tariff code number solely for merbau. However, it does have one for logs of merbau and four other species as a group (HS code 440349299). Japan's imports of such logs has greatly declined – from 60,000m^3 to 25,000m^3 between 2000 and 2001 and then from 20,000m^3 to 3,000m^3 between 2003 and 2007. Malaysia accounted for the great majority of those supplies, Indonesia supplied almost occasional small volumes and imports from

Papua New Guinea fell from 2,000m3 to nil between 2000 and 2005. This decline tends to confirm that Japan did not import substantial volumes of merbau (logs) during 2007.

Table 21
Interview results of 19 direct import and retail companies in Japan

No. of companies	Importing amount of 2005–2006 (m^3/year)
1	75
1	> 20
1	20
1	17
1	< 1
11	0
3	0

4.7. India

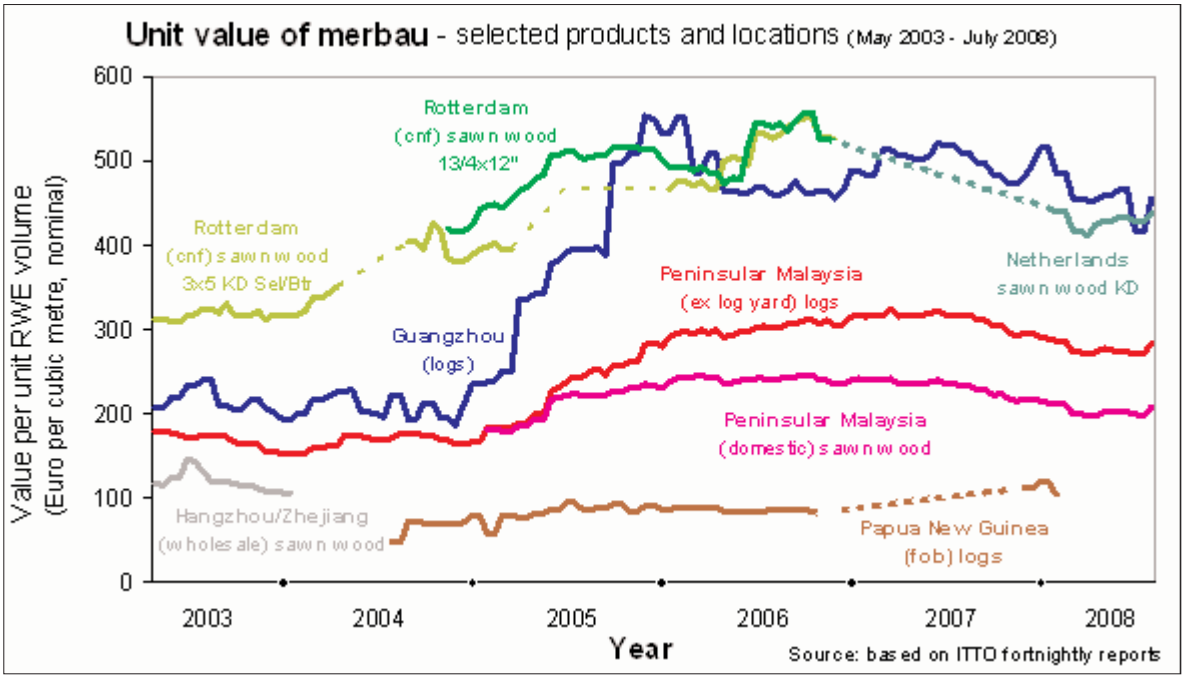
India trade statistics do not include merbau either as an individual species or as one of a number of named commercial species in a group. For all natural logs, Malaysia is the dominant exporting country to India, supplying 1.5 million m^3 during 2005 and 1.3 million m^3 in 2006. India imported 180 m^3 and 100 m^3 of logs (of all species) in 2005 and 2006, respectively, from Indonesia. Logs of all species imported from PNG were 70 000 m^3 in 2005, 35 000 m^3 in 2006 and 50 000 m^3, January–September 2007.

5.0 PRICE TRENDS

Figure 10 illustrates that the value per unit of RWE of merbau for supplies entering Europe rose by more than 50% between early 2004 and mid-2005. In contrast, that for merbau entering China rose 250% between the end of 2004 and late 2005. Although the data set for the Netherlands is broken, it seems that unit values in the Netherlands and China stabilized during 2006 at similar levels and have declined since the later part of 2007. There has also been a recent downwards trend in unit values for exports from Malaysia (between mid-2007 and early 2008). Although unit values for exports from PNG appear to have risen considerably during 2007, they still seem so much lower than those from Malaysia that an investigation (by the tax authorities in PNG and the country's creditors) into the reasons why might be warranted.

The earlier substantial (50%) difference between unit prices in the EU and China reflects the ease with which China was able to procure logs illegally exported from Indonesia—there is a long standing ban on the export of logs from Indonesia. The ready availability of (cheap and implicitly highly profitable) merbau will have tended to inflate the size of the market in China and thereby oblige importers in the EU to offer higher prices in order to maintain access to supplies.

Figure 10
Trends in the unit value of merbau for selected products and locations



Operation Hutan Lestari II, launched by the Government of Indonesia during March 2005, enforced the law in Papua and West Papua and significantly curtailed supplies of merbau.[7] This will have been a primary cause of the increase in unit prices in China.

During 2006, the unit price in PNG was not only between a half and one-third of that in Malaysia, but it had also changed little since 2004, despite the very substantial increase in unit prices in export markets and in other range States. This might reflect transfer pricing fraud and illegal supplies—which a listing in either Appendix III or Appendix II of CITES, if effective, should minimize.

6.0 LOOK-ALIKE SPECIES

Doussié *Afzelia* spp., found in both Africa and Southeast Asia and jatoba *Hymenaea* spp. from South America seem to be the next-most marketed tropical wood species in the EU parquet industry. Some companies refer to merbau as Asian doussié—partly because *doussié* could resemble merbau, depending on the products. The increasing likelihood that the EU imports some doussié from parquet mills in East Asia adds to the confusion on which of the two species a product is actually made from. However, although specialist knowledge is necessary to confirm whether unprocessed wood is either doussié or merbau, it is possible with the naked eye to make a provisional distinction if the wood is a strip of parquet and one compares this with representative samples of the two species (Hewitt, J. *in litt.*, April 2006). In Southeast Asia, the botanical difference between merbau and *Afzelia* is small, but discernable by three fertile stamens, flat seeds lacking an aril, and leathery pods (Soerinegara and Lemmens, 1994).

Alternative species to merbau used in Japan are *Eusideroxylon* spp., amongst the most frequently mentioned by the traders, in addition to Teak and *Shorea* spp.

---

7 http://www.salvonet.com/eia/cgi/news/news.cgi?a=\242&t=template.htm

7.0 DISCUSSION AND CONCLUSION

There is concern over the sustainability of merbau populations. This concern arises especially from reported intensive and indiscriminate logging activities in biodiversity-rich tropical countries. However, the major problem in trying to determine the sustainability of merbau is that most countries do not have up-to-date national forestry inventory information for merbau. Assessment of merbau resources is thus a critical precursor to verifying their population and trade sustainability.

Decision-making often relies on relevant information extracted from data. Thus, lacking data will jeopardize efficient decision-making processes. Indonesia and PNG have incomplete trade data on the export of merbau logs and processed merbau products. In some cases, sets of data from different sources for the same trade do not correspond. The data sets within Indonesia and PNG are also not comprehensive and vary from district to district. In Indonesia, merbau from islands enters the trade chain but the emphasis thus far on monitoring, control and enforcement is on merbau production in Papua and West Papua. There is a need to monitor inter-island timber movement, including that of merbau, and to carry out regular analysis of the production, processing and trade of merbau, but also other timber species in Indonesia.

In all producer countries there is a lack of data on domestic processing of merbau. Malaysia has more comprehensive merbau trade data than other countries. There is a need to compare and analyse statistics between exporting and importing countries, owing to the significant discrepancies found even in the limited merbau statistics available. China's import data on merbau do not match export statistics from countries of origin for its merbau imports. Problems of data discrepancy between exporting countries and importing countries are common and cannot easily be solved but this applies to all countries. China is well advanced in its tracking capability for merbau trade, being one of the few countries with an HS code for the species.

There is no record in the literature of any initiative for merbau plantations. Indeed, merbau was categorized as a lesser-known timber species as recently as the early 1990s (Soerinegara and Lemmens, 1994). Consequently, research studies on merbau thus far are scattered and few.

The situation with regard to allegations over illegal logging in Indonesia, in particular Papua and West Papua, is a major cause for concern. The Indonesian Government has made a strong effort to curb illegal logging, through strengthening the policy and legal framework, changes in monitoring procedures and enforcement efforts. Much more could be done and should be done. The tenure of local communities could be further strengthened to allow greater negotiation rights to the forest by logging companies.

In PNG, the issue is one of making strong efforts to ensure the laws and procedures are fully subscribed to without bias and influence by politicians and powerful logging companies. In a recent compilation and analysis by the Government of PNG between 2000–2004, funded by the World Bank, it was clear that many forestry operations, including licensing of the forests, were in breach of some regulation. This means that practically all logging in PNG could be considered illegal. It should be noted that new legislation has been introduced since the studies were conducted.

China has data on merbau imports, but the EU does not have specific merbau statistics. This is a major handicap in trying to carry out any analysis and monitoring of the trade. The direct and indirect imports

of merbau into the EU means that the EU is a potentially influential market that could exert a strong pressure to purchase legal merbau from range countries. The EU does not appear to import as much processed merbau direct from range countries. However, if the export of flooring from China is an indication, EU could indirectly import merbau via China after processing there, although China statistics do not cover processed merbau or composite materials and are not linked to import data.

The demand for merbau in flooring materials is set to continue in the EU and developed countries elsewhere. However, civil society campaigns to gain consumer recognition of the issues related to illegal logging of merbau may have an impact on consumer demand. Large companies that sell flooring, possibly made from merbau, would as a result seek to obtain legal merbau where possible. However, until the restructuring of the forestry administrations in PNG and Indonesia are completed and have the confidence of the consuming public and buyers, legal merbau will not amount to a volume sufficiently significant to assuage the demand beyond its capacity to supply. Unsustainable trade will continue as long as merbau products can continue to leave PNG and Indonesia. In most countries there are no provisions to stop the import of illegally sourced merbau. Until this changes, the fight against over-exploitation of merbau rests with the range countries and within their own borders.

It is possible that the exploitation of merbau will continue at a rapid rate until it is no longer a viable timber product. The price trend appears to be upward as a result of restrictions in supply, owing to enforcement actions, mainly in Indonesia, and should reach a peak if it has not done so, before becoming more stable, in line with the limited legal supplies, probably from Malaysia. Substitutes will take over from merbau when the price of merbau makes it unprofitable to use in lower-end flooring.

A CITES listing for merbau is one avenue that could provide additional measures to monitor and control the international trade in merbau. The challenge ahead for CITES is that industry perceives CITES-listing as a prohibition on trade rather than a positive measure to help assure sustainable trade and CITES implementation. CITES will not be easy to implement for merbau, as it is exported in various forms. Logs, timber, and sawn wood, should be readily recognizable, but for further-processed products, such as parquet and doors which may have been varnished, or treated, identification by Customs and other non-timber experts will pose a challenge to the effective implementation of CITES.

A workshop organized in Yokohama, Japan by TRAFFIC held on 10 November 2006 to discuss initial results of this study, brought together representatives from five countries representing producer and consumer countries, as well as civil society (**Annex 5**). The participants generally agreed with the findings of the study above. Another workshop on merbau was held in Jayapura, Papua, on 11 January 2007, bringing together provincial government agencies in Papua, NGOs and local industries to discuss the results of this study (**Annex 5**). The government agencies were especially forceful in informing the workshop that previous studies that highlighted the issue of merbau in Papua had not consulted officials, leading, in their view, to a distortion of facts and unsubstantiated data. It was also noted that a number of issues raised in this report had to be addressed, both at the provincial level and at central government level, in particular the matter of inter-island export of merbau. Many of the recommendations arising from discussions at the workshop are reflected in this report.

8.0 RECOMMENDATIONS

The following are offered as recommendations, based on the analysis above, for short- and long-term strategies for merbau conservation:

Strengthening national and international co-ordination

- There is an urgent need to strengthen the implementation of existing laws to control the licensing and management, and to regulate the harvest of this high-quality timber where applicable.

- Good communication is strongly encouraged at central and provincial government level, to implement country policy and legislation effectively.

- Statistical information between different agencies within a producer country such as Indonesia differs widely. Greater co-ordination and comparative analysis is required in-country to narrow the discrepancies in data without compromising data quality. A review of the internal systems and procedures for data-collection, and identification of useful statistics should be a high priority.

- There are only a few regional or international co-operation avenues to exchange intelligence on illegal shipments, cross border co-operation, enforcement training workshops, etc., which may help the Customs authorities and forestry agency officials to carry out their duties effectively and efficiently. It should be possible to work within ASEAN (through the Senior Officials on Forestry or ASOF), the Asia FLEG Task Force and other fora to bring forward merbau as a specific item for discussion and action, within the context of timber trade in general. Merbau has already been brought to the attention of the international community and taking specific co-operative action on this genus would help the timber sector in general.

CITES listing

- CITES Appendix III could potentially provide a useful international instrument to collect merbau trade data. Failing this, countries should create national HS codes for merbau products. In the short term, to reduce the gap in statistical discrepancy, producing countries and China should institute a prior notification and/or verification process for merbau shipments.

- Producer countries Indonesia, Malaysia and PNG should explore further the option of using a CITES listing for merbau, if this would assist in monitoring, control and enforcement of international merbau trade. Awareness of CITES in Papua, West Papua and PNG should be improved, including by highlighting that CITES is not a prohibition on trade, but a tool to assuring sustainable trade.

Further research

- Forest inventories are lacking or obsolete in producer countries. There is an urgent need to define local distribution, density/volume and population viability in natural forest clearly, especially for PNG and Indonesia. Resources should be made available to these producer countries to take on this task.
- Feasibility studies into the potential of the wood processing industry in Papua, West Papua and PNG, and an assessment of potential wood yield and of technical ability should be carried out in those locations, for example by ITTO or FAO. In this way, the prospects for venturing into secondary/semi-processed wood products and for wood yield will have been assessed prior to any possible eventual export ban on merbau logs.

- Scientific research on merbau should be conducted by the relevant national and regional forestry research organizations in PNG, Indonesia and Malaysia, the main exporting countries, to address the following important areas:

  a) the impact of exploitation on merbau populations, to create a time-series model and to predict population trends based on volume;
  b) regeneration capacity in logged-over areas;
  c) silviculture treatment in natural forest;
  d) merbau population density and distribution.

9.0 REFERENCES

Aggraeni, D. 2007. Patterns of commercial and industrial resource use in Papua. In: Marshall, A.J. and B.M. Beehler (Eds). *The ecology of Papua.* The ecology of Indonesia series, vol. VI. Periplus.

Badan Inventarisasi and Tata Guna Hutan. (1987). *Potensi kayu kurang dikenal in Prosiding Diskusi Pemanfaatan Kayu Kurang Dikenal*. Badan Inventarisasi and Tata Guna Hutan.

Badan Pusat Statistik. 2002. Statistics of Forest Concession Estate. Badan Pusat Statistik, Indonesia.

Badan Pusat Statistik. 2003. Statistics of Forest Concession Estate. Badan Pusat Statistik, Indonesia.

Badan Pusat Statistik. 2004. Statistics of Forest Concession Estate. Badan Pusat Statistik, Indonesia.

Badan Pusat Statistik. 2005. Statistics of Forest Concession Estate. Badan Pusat Statistik, Indonesia.

Barr, C., Resosudarmo, I.A.P., Dermawan, A., McCarthy, J., Moelina, M., and Setiono, B. (Eds) (2006). *Decentralization of Forest Administration in Indonesia: Implications for Forest Sustainability, economic development and Community Livelihood.*. CIFOR, Bogor.

Beehler, B. (2007). Introduction to Papua. In: Marshall, A.J. and B.M. Beehler (Eds). *The ecology of Papua*. The ecology of Indonesia series, vol. VI. Periplus.

Blakeney, J. (2001). Overview of Forest Law Enforcement in East Malaysia. WWF Malaysia, Petaling Jaya, Malaysia.

Bromokusumo, A.K. (2006). *Indonesia solid wood products annual 2006*. Global Agriculture Information Network Report ID6012. USDA Foreign Agricultural Service.

Chen, H.K. (2006). *The roles of CITES in combating illegal logging – current and potential.* TRAFFIC International.

Colchester, M., Jiwan, N., Andiko, Sirait, M., Firdaus, A.Y., Surambo, A. and Pane, H. (2006). *Promised land. Palm oil and land acquisition in Indonesia: implications for local communities and indigenous peoples*. Sawit Watch, World Agroforestry Centre, HuMA, Forests Peoples Programme. Bogor, Indonesia.

EIA and Telapak. (2005). *The last frontier: illegal logging in Papua and China's massive timber theft*. London, UK.

Forestry Department Headquarters, Malaysia. (1997). *Country report—Malaysia.* APFSOS Working Paper No. 7. FAO, Rome.

Forestry Department Peninsular Malaysia (FDPM). (2000). *Forestry statistics Peninsular Malaysia 2000*. FDPM.

FDPM. (2001). *Forestry statistics Peninsular Malaysia 2001*. FDPM.

FDPM. (2002). *Forestry statistics Peninsular Malaysia 2002*. FDPM.

FDPM. (2003). *Forestry statistics Peninsular Malaysia 2003*. FDPM.

FDPM. (2004). *Forestry statistics Peninsular Malaysia 2004*. FDPM.

Greenpeace. (2006). *Sharing the blame: global consumption and China's role in ancient forest destruction*. Greenpeace.

Hammermaster, F.T. and Saunders, J.C. (1995). *Forest resources and vegetation mapping of Papua New Guinea.* PNGRIS publication No.4. Commonwealth Scientific and Industrial Research Organization (CSIRO), Australia.

Hammond, D. (1998). *Hardwood programmes in Fiji, Solomon Islands, and Papua New Guinea.* (ed. Varmola, M.) Forest Plantations Working Paper/21. Forestry Department, Food and Agriculture Organization of the United Nations (FAO).

Hewitt, J. (2001). Internal report for Friends of the Earth.

Institute for Development Studies, Sabah. (2005). *Review of Sabah's major economic indicators in 2004*. Institute for Development Studies, Sabah.

International Tropical Timber Organisation. (2005). *Annual review and assessment of the world timber situation 2005*. ITTO.

ITTO. (2005). *Final report on the measures to promote the expansion and diversification of International trade in tropical timbers*. ITTC(XXXVII)/10. ITTO.

ITTO. (2006). *Status of tropical forest management 2005*. ITTO.

IUCN (2008). *2008 IUCN Red List of Threatened Species*. www.iucnredlist.org Viewed 12 October 2008.

Johns, R.J., Laming, P.B., den Outer, R.W. and Sosef, M.S.M. (1994) *Intsia* Thouars. In: Soerianegara, I, Lemmens, R.H.M.J. (eds) *Timber trees: major commercial timbers*. Plant Resources of South East Asia (PROSEA), Bogor Indonesia 5(1).

Lim, K.Y. (2003). Press Release by Y.B Dato' Seri Dr. Lim Keng Yaik, Minister of Primary Industries on the Import Ban of Indonesian Log. Ministry of Primary Industries, Malaysia. 13 May 2003

Papua Province Forest Service (2001). *Statistik Dinas Kehutanan Papua*. Papua Province Forest Service, Jayapura.

Papua Province Forest Service. (2003a). *Perkembangan pengesahan RKT 2003*. Papua Province Forest Service, Jayapura.

Papua Province Forest Service. (2003b). *Laporan producksi kayu bulat perusahaan*. Papua Province Forest Service, Jayapura.

Rusli, A, and Amat, R.Y. (2001). Overview of Forest Law Enforcement in Peninsular Malaysia. WWF Malaysia, Petaling Jaya.

Sabah Forestry Department. (2002). *Annual report 2002.* Sabah Forestry Department.

Sabah Forestry Department. (2004). *Annual report 2004*. Sabah Forestry Department.

Shearman, P. and Cannon, J. (2002). PNG Forest Resources and the Log Export Industry: A quantitative analysis of forest resources, the impact of commercial logging and the future for the log export industry. Working Paper. Papua New Guinea Eco-Forestry Forum.

Soepadmo, E. and Saw, L.G. (eds.)(2000*). Tree flora of Sabah and Sarawak. Vol. 3.* Sabah Forestry Department, Malaysia, Forest Research Institute Malaysia and Sarawak Forestry Department, Malaysia.

Sorieanegara, I. and Lemmens, R.H.M.J. (eds.) (1994). *Timber trees: major commercial timbers*. Plant Resources of South East Asia (PROSEA), Bogor Indonesia 5(1).

Toyne, P., C. O'Brien and R. Nelson. (2002). *The timber footprint of the G8 and China: making the case for green procurement by government.* WWF International, Gland.

Verdcourt, B. (1979). *A manual of New Guinea legumes*. Kristen Press, PNG.

.

White, K.J. (1976). *Lowland rainforest regeneration in Papua New Guinea with reference to the Vanimo sub province.* Tropical Forestry Research Note SR32. Papua New Guinea Department of Forest.

Whitmore, T.C. (1972). Tree *flora of Malaya, I.* Malayan Forest Records no.26. Longman and Peninsular Malaysia Forestry Department, Malaysia.

Wyatt-Smith, J. (1952). *Pocket check-list of timber trees*. 4th edition. 1999. Malayan Forest Records No. 17. Forest Research Institute Malaysia.

Zhu, C.Q., R. Taylor and G.Q. Feng. (2004). *China wood market, trade and environment report*. Science Press Inc, USA.

Web references:

Anon. (2008). Papua New Guinea to ban log exports by 2010. Viewed on 18th July 2008. http://news.mongabay.com/2008/0318-png.html

Barr, C. (2006). Banking on sustainability: structural adjustment and forestry reform in Post-Suharto Indonesia. CIFOR and WWF. http://www.cifor.cgiar.org/publications/pdf_files/books/profits.pdf Viewed 1 September 2006.

Colchester, M. (2006). Strengthening the social component of a standard for legality of wood origin and production in Indonesia. http://www.illegal-logging.info/papers/TNC_final_report.doc Viewed 1 September 2006.

EIA and Telepak (2006). http://www.eia-international.org/ Viewed 20 April 2006

European Federation of the Parquet Industry (2006). FEP statistics 2004 http://www.parquet.net/pdf/STAT-2004.pdf Viewed 20 March 2006.

Forest Trends. (2006). Logging, legality, and livelihoods in Papua New Guinea: Synthesis of official assessments of the large-scale logging industry. Vol. I and II. http://www.forest-trends.org/documents/png/index.php Viewed 2 September 2006.

Hout. (2006). Hout info. http://www.houtinfo.nl/main/php?mn=0&id=1002 Viewed 20 March 2006.

Illegal-logging info(a) (2006). Illegal logging still going strong. http:www.illegal-logging.info/news.php?newsID=1183 Viewed 20 April 2006.

Illegal-logging info(b) (2006). Jasin MP admits that firm in Customs timber saga is his. http://www.illegal-logging.info/news.php?newsId=1434 Viewed 31 October 2006.

ITTO Tropical Timber Market Report. (2006) ITTO Tropical Timber Market Report volume 11, number 4, 16-28 February 2006. http://www.itto.or.jp Viewed 20 December 2006.

Mahfudz, S. Pudjiono, T. Pamungkas, M.U. Pudja and A.S. Batseba 2006. Merbau (*Intsia* spp) dan upaya koservasinya. Badan Penelitian dan Pengembangan Kehutanan, Departmen Kehutanan.

Malaysia Timber Council (2005). 2005 statistics on timber industries. www.mtc.com.my Viewed 1 October 2005.

Masalai (2006). Masalai Achieves no. 1–49. Masalai. http://www.masalai-tokaut.com viewed 1 October 2006.

Ministry of Forestry (Indonesia) (2006). Press Release http://www.dephut.go.id/ Viewed 20 April 2006.

PNG Forest Industry Association. *SGS Log Monitoring Report, 2002–2005*. www.fiapng.com viewed 2 November 2006.

Setiono, B. and Y. Husein (2006). Fighting forest crime and promoting prudent banking for sustainable forest management. CIFOR occasional paper no. 44. CIFOR. http://www.cifor.cgiar.org/publications/pdf_files/OccPapers/OP-44.pdf Viewed 30 September 2006.

Thaman, R.R., L.A. Thomson, R. DeMeo, F. Areki, C.R. Elevitch (2006). *Intsia bijuga* (vesi). Species profiles for Pacific Island Agroforestry. www.traditionaltree.org Viewed 20 August 2006.

UNEP-WCMC. http://www.unep-wcmc.org/trees/trade/int_bij.htm Viewed 20 April 2006.

Well, A. (2006). Country case study 8. Systems for verification of legality in the forest sector, Malaysia: domestic timber production and timber imports. Verifor. http://www.verifor.org/case_studies/Malaysia.doc Viewed 1 October 2006.

World Agroforestry Centre webpage http://www.worldagroforestry.org/SEA/Products/AFDbases/AF/asp/SpeciesInfo.asp?SpID=17930 Viewed 20 April 2006.

Annex 1: Assumptions about the percentage of merbau in the weight of products imported into the EU from four countries under selected HS commodity codes

HS code	Brief description	China	Indonesia	Malaysia	PNG
4403955	Logs	1%	3%	2%	3%
44072905	Sawn wood	1%	3%	2%	40%
44072930	Sawn wood of Jelutong, Jongkong, Kempas, Keruing, merbau, ramin and Teak	5%	10%	10%	40%
44072950		5%	10%	10%	40%
44072969		5%	10%	10%	40%
44079994		1%	3%	2%	40%
44079996	Sawn wood	1%	3%	2%	40%
44079997		1%	3%	2%	40%
44092091	Parquet components	3%	20%	15%	20%
44092098	Other mouldings	1%	5%	2%	5%
44181010	Windows	5%	15%	10%	10%
44182010	Doors	5%	15%	10%	10%
44183010	Mosaic parquet	5%	20%	20%	20%
44183091	Multi-layer parquet	5%	20%	20%	20%
44183099	Solid parquet	5%	20%	20%	20%
44201011	Ornaments	1%	3%	2%	3%
44209091	Caskets	1%	3%	2%	3%

The percentages in the table above do not take into account the fact that at least two of the HS commodity codes listed might refer to composite products.

The proportion of merbau in multi-layer merbau parquet is assumed in this study to be 20%.[8] The proportion of merbau in merbau doors is assumed for this study to be 80% overall (reflecting the possibility that some merbau doors imported into the EU are likely to comprise merbau in their facing while other species form their core).[9]

The percentages shown in the table are estimates. They are averages for the EU as a whole and might differ from the percentages which pertain to non-EU countries' imports. The actual percentages for individual EU member states might be greater or lower than those shown.

---

8 This percentage is derived by considering (a) the typical thickness of the wearing (/surface) layer of the different types of parquet reported by the FEP, (b) the proportion which each type of parquet has in the total surface area of parquet reported by the FEP, and (c) the density (weight per unit of volume) of the different layers of parquet-Merbau (0.83 tonne per cubic metre) being rather more dense than the species which tend to be used in the other layers of multi-layer parquet (such as spruce or rubberwood)

9 It is unlikely that doors will be imported with glazing or other fixtures

The proportions assumed have a material impact in determining ones estimate of the volume of merbau which enters the EU *only* in the case of those *few* product groups which the EU imports in substantial quantity.

Although products which comprise or contain merbau and which are imported into the EU from those four countries might (perhaps wrongly) be declared under HS commodity codes other than those shown above, the quantities involved are assumed to be negligible.

The percentages assumed for Malaysia are generally a little lower than those for Indonesia in order to reflect the probably greater number of species used in the former's export-oriented timber industry. For parquet, this difference is offset by the availability of teak in Indonesia.[10]

Merbau appears to be the tropical species most frequently marketed within the EU. Kempas and teak (perhaps from Burma) are the two other South East Asian species that are marketed most frequently as parquet within the EU. Several other South East Asian species are being made into parquet within China and, depending on how the fashion for flooring changes, manufacturers in China might seek to export such parquet to the EU.[11]

The percentages assumed for EU imports from Indonesia and Malaysia under the HS commodity codes 44072930, 44072950 and 44072969 are greater than for a number of the other HS commodity codes because those three codes only describe a few species.

The percentages assumed for China tend to be lower than those for Indonesia and Malaysia due to the greater number of species from which exporters select—the majority of these will have been imported into China.[12]

The percentages assumed for Papua New Guinea are relevant only for sawn wood. Merbau (/kwila) is said to be the country's principal species exported as sawnwood.[13]

The published export statistics of the range states do not help in refining these assumptions. Indeed, although several other species are mentioned under the HS commodity codes used by Indonesia, neither merbau nor kempas are named explicitly—despite merbau and kempas being rather more prominent export species than some of the species mentioned.

---

10 However, a change in the remit of the (state-owned) company which manages Indonesia's extensive teak plantations has contributed to the loss of all former FSC-certificates from those plantations, and to a clear deterioration in the average quality of teak that is being exported. This deterioration might reflect the ability and interest of the government of Indonesia to ensure that Indonesia's forests are managed either sustainably or within the law.

11 The current fashion in China is for dark species (particularly from South East Asia and South America - indicating that (probably illegal) tropical hardwood might be more profitable and readily available than alternative species. Although the fashion in the EU is for paler species - including Russian oak parquet made in China - the EU market for tropical species remains buoyant.

12 China is widely believed to be the world hub for trade in illegal timber.

13 http://www.forest-trends.org/documents/publications/PNG_Study_final_rev_5-26.pdf

Annex 2: Tentative estimate based on FEP statistics

The share of tropical parquet in the surface area of parquet sold by members of the European Federation of the Parquet Industry, "FEP", fell 5% between 2003 (17.2%) and 2004 (16.4%) whereas, for the longer standing member states of the EU, the total surface area rose 20% (66 million m2 in 2003 and 74 million m^2 in 2004)—indicating an increase in the surface area of tropical parquet sold.[14]

The member companies of the FEP probably account for a very substantial share of the merbau parquet which is supplied in some EU countries.[15]

A number of other parquet companies are represented by trade associations other than the FEP. Those whose membership is international tend to represent importers, notably the Union of Parquet Importers (Euparal) and the European Federation of Parquet Importers, and some of these might supply members of the FEP.

Merbau appears to be the most prominent tropical species supplied to the EU parquet market and might account for 10-15% of the EU's tropical parquet market. [16]

The average thickness of the merbau parquet entering end-use within the EU can be estimated very approximately to be about six millimetres—by assuming the average thickness of the different types of all parquet sold by FEP members and by considering the range of thicknesses of the wearing layer in the merbau parquet being offered by the parquet companies identified during the literature survey.

Using these estimates and assumptions about the share of the EU market supplied by FEP member companies,[17] one might estimate that the volume of merbau wood entering end use within the EU was in the order of 15 000 cubic metres during 2004.

---

14 See for example items in the webpages of FEP news

15 The FEP does not represent any companies in, for example, the UK-partly because there are few UK-based parquet manufacturers of sufficient size to benefit from FEP membership.

16 Merbau and to a lesser extent jatoba and doussié/afzelia are offered in the EU by almost all parquet companies. In the EU, merbau and to a lesser extent kempas and teak are the most frequently offered South East Asian species. The range 10%-15% assumes that merbau, jatoba and doussié/afzelia account for about 30% of the EU market for tropical parquet, and that a further 30% or so is accounted for by about 10 other commonly offered species (the only SEAsian species of which are kempas and teak). Rubberwood, which might comprise the wearing layer of some parquet, is not regarded as tropical timber in this analysis.

17 The FEP's members might account for 80% of the surface area of merbau which enters end-use in their respective countries. The quantity of merbau entering end-use as parquet in other EU countries can be estimated by comparing the population and character of the market in such countries with those in similar FEP members' countries. Such countries might account for 20% of the total quantity of merbau which enters end-use as parquet in the EU

Annex 3: Questionnaire and instructions to European timber trade associations, importers, manufacturers and retailers

Of the merbau-containing products shown in the following headings, how much did your **country/ members/company** (*please delete as necessary*) import from outside the EU (Q1), import from within the EU (Q2), and export during 2005 (Q3)?

Product	**4407**	**4418 1**	**4418 2**	**4418 3A#**	**4418 3B#**	**4409 A#**	**4409 B**	**Furniture**	**Other •**
Q1 import from outside the EU during 2005 (*or other year—please specify*)?									
Quantity									
Unit (t/m3/m2)									
Source									
Sector basis									
Country basis									
Q2 import from within the EU during 2005 (*or other year—please specify*)?									
Quantity									
Unit (t/m3/m2)									
Source									
Sector basis									
Country basis									
Q3 export during 2005 (*or other year—please specify*)?									
Quantity									
Unit (t/m3/m2)									
Destination									
Sector basis									
Country basis									

Please also provide thickness (in millimetres) if the unit of measure is "m^2" (square metres)

• Please specify

For the products shown in the following headings, how will the listing of merbau in Appendix III of CITES affect your **country's/members'/company's** (*please delete as necessary*) imports of merbau (Q4) and alternative species (Q5 and Q6)?

Product	**4407**	**4418 1**	**4418 2**	**4418 3A**	**4418 3B**	**4409 A**	**4409 B**	**Furniture**	**Other •**
Q4 imports of merbau?									
Trade									
Unit cost									
Unit price									
Source country									
Q5 imports of alternative species (from forest in South East Asia)?									
Trade									
Unit cost									
Source country									
Which species?									
Q6 imports of alternative species (from forest in other regions)?									
Trade									
Unit cost									
Source country									
Which species?									

Further comments—particularly about how best to ensure sustainable production and trade in merbau (please consider public procurement policy, the EU FLEGT process and industry-driven schemes such as the Timber Trade Action Plan):

Further comments:

• Please specify

Instructions

Column headings

The headings of the questionnaire refer to specific products which might be made entirely or partly from merbau. The headings are generally based on the HS nomenclature used by Eurostat and are described as follows:

4407	Sawn wood
4418 1	Windows
4418 2	Doors
4418 3A	Parquet panels (one layer only)
4418 3B	Parquet panels (two or more layers)
4409 A	Mouldings (for parquet flooring)
4409 B	Mouldings (other than for parquet flooring)

Please highlight the headings of the product group(s) in which you specialise and provide responses under those headings and, if possible, also under other headings.

Row headings

Quantity: please indicate the quantity of merbau *not* the quantity of the product (which would of course be greater for composite products). If you are unable to insert a number, please indicate which of the following ranges best reflects that amount:

Annual trade	A	B	C	D	E
(tonne)	<50	51-200	201-1000	1001-5000	>5000

If you can only provide an estimate of the quantity of composite products that contain merbau, please insert this, state that you have done so and indicate how one might determine the quantity of merbau from this. If you can only provide an estimate of the quantity of tropical timber imported or exported, please insert this, state that you have done so and indicate how one might determine the quantity of merbau from this. For parquet, please also indicate the typical thickness of merbau in the product. Please provide data for 2005. If this is not yet available, please provide data for the most recent year for which it is available and state the year to which that data refers.

Source: please state the main country of supply (– not the country of origin).

Sector basis: please indicate the relative proportion of merbau-containing products which your country imports (Q1, Q2) or exports (Q3) in each of the product groups shown.

Country basis: please indicate (preferably as a percentage) how much your country imports (Q1, Q2) or exports (Q3) relative to the total which the EU imports or exports.

Destination: please state the main initial destination country.

Trade: please indicate the percentage change* in the weight/volume/area you expect to sell.

Unit cost (purchases) & **unit price** (sales): please indicate the percentage change* and, for unit price, also insert the letter P if a price premium can be achieved.

Further Comments

Please continue on additional pages if necessary.

* Where appropriate, please use ↑ or ↓ (denoting "increasing" or "decreasing" respectively) in order to indicate the direction of any change or trend.

Annex 4: Estimated quantities of merbau imported into, exported from, and entering end-use within selected EU Member States (2005)

Countries (see code below)	AT	BE	CZ	DK	FI	FR	DE	GR	IE	IT	NL	PL	PT	ES	SE	UK
Imports																
Parquet (441830 & 44092091)	500	1500	100	2500	1000	1000	3000	400	300	1500	1000	900	300	1200	2000	2000
Doors	50	100	-	50	-	50	200	-	-	-	3000	-	-	-	-	100
Sawn wood	50	1800	-	800	100	700	1500	-	100	500	3000	50	-	100	400	200
Other	50	1200	50	200	50	200	1500	50	100	200	2000	50	50	100	100	200
Sum	650	4600	150	3550	1150	1950	6200	450	500	2200	9000	1000	350	1400	2500	2500
of which from outside the EU	50	4400	50	1500	500	1500	3000	300	300	2000	8000	800	300	1000	500	1500
End-use																
Parquet	300	600	100	400	300	1200	3500	400	300	1800	1000	600	300	1200	400	2000
Doors	50	200	-	50	-	100	400	-	-	50	5000	-	-	-	-	100
Other	50	700	50	350	50	200	600	50	200	200	1500	100	50	100	-	200
Sum	400	1500	150	800	350	1500	4500	450	500	2050	7500	700	350	1300	400	2300
Exports and processing waste	250	3100	-	2750	800	450	1700	-	-	150	1500	300	-	100	2100	200
Population (million people)	8	10	10	5	5	60	82	11	4	57	16	39	10	41	9	59

Country codes

AT	Austria	**FI**	Finland	**IE**	Ireland	**PT**	Portugal
BE	Belgium	**FR**	France	**IT**	Italy	**ES**	Spain
CZ	Czech Republic	**DE**	Denmark	**NL**	Netherlands	**SE**	Sweden
DK	Denmark	**GR**	Greece	**PL**	Poland	**UK**	United Kingdom

Source: Rough estimates based on Eurostat trade statistics, modified both to reflect industry comment and by an assessment of the product portfolios of 200+ EU-based companies which import, make, distribute, or otherwise sell products which contain merbau. Units: cubic metres (wood volume)

Note 1: statistics of weight have been converted into cubic metres by multiplying by 1.2 (m3/tonne).

Note 2: the statistics shown for parquet in end-use take into account merbau's popularity and the area of tropical parquet reported by the FEP.

Note 3: assumptions have been made concerning the proportion (and thickness) of merbau in each product group reported by Eurostat.

Note 4: the sum of imports is always greater than the sum of end-use—the difference being equal to exports and processing waste.

Note 5: more parquet would enter end-use in a given country than is imported into that country if more merbau parquet were manufactured from other products (notably sawn wood) than is exported.

Annex 5: Participants of the international community and exporting countries initiative to enhance the sustainability of merbau *Intsia* spp. in trade, 10 November 2006, Yokohama, Japan

No.	Name	Organization
1	Federico Lopez- Casero	Institute for Global Environmental strategies (IGES), Japan
2	Horiuchi Chiho	Ministry of Foreign Affairs (MOFA), Japan
3	Hayashi Mariko	Ministry of Foreign Affairs (MOFA), Japan
4	Frank Agaru	PNG Forest Authority
5	Dr. Norini Haron	Forest Research Institute Malaysia (FRIM), Malaysia
6	Siti Syaliza Mustapha	Malaysian Timber Council (MTC)
7	Jerilyu Levi	USDA Forest Service
8	Masaki Yamashita	Forestry Agency, Japan
9	Yoshio Nishioka	HUTAN, Japan
10	Mohammad Yayat Afiando	Telapak, Indonesia
11	H. Takai	Forestry Agency, Japan
12	Morris Kapong	HJSB, Malaysia

Annex 6: Participants of the seminar on merbau potentials and its development in Papua, 11 January 2007, Indonesia

No.	Name	Institution/organization
1	Hendrite L.Ohee	Conservation Internationl, Papua
2	Lyndon B. Pangkali	WWF Jayapura
3	Burhan Tjaturadi	Conservation International, Papua
4	Musriadi	Wapoga
5	Ade Ridwar	Dishut Papua Province
6	Dn. Mamay	Dishut Papua Province
7	Harris Djalali	Dishut Papua Province
8	Martea Maudang	Dishut Papua Province
9	Septer Manufandu	Foker, Papua
10	Tekstiyauto	BP Das Memberamo
11	Elias Paonganan	Bappeda Papua Province
12	U. Situmnang	Dishut Papua Province
13	Noak Kapisa	BPKH X
14	Yusuf Bungkang	FMUPA UNDE IV
15	Obed Bittu	Dinas Kehutanan Papua Province
16	Aruald Mauting	BPKH X
17	M. Nasri	n.a
18	H. Reeamba	BSPPHH XVII Papua
19	B. Saroy	BKSDA Papua
20	Joko Susilo	Dinas Kehutanan Papua Province
21	Huseu D.	Dinas Kehutanan Papua Province
22	Bendmin A. Hakabu	Dinas Kehutanan Papua Province
23	Ferdinando Sineri	PT. Hanurada
24	Jan Jap Ormuseray	Dishut Papua
25	Untuing	BKSDA Papua 1
26	Isak Fimbiak	Dishut Papua
27	A. Ruubino	Dishut Papua
28	Edison Misah	PT. Wapoga
29	Abraham L. Wanggali	Dishut Papua Province
30	Beni Susilo	APHI, Papua

Annex 7: Presentations and list of participants from the workshop on sustainable management of merbau, Singapore, 17–18 November 2008

This report, *Review of trade in merbau* Intsia *spp. from major range States* by Tong P.S., Chen, H.K., Hewitt, J., and Affre A., was presented at TRAFFIC's workshop on sustainable management of merbau, Singapore, 17–18 November 2008. The workshop, funded by the German CITES Scientific Authority, *Bundesamt für Naturschutz* (BfN-Federal Agency for Nature Conservation), included participants from Australia, China, Germany, Indonesia, Malaysia, New Zealand, Papua New Guinea, Singapore, Thailand, the CITES Secretariat, national CITES Management and Scientific Authorities, international organizations, trade associations and research institutions. For further information, see http://www.traffic.org/home/2008/11/17/focus-on-merbau-trade.html. Presentations from participants are provided here.

List of participants at the workshop on sustainable management of merbau, 17–18 November 2008, Singapore

No.	Name	Institution/organization
1	Neil Ellis	CITES Secretariat, Switzerland
2	Paul Elsmore	Simmons Lumber Group, Australia
3	Dr. Yuan Liangchen	CITES Management Authority, China
4	Lin Xiaping	Timber Trade Association, China
5	Hajo Schmitz-Kretschmer	CITES Scientific Authority, Germany
6	Tajudin Edy Komar	Center for Forest and Nature Conservation, Indonesia
7	Marthen Kayoi	Forestry Office, Papua Province
8	Dr. Bintang Simangunsong	Bogor Agricultural University, Indonesia
9	Nazir Khan Nizam Khan	Forest Department Peninsular Malaysia
10	Edmund Daging Mangku	Sarawak Timber Industry Development, Malaysia
11	Siti Syaliza Mustapha	Malaysia Timber Council
12	Ahmad Alsraf Ahmad Mokhtar	Ministry of Natural Resources and Environment, Malaysia
13	Yusoff Ismail	Malaysia Timber Industry Board
14	Normazmin Che Ad.	Malaysia Timber Industry Board
15	Almizi Ibrahim	Malaysia Timber Industry Board
16	Thang Hooi Chew	ITTO
17	Audrey Lee	WWF, Malaysia
18	Marco Poot	Lionex (M) Sdn. Bhd., Malaysia
19	Wendy Jackson	CITES Management Authority, New Zealand
20	Ishmel Libitino	Papua New Guinea Forestry Authority
21	Geoffrey Davison	Singapore National Parks Board
22	Hassan Ibrahim	Singapore National Parks Board
23	Lua Hock Keong	Singapore National Parks Board

No.	Name	Institution/organization
24	Paul Wilson	Double Helix Tracking Technologies Pte Ltd, Singapore
25	Darren Thomas	Double Helix Tracking Technologies Pte Ltd, Singapore
26	Shanker Iyerh	Double Helix Tracking Technologies Pte Ltd, Singapore
27	Wichar Thitiprasert	CITES Plant Committee, Asian representative
28	Sumalee Tongdonae	Department of Agriculture, Thailand
29	Harriet Gillett	UNEP World Conservation Monitoring Center
30	Chen Hin Keong	TRAFFIC International
31	Azrina Abdullah	TRAFFIC Southeast Asia
32	Noorainie Awang Anak	TRAFFIC Southeast Asia
33	Tong Pei Sin	TRAFFIC Southeast Asia

Presentations from the international merbau workshop: sustainable management of merbau, 17-18 November 2008 Singapore,

Siti Syaliza Mustapha/MTC

Group discussion during the international merbau workshop in Singapore

Relevance of listing merbau on CITES

Neil Ellis
Programme Officer - Timber
CITES Secretariat

Abstract

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) can be considered a key international legal instrument to regulate sustainable trade in timber species. Why? Because CITES is a multilateral agreement, it recognizes the value of international co-operation and has the aim of protecting certain species in international trade against over-exploitation. CITES combines wildlife (timber) and trade with a legally binding instrument for achieving conservation and sustainable trade objectives. The Convention provides an international legal framework with common procedural mechanisms for the effective regulation of international trade in listed species and it operates on the basis of a system of permits and certificates. Species listed on CITES Appendix-II can be commercially traded but must meet certain criteria to ensure that the trade is not detrimental to the survival of the species. Some commercially traded timber species that are listed on Appendix-II of CITES include *Pericopsis elata*, (afrormosia), *Gonystylus* spp. (ramin), and *Swietenia macrophylla* (bigleaf mahogany). Merbau (*Instia* spp.) may benefit from listing on CITES.

Key words: CITES, timber, trade

Introduction

The purpose of CITES is to ensure that no species of wild fauna or flora becomes or remains subjected to unsustainable exploitation because of international trade. This agreement between governments recognises the importance of international cooperation for the protection of specified species that are prone to over-exploitation through international trade. It provides for an international legal framework, as a legally binding instrument, for common procedural mechanisms to regulate export and import of certain species through a permit and certificate system. For these reason, the Convention can be considered a key international legal instrument to regulate sustainable trade in timber species. As such, Merbau (*Instia* spp.) may benefit from listing on CITES if it meets the criteria specified in Resolution Conf. 9.24 (CoP14) and the CITES Conference of the Parties (CoP) agrees to the listing.

Discussion

CITES provides a mechanism to monitor international trade in species that are not necessary threatened but trade must be controlled to prevent these species from becoming threatened. In this regard, the title of CITES is unfortunate as it refers to 'endangered' species despite the Convention regulating a wide range of non-endangered species. The confusing title has lead to claims that certain species, including timber species, should not be listed on CITES at this point in time because they are not yet endangered. In actual fact, over 90% of the species regulated by the Convention are not endangered. These species are on

the Appendix II or III of CITES and have been listed because they are not necessarily threatened but may become so unless closely monitored. For Appendix II and III specimens, commercial trade is generally permitted but is regulated to monitor impacts on the species populations. Timber, or tree species, that are not endangered, but have populations that may be reducing, could benefit from the monitoring and non-detriment findings (NDF) that are required under CITES.

The NDF is a key requirement for trading species listed in Appendix II. The Convention requires the designated CITES Scientific Authority of the export country to verify that trade is not detrimental to the survival of the species. The Scientific Authority may determine that the export of specimens should be limited in order to maintain the species throughout its range at a level consistent with their role in the ecosystem in which it occurs and well above the level at which the species might become eligible for inclusion in Appendix I. It should be noted here that species in Appendix I are considered endangered species and no commercial trade is allowed. Essentially, an NDF can be considered a risk assessment verifying that the level of trade is sustainable. The amount of data to inform an NDF depends on the perceived risk and this increases with increased trade volumes and the vulnerability of the species.

Making an NDF can be easily formulated for some CITES species but it can become more complex for timber species. Generally, the greater the volume of trade and the higher the vulnerability of the species in question, the more complex and comprehensive the data needs to be to justify that the trade in the species is sustainable. Hence, delaying the listing of a timber species, such that it becomes more vulnerable due to extended over-exploitation, can lead to more complex data requirements. It could be said that this has been the case for Swietenia macrophylla (big-leaf mahogany) that was listed in Appendix II in 2002. Proposals for inclusion in Appendix II were rejected at the CoP8 (1992), CoP9 (1994) and CoP10 (1997). Exporting range States are now encountering problems with implementation of the NDF and are faced with increasing concerns by Parties to CITES about the volume of trade given the perceived vulnerability of this species.

The reluctance of many range States to have their timber species included in CITES is mainly based on political considerations. This is driven in some way by the perception that species listed on CITES are endangered and that commercial trade is not allowed. There are also concerns about stricter measures, or trade bans, that may be taken by importing countries that are not convinced about the sustainability of the trade.

Despite the reputation of CITES as a Convention that puts in place trade bans, the Convention provides a basis to facilitate trade between Parties. The permits that are issued, and then accompany the shipments of CITES-listed specimens, provide certification that the trade is not detrimental to the species, in other words sustainable, and that the specimens were legally obtained. This permit system is to facilitate movement of CITES specimens in trade. This facilitation is occurring unhindered around the global for most CITES species. Problems may arise however, if an exporting range State, should it be asked, does not have sufficient data or reliable information in an NDF to justify the volume of trade.

One of the key advantages of CITES is the mechanism to monitor trade volumes and harness global assistance to stop illegal trade. As trade volumes are closely monitored, illegal trade can be more readily identified. Under the Convention, importing Parties have a responsibility to prevent illegal trade in CITES listed specimens. This global assistance helps exporting range States to reduce losses in foreign revenue and forest-related taxes that are caused by illegal trade.

It is worth noting that CITES has considerable experience with tree species with 30 genera and around 100 tree species listed. These tree species include a number of important timber species which are spread across all three Appendices of CITES. Of these, three timber species of high commercial importance are Gonystylus spp. (ramin), Pericopsis elata (afrormosia) and Swietenia macrophylla (big-leaf mahogany) and these are listed on Appendix II. These three species are currently the focus of a joint International Tropical Timber Organization (ITTO) and CITES capacity building programme in the range States.

Currently, range States exporting ramin, afrormosia and big-leaf mahogany have access to the joint ITTO-CITES capacity building programme to facilitate and strengthen the implementation of CITES. This programme has funds of more than EUR 3million which are being directed towards improved forest management, silviculture techniques, strengthened legislation and compliance activities.

Regarding the listing of Merbau on CITES, several aspects need to be addressed to present a proposal to CoP15 scheduled for January 2010. The criteria in Resolution Conf. 9.24 (CoP14) needs to be addressed in the proposal. This includes that 'It is known, or can be inferred or projected, that regulation of trade in the species is required to ensure that the harvest of specimens from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences.'. Any proposal that is developed requires consultation with the range States, either via the CITES Secretariat or directly by the proposer of the listing. In addition, under Resolution Conf. 10.13 Implementation of the Convention for timber species, there needs to be additional consultation with at least four expert organizations such as the FAO, ITTO, IUCN, TRAFFIC or UNEP-WCMC to verify biological or trade data used in a timber species proposal.

Conclusions

CITES represents a key international instrument for regulating trade in timber. The permit system allows the volume of trade to be monitored, and provides a certification of legality of the specimens and also the sustainability of the trade through the NDF process. In addition, as the system of international cooperation obliges importing Parties to monitor trade and identify illegal shipments, range States can benefit by minimizing loses on revenue collection caused by illegal trade. Currently, there is access to a substantial capacity building programme to support implementation of CITES for timber species. All these aspects offer advantages for sustainable trade of a timber species.

As such, Merbau could be considered a suitable candidate for listing. Further research on its eligibility for listing and its ability to meet the listing criteria of Resolution Conf. 9.24 (CoP14) would be a valuable step forward for the sustainable management of this species.

Trade management of CITES-listed species in China

Dr. Yuan Liangchen
CITES Management Authority, China

Overview of the Implementation of CITES in China

Institutional arrangements. China acceded to CITES on 8 January 1981 and CITES entered into force in China on 8 April 1981. The Endangered Species Import and Export Management Office of P. R. China, affiliated to the State Forestry Administration, is designated as the CITES Management Authority, responsible for issuing CITES permits or certificates and coordinating relevant government agencies, including Forestry, Fisheries, Customs and Public Security etc., to implement CITES on behalf of the Chinese Government. So far, the CITES Management Authority has established 22 branches and 4 inspection stations in some provincial capitals and port cities with 130 full-time professional staff inclusive of the Headquarters in Beijing. The Scientific Authority is the Endangered Species Scientific Commission of P. R. China that is affiliated to the China Academy of Sciences, with responsibility for carrying out scientific consultations in relation to CITES implementation.

Legislation. For the purpose of conserving wildlife resources and fulfilling CITES obligations, China has successively enacted a series of laws and regulations, including *Forest Law (1985) Customs Law (1987), Law on the Protection of Wild Animals (1989), Regulations on the Implementation of Protection of Terrestrial Wild Animals (1992), Regulations on the Implementation of Protection of Aquatic Wild Animals (1993), Regulations on the Protection of Wild Plants (1997)*. Especially, *Regulations on the Import and Export Management of Endangered Wild Fauna and Flora* entered into force in 2006, which is specialized for the implementation of CITES. In conjunction with other integrated laws and regulations, a relatively comprehensive legal system has been established on CITES implementation in China.

Law enforcement coordination. The CITES Management Authority is attaching great importance to the collaboration with relevant government agencies, including Forestry, Fisheries, Customs and Public Security etc., to make concerted efforts to intensify the enforcement of CITES and domestic laws and regulations on wildlife conservation. Over the past five years, cooperative memorandums have been signed respectively between the Headquarters of the CITES Management Authority and the General Administration of Customs, and between the 22 branches of the CITES Management Authority and the Customs Administrations at provincial level where these branches are located, establishing a long-term cooperative mechanism of both sides in information sharing, specimen identification, counter-smuggling operation, public education and training, disposal of seized specimens. The CITES Management Authority actively coordinated relevant law enforcement agencies to organize multiple times of inter-agency law enforcement operations, which effectively cracked down on illegal international trade in endangered species. The CITES Management Authority also enhanced the international law enforcement cooperation with the CITES Secretariat, other CITES Parties, Interpol and World Customs Organization to assist in investigating and prosecuting various cases of cross-border smuggling of endangered species.

Trade Control of CITES-listed species in China

Import and re-export permitting. China has all along taken stricter measures of trade control than CITES. Article 38 of Forest Law and Article 20 of Regulations on the Protection of Wild Plants both state that, imports, exports or re-exports of specimens of wild plant species whose imports and exports are restricted by international conventions to which China is a Party, require an import, export, or re-export permit issued by the CITES Management Authority, and the Customs shall clear the imports, exports or re-exports after examining the pertinent permit.

Confirmation of foreign CITES permits or certificates. According to the procedures currently in force, anyone applying for an import permit of CITES-listed species should submit to the CITES Management Authority relevant documents, including photocopy of CITES export permit from the export country or CITES re-export certificate from the re-export country or region (CITES certificate of origin is also applicable as its inclusion in Appendix III), auditing document from the Provincial Forestry Department where the applicant is located, approval document from the State Forestry Administration, application form, contract, and invoice. For applying for a re-export permit, the applicant should provide the CITES Management Authority with the following documents, photocopy of import permit corresponding to the preceding imports with the exception of pre-Convention acquisition, photocopy of Customs' import goods clearance form corresponding to the preceding imports, auditing document from the Provincial Forestry Department where the applicant is located, approval document from the State Forestry Administration, application form, contract, and invoice. Before issuing CITES import or re-export permits, the CITES Management Authority requires contacts with the pertinent Management Authorities in exporting or re-exporting countries or regions to confirm the authenticity and validity of CITES export permits or re-export certificates on a regular basis.

Adoption of species-specific HS codes. As of 1998, the CITES Management Authority and the General Administration of Customs have jointly developed and implemented the HS Commodity Catalogue of Import and Export on Wild Fauna and Flora, with 10-digit HS Codes relevant to specimens of CITES-listed species or national regulated species being annotated by surveillance requirement of permits. For an application to import or export specimens of wildlife species under 10-digit HS Codes with presentation of permit, the computerized declaration system of Customs could automatically alert the applicant and Customs officers that an permit from the CITES Management Authority is required. This HS Commodity Catalogue is timely revised along with the updates of CITES Appendices, China's National Key Protected Wild Animal Species List and China's National Key Protected Wild Plant Species List, which has greatly improved the supervision efficiency of Customs to the specimens of endangered species in international trade. To ensure the effective implementation of the HS Commodity Catalogue of Import and Export on Wild Fauna and Flora, another system named Certificate for Non-regulated Species has been put into operation. If a HS Code the applicant declared is not subject to a permit and Customs officers are not fully convinced of its accuracy, the applicant would be required to provide a Certificate for Non-regulated Species issued by the CITES Management Authority in order to prevent mistaken or fraudulent declaration.

Levy of import administrative fees. To control the imports of specimens of endangered wildlife species and adjust the flowing direction of international trade, import administrative fees have been levied upon imports of specimens of CITES-listed species since 1 August 2000 with the approval of the Ministry of finance and the State Planning Committee (currently State Development and Reform Commission), with 1.5% of total contract value for live or dead body or parts, and 0.5% of total contract value for derivatives.

Registration of importers and exporters. The CITES Management Authority has registered the traders engaging in imports or exports of specimens of endangered species

Smuggling Seizures. One shipment involving 36 pieces or 90 m3 of Ramin logs (Gonystylus spp.) without appropriate CITES documents was seized upon import declared from Papua New Guinea by the Zhangjiagang Customs office in east China's Jiangsu Province in December 2002. Another seizure occurred in November 2006. One shipment declared from Indonesia involving various hardwood or softwood species was detected mixing with Ramin logs without an appropriate export permit also by the Zhangjiagang Custom. The shipment was finally returned to the export country.

Further Measures and Actions for Effective management of CITES-listed timber in China

Carrying out further training for enforcement officers. The CITES Management Authority of China will intensify training efforts to enable enforcement officers from Customs and Forestry Department at all levels, to adequately perform their duties with respect to the implementation of CITES, in particular, to improve their capabilities of timber species identification.

Enhancing inter-agencies coordination. The CITES Management Authority of China will further strengthen collaboration with all relevant government agencies, comprising Customs, Forestry and Commerce, to make concerted efforts to ensure the effective implementation of the CITES.

Intensifying exchange of information with counterparts of trading countries and regions. The CITES Management Authority of China will further improve information sharing mechanism with all relevant CITES Management Authorities of China's trading partners for CITES-listed timber species, including range States, in order to prevent the occurrence of illegal international trade and to ensure the timely and appropriate investigation of smugglings.

Merbau conservation and plantation status in Indonesia

Tajudin Edy Komar
Forestry Research and Development Agency (FORDA)
Jalan Gunung Batu No.5, Bogor

Abstract

Merbau (*Intsia* spp) has received special attention in last decade, especially on its status of conservation. This attention raised primarily due to its excessive and illegal logging in its natural forest, not only in Papua but also in other parts of the country. In this opportunity, conservation and plantation status in Indonesia is addressed. Data and information presented in this paper were collected from literature review and other data collected from relevant agencies within the Ministry of Forestry.

Merbau distributes naturally in Indonesia from Sumatra, Java , Kalimantan, Sulawesi, Nusa Tenggara and with larger population distribution in Maluku and Papua. Policy to ensure protection and conservation of merbau has been issued since 1970s, where in that time, only merbau trees with diameter of over 60 cm were allowed to be cut. Currently, to ensure merbau conservation, its harvest and trade are regulated through the issuance of harvest and utilization permits to forest concession company by Ministry of Forestry and Provincial Government of Papua (for Papua) and export regulation by both Ministry of Forestry and Ministry of Trade.

In addition, merbau has been conserved *in situ* and *ex-situ*. *In situ* conservation of merbau is carried out in conservation areas, such as in National Park, Nature Reserve and forest research areas in most islands of its natural distribution and in small portion of production forest areas, called plant genetic resources areas. *Ex-situ* conservation has been established in arboretums, research trial site, botanical garden and in newly established conservation forests. The latter, merbau from various provenances of all its natural range of distribution are collected and pooled in this conservation forest. There are two locations where merbau conservation forests have been being established, in Manokwari (West Papua) and Bondowoso, East Java.

Scattered plantation of merbau has been conducted since last several decades in research trials, arboretum and botanical garden and more intensive plantation has been incorporated into the National Movement on forest and land rehabilitation (Gerakan Nasional Rehabilitasi Hutan dan Lahan-GERHAN). Under this program, merbau is planted together with other forest tree species (mixed planting). Based on the number of seedlings planted so far, merbau has been planted under this program in relatively larger area in Papua and Maluku. Restoration of merbau population in its original habitats and other types of plantation will be established in Indonesia.

Keywords: merbau, conservation, plantation

Introduction

Merbau (*Intsia* spp) from family Caesalpiniaceae, consists of many species, and in Indonesia only 2 species are well recognized, *Intsia palembanica* and *Intsia bijuga* (Masano, 1993). Merbau is a large tree,

up to 40 m high, up to 100 cm in diameter (dbh) and up to 30 m high clearbole. Grow with knee root of up to 400 cm high and 400 cm wide (Mukhtar, 1993). Natural distribution of merbau throughout Indonesia including large islands of Sumatra, Kalimantan, Java, Sulawesi, Nusa Tenggara, Maluku and Papua. Larger population of merbau are found in Maluku and Papua. Merbau in Papua is widely spread and relatively abundant in most districts.

Merbau timber is hard (strong), durable and slightly harder in its wood processing. Due to its characteristics, merbau is used for heavy construction, railway sleeper and outdoor use. In the beginning, merbau timbers were not commonly used for indoor furniture, recently, merbau timber is used and getting popular, especially for veneer (plywood) and flooring.

Since the emergence of merbau timber utilization and huge demand for trade, especially export, the harvest activity of merbau increase and become excessive, including illegal logging of merbau which takes place, especially in Papua. To ensure conservation of merbau, the government has issued policy to protect merbau population since early 1970 by issuing the harvest ban for merbau trees which diameter below 60 cm and merbau growing in high slopes and distinct habitats, which have potential to threaten the survival and natural regeneration of species.

Currently, to ensure protection and sustainable management of merbau, Government of Indonesia (Ministry of Forestry) has issued several regulation to protect and conserve the species through harvest and trade regulation. Conservation both *in-situ* and *ex-situ* has also been intensified to ensure the achievement of merbau protection and conservation in its natural habitat and outside its natural habitat in most islands where merbau is naturally growing. In the other hand, the restoration of merbau population and plantation are also currently promoted and established. Small scale and unrecorded plantation have been carried out in aboretum, whereas larger scale plantation has been incorporated into the rehabilitation program under the National Movement of Forest and Land Rehabilitation program (GERHAN), which has been launced since early 2003.

Population distribution

Geographical distribution of Intsia spp in Indonesia ranges from all parts of Sumatra, Jawa, Kalimantan, Sulawesi, Maluku and Irian Jaya (West Papua). More dense population of Intsia spp has been reported to occur in Maluku and West Papua, compared to other ranged distribution. Soerianegara and Lemmens (1994) mentioned three major producers of merbau in Indonesia recorded until 1992 are Aceh, Maluku and Irian Jaya. Irian Jaya is recorded the highest producers of merbau timber. In 1985, the geographical distribution of merbau has been first explored. However, there is no up-dated data and information on their current geographical distribution, population status and even on its current growing stock in most areas, except in Irian Jaya (West Papua).

Intsia spp grows naturally in primary forests, dry with sometime covered with water and sandy soil. Grow well widely distributed in the elevation up to 50 m above sea level and in some cases survives in area up to 200 m above sea level. Soil types range from sandy soil and stony, in the flat or slopy areas (Mukhtar 1993). Intsia palembanica is reported to have wider range of distribution, from lowland to hilly areas. Those species naturally distribute in the climatic range of A-D of Schmidt and Fergusson climate clqassification. In Papua, Intsia spp grows associated with other species such as Palaqium, Myristica, Pometia and other species forming shrubby of lowland forest to highland forests areas (Makhfud et al, 2006).

Growing stock of merbau has ever been inventoried in 1987 (Forestry Planning, 1987-Masano 19993). According to the inventory results, merbau occupied the growing area of 32.821.200 ha countrywide with the initial growing stock of 202.478.600 m3 with the average volume per ha of 6.17 m3/ha. In 1991/1992, the average timber production of merbau in Papua represented 35-37% of total timber production from all speies in this area (Annonymous, 1993).

Growth rate of merbau, especially *Intsia bijuga* recorded from several Kebun Percobaan (Species Trial Gardens, currently named as Research Forests) of FORDA showed that *I bijuga* is considered as a slow growing species with Mean Annual Increment (MAI) of 0.76 m for height and 0.93 cm per year for diameter (Masano, 1993). However, it is not described in what stage or age of tree development when the measurement was carried out. Merbau was first introduced in these Research Forests early 1950s (Masano 1993).

Conservation status of merbau

Merbau has received serious threat due to accessive logging. This threat is also due to its limited and narrow elevational distribution which distributes only below 200 m above sea level (Mukhtar, 1993). This species also has relatively slow growing compared to other tropical tree species.

Due to its growth characteristics, cutting of this species has been regulated since early 1970s through a Decree of Minister of Agricultural (1972). According to this regulation only merbau with diameter above 60 cm in diameter (dbh) is allowed to be cut. This regulation applies in the harvest of merbau in production forest with silvicultural system of Indonesia Selective Cutting and Planting (TPTI). Merbau in conservation areas is fully protected and cutting is prohibited.

Currently there are two conservation methods, *in-situ* and *ex-situ* conservation of merbau and have been carried out throughout its natural habitat in Indonesia.

In-situ Conservation

In-situ conservation of merbau is carried out in its natural habitat, which are currently classified into conservation areas and nature reserves (Mukhtar, 1993). *In-situ* conservation in conservation areas are mostly protected and conserved in the National Parks, which are widely distributed and represented from its geographical range from Sumatra through Papua. Whole management of conservation areas is led by Directorate General of Forest Protection and Nature Conservation (MoF). Baseline data and information regarding merbau population and its habitat in these conservation areas mostly remain extremely limited. In these conservation areas, cutting of merbau is totally prohibited, however, exploration and collection of data on populaion status of this species is critically important for future and effective management.

Ex-situ Conservation

Ex-situ merbau conservation is carried out in several methods, depending on the terminology used. In this *ex-situ* conservation, genetic materials of merbau are pooled outside its natural habitats, such as arboretum,

Grand Park areas, conservation garden and research station. Various institutions may have established these types of conservation, such as Forest Concession Company (arboretum), Universities (Arboretum and research forests), Research Institution (Arboretum, Research Forest) and other institutions (Educational Forest/Botanical garden).

Several collections of merbau in research and educational forests, arboretum and botanical garden have been established. Forest Research Institute (now FORDA) has also established several Kebun Percobaan (Species collection trials, now named as Research Forests) in West, Central and East Java (Masano, 1993, Machfud et al, 2006). Some are listed in Table 1 below. However, their current population need to be further up-dated. The orginal purpose of FORDA collection was to pool the plant genetic materials in the collection sites. In this collection site, the number of plants for each species was not sufficient to be further used for species or provenance trials. The representativeness and the design of the plantation in the sites were also not specifically formulated for further analyses.

Other Conservation Efforts

Other efforts to promote conservation and plantation of merbau, several approaches have been started and initiated by FORDA (Machfud et al, 2006). Those efforts include collection of plant genetic materials, the establishment of merbau conservation garden, testing of merbau genetic diversity, the establishment of Hedge Orchard, silvicultural trials and progeny test trials.

Collection of merbau plant genetic materials has been carried out through the exploration and collection of merbau seeds, seedling and vegetative cutting from its natural distribution from Sumatra, Sulawesi, Maluku and Papua. In Papua and Maluku, merbau genetic materials have been collected from Sorong, Manokwari, Biak, Nabire, Serui, Wasior, Teminabuan, Halmahera and Seram. These genetic materals are used to establish conservation gardens in Bondowoso and Manokwari (Machfud et al, 2006).

Analyses of genetic diversity of merbau, the establishement of Hedge Orchard, silvicultural trials and progeny tests are aimed to promote conservation and plantation of merbau species not only in Papua but also in other places, where its population in their natural habitats has been threatened due to various causes.

Rehabilitation and plantation status

A. Handling Planting Materials Of Merbau

1. Phenology

Merbau (*Intsia* spp) flowers every year and produces relatively larger quantity of seeds, similar to other most leguminosae species. Flowering season differs sligthly from one place to another places, since its wide range of geographical distribution from Sumatra, the western most part to Irian Jaya (Papua) the eastern most part of Indonesia. In Papua and Biak, *Intsia* spp start flowering December-January and mature seeds normally collected between May-August (Machfud et al, 2006).

Table 1. Some of Research- Educational Forests, where merbau was planted as ex-situ conservation (Note: merbau in these collections was single and or mixed planted with other species)

Research/Educational Forests, Institutions	Location/approximate area*
Darmaga Research Forest, FORDA	Darmaga, Bogor
Haurbentes Research Forest, FORDA	Jasinga, Bogor
Gunung Walat Educational Forest, IPB	Sukabumi, West Java
Playen-G.Kidul Research Forest, FORDA	Gunung Kidul, Yogyakarta
Kaliurang Research Forest, FORDA	Kaliurang, Yogyakarta
Wanagama Educational Forest, UGM	Gunung Kidul, Yogyakarta
Bondowoso Research Forest, FORDA	Bondowoso, East Java
Sumberwringin Research Forest, FORDA	Jember, East Java
Manokwari Conservation Garden, FORDA	Manokwari, West Papua

• FORDA: Forestry Research and Development Agency-MoF, IPB: Institut Pertanian Bogor, UGM: Universitas Gajah Mada.

2. Planting material propagation

Merbau planting materials could be propagated through generative (seeds) and vegetative materials, especially from stem cuttings. In practice, propagation by using seeds is more practical than vegetative materials. For tree improvement program, vegetative propagation (clone) is used to maintain genetic make-up of the mother plant, especially the superior clone. Merbau seeds for plantation are able to be yearly collected, especially from Maluku and Papua and there is no significant barrier reported in the collection and provision of merbau seeds for large scale plantation.

3. Seed pre treatment, germination and nursery growing.

Merbau has thick and hard seedcoat, which requires pretreatment before sowing. Two ways of pre treatment method have normally been used: scarification and stratification. Combination of scarification and soaking in hot water is the best pretreament of merbau seeds and mostly results into over 90% germination. Seeds of merbau sow in seed beds using mixed soil and sand as growing medium in the nursery. After three months in the nursery, with normally 3-4 leave emerge, the germinated seeds are transplanted into polybag. Over three months old in polybag, the merbau seedlings are ready to be transplanted into the field (Yuniarti, 1994).

4. Growth Performance

The growth of merbau after transplang varies depending on the site characteristic and after transplanting maintenance. Plantation trials in Research Station Anggresi (Manokwari) with initial spacing of 3x3 spacing resulted in survival rate of up to 80%. At 11 years after planting, the merbau reaches 11.8 m high and 12.9 cm in diameter (Machfud et al, 2006).

B. Plantation Of Merbau

In addition to the plantation for conservation and research trials, merbau plantation has been incorporated into national program for rehabilitation of forest and land, locally called as Gerakan Nasional Rehabilitasi Hutan dan Lahan (GNRHL-National Movement for Forest and Land Rehabilitation) started from 2003. Merbau plantation was carried out in subsequent years and its record from 2005 through 2007 is listed in Table 2 below.

Table 2 indicates the large number of merbau seedlings have been widely planted in Papua (Irian Jaya) covering 9 districts and city within this province. This table excludes merbau plantation carried out in other places. The plantation is mostly mixed with other GERHAN species such as Swietenia, Agathis, Tamarindus, Eucalypt, Paraserienthes, etc. The choice of species is depending on the location (elevation) and may differ from one to other location. The number of merbau seedlings planted under these scheme might not be accurate if converted directly to the total area of merbau plantation. Until 2007, merbau plantation both in reforestation program and community forestry throughout Papua has been significant, assuming all the planted seedlings are well growing and have high survival rate.

Conclusion

Efforts to conserve merbau plant genetic resources in Indonesia have been started. Merbau has been conserved both in situ and ex-situ. In situ conservation of merbau is carried out in conservation areas, such as in National Park, Nature Reserve and in plant genetic resources areas. Ex-situ conservation has been established in arboretums, research trial site, botanical garden and in newly established conservation gardens.

Scattered plantation of merbau has been conducted since last several decades in research trials, arboretum and botanical gardens (Research Forests). More intensive plantation has been incorporated into the

National Movement on forest and land rehabilitation (Gerakan Nasional Rehabilitasi Hutan dan Lahan-GERHAN). Under this program, merbau has been widely planted together with other forest tree species (mixed planting), especially in Papua and Maluku.

Table 2.

Merbau plantation based on the number of seedlings planted in GN-RHL-GERHAN related activity in Papua, 2005-2007 *

No.	Location, districts	No. Of seedlings planted in Reforestation and Community Forestry		Note
		2005	2007	
1	District of Biak, Numfor	96.800 (ComFor)	90.000 (Refor)	*enrichment planting in the previously established Community Forestry)
		3.000 (enrichment in ComFor)*	26.400 (ComFor)	
		672.000 (Refor)	16.000 (Refor)	
		21.000 (Refor)	10.500 (ComFor)	
2	District of Jayapura	77.761 (Refor)	57.750 (Refor-Bencana)*	* Reforestation carried out in previously established Reforestation area or Community Forestry which have been damaged by disaster
			3.080 ComFor-Bencana)*	
			20321 (Refor-2005)	
3	District of Yapen	112.800 (Refor)	-	
		35.200 (ComFor)		
4	City of Jayapura	88.628 (Refor)	16.500 (Refor-bencana)*	* Reforestation carried out in previously established Reforestation area which have been damaged by disaster
			42.372 (Refor-2005)	
			9.900 (Refor)	
			2.300 (ComFor)	
5	District of Waropen	408.000 (Refor)	-	
		88.000 (ComFor)		
6	District of Sarmi	49.000 (Refor.)	-	
		17.600 (ComFor)		
7	District of Asmat	79.358 (Refor)	-	
		22.880 (ComFor)		
8	District of Boven Digul	12.000 (Refor)	-	
		5.280 (ComFor)		
9	District of Supiori	-	48.000 (Refor)	
			16.000 (ComFor)	

Note: *Data were extracted from Statistik Pembangunan Ditjen Rehabilitasi Lahan dan Perhutanan Sosial, 2007.

** Refor:reforestation, ComFor: Community Forestry

References

Annonymous, 1993. Eksploitasi dan pemanfaatan kayu merbau. Kayu Lapis Indonesia Group/BPTG 1993. Prosiding Seminar sehari Optimalisasi Pemanfaatan Kayu Merbau di Indonesia. APHI, 1993

Annonymous, 2007. Statistik Pembangunan Direktorat Jenderal Rehabilitasi Lahan dan Perhutanan Sosial, 2007.

Masano. 1993. Beberapa informasi silvikultur merbau (Intsia spp) sebagai usaha dalam pembinaan pelestarian. Prosiding Seminar sehari Optimalisasi Pemanfaatan Kayu Merbau di indonesia. APHI. 1993.

Mukhtar, AS. 1993. Pembinaan dan Pelestarian Pohon merbau (Intsia spp) di Indonesia. Prosiding Seminar sehari Optimalisasi Pemanfaatan Kayu Merbau di indonesia. APHI. 1993

Machfud; S. Pudjiono; T. Pamungkas; PM Utomo and Basteba AS. 2006. Merbau (Intsia spp) dan Upaya Konservasinya. Puslitbang Hutan Tanaman, Badan Litbang Kehutanan.

Sorianegara I and RHMJ Lemmens, 1994. Timber Trees: Major Commercial Timber. Plant Genetic Resources of South East Asia. No. 5(1), 1994:264-265

Yuniarti, N. 1994. Teknik Budidaya merbau (Intsia spp.) untuk pembangunan hutan tanaman. Klon, informasi dan komunikasi benih. Balai Litbang Teknologi Perbenihan. Vol.2 (01). 1994

Management of merbau in Papua,

Marthen Kayoi and Noak Kapisa *

Introduction

The total forest area of Papua land (both Papua and West Papua) is 42,224,840 hectares, and covers approximately 95 % of the total land area. Papua's natural forests are a source of biodiversity of plant species and wildlife that play a vital role in maintaining the balance of nature. Its impact to the global environment is very significant. In terms of area, the tropical forest of Papua land is the second largest in the Indonesia after Kalimantan. The Ministry of Forestry categorizes the forest land base as follows : park and conservation forest (8,025,820 ha), protection forest (10,619,090 ha), limited production forest (2,054,100 ha), production forest (10,585,210 ha), and conversion forest (9,262,130 ha).

The harvesting of timber is practiced mainly on the production and limited production forests. Conversion forests are designated in the long term for non-forestry land uses, mainly agriculture, resettlement and mining, but remain under the control of the ministry of forestry until cleared of any existing commercially harvestable forest.

Ministry of Forestry of Indonesia and Forest Service of Papua (both Papua and West Papua) are responsible for managing and conserving Papua's natural forest resources. An important aspect of the sustainable forest management of tree species such as merbau is the potential to increase and improve local community propserity and to support development in Papua.

Merbau is a very durable and attractive wood and is one of the most valued timbers in Europe, USA, China and South East Asia. It is stronger than Teak and is one of the most decay-resistant timbers known (when not in contact with the ground). It is used for all high-class general construction, flooring (it produces the famous 'merbau floors'), posts, beams, etc. and also for musical instruments, furniture and cabinet making. Bark and leaves are used medicinally and the seeds are edible. In addition, the wood is a dye source.

Distribution and potency

In general, Papua's tropical forest is rich in biodiversity but low in commercial tree species. There are seventy commercial tree species recorded, and merbau (three species of merbau found in Papua namely *Intsia bijuga, Intsia palembanica* and *Intsia acuminata*), especially *Intsia bijuga,* is one of the most exploited due to its highest economic values both in local, regional, national and international markets. Merbau grows naturally in almost all the lowland tropical rain forest of Papua. The trees are found dominantly in production forest area among other comercial tree species. It is a lowland tree, which is often found in coastal areas bordering mangrove swamps, rivers, or floodplains. It is also found inland up to 600m, in primary or old secondary forests (Soerianegara & Lemmens, 1993, Kade Sidiyasa 1994).

* **Marthen Kayoi**, Head of Forest Service of Papua Province, Indonesia
Noak Kapisa, Head of Forestry Planning Institute of Papua, Indonesia

Merbau (*Intsia bijuga*) is the most valuable timbers of Papua. The species has been exploited so intensively for timber, however, merbau trees are still abundant in natural forests of Papua. The Ministry of Forestry, jointly with Forest Serives of Papua, has set up a huge rehabilitation program to secure and protect merbau through plantations. In Papua, *Intsia bijuga* is more dominant than *I. Palembanica and I. acuminata*; however, the species has been recorded as threatened species in Indonesia (WCMC, 1991-check or ITTO report) but natural seedlings and mature trees are still abundant in lowland natural forest of Papua (Tokede, et.al, 2007).

Merbau trees produce huge amounts of seed every year. Natural regeneration and growing natural seedlings of species are abundant under trees or blanket of closed forest canopy in natural forest of Papua, the number of seedlings reaching 225 seedling per hectare (Tokede, et.al, 2007). Average standing stock for merbau is recorded for 9 trees per hectare with a volume of 24,38 m3 per hectare, while average plus# tree density of merbau is trees per hectare or a volume of 19,69 m3 per hecter. No. of plus trees and mature trees of merbau recorded are 17,69 percent and 59,46 percent of total commercial tree species potency, respectively. According to Tokede, et.al (2007), exploitation of merbau with limited diameter cutting of 56 cm up means that standing stock of merbau trees for a 35 year cutting cycle is still enough in natural forest, namely at least 25 trees per hectare, while number of plus trees are 125 trees per hectare. Based on this report, extinction of merbau due to over exploitation could not happen in Papua, and therefore, we ask and suggest that merbau species should not be included in CITES III and any suggestion to include it needs to be reconsidered.

Production and trading

Papua forestry sector is the second biggest revenue earner at 5,24 % of total export values (or 59,43 % of export value without the Freeport mine). This is due to the fact that their rights over land and forests are recoqnized under the new order regime. Merbau *(Intsia species)* is one of the Papua's endemic commercial tree species which is widely exploited among other tree species due to its highest commercial valuable wood both for demestic and internetional demand. In early 1970 merbau trees are not atracttive to be exploited by forest concessionaries right (HPH) but in early 1980 merbau became the most popular species to be exploited due to its highest market value in the world. Since 1984, there has been 68 licenses granted to forest concession rights. Yet, there was no significant contribution to the state and local revenue

Merbau tree species are continuing widely logged as a vital forest products to meet need of Papuan local community daily life, for supporting economic developing, providing most of the domestic and international wood demands. The total production of merbau in 1992 in Indonesia was about 137, 000 m3, and particularly Papua was about 121,000 m3/year. In Papua, there was an increase in merbau production, reaching 252,000 m3 in 2002. Based on Free on Board (FOB) price of US$ 400/m3, the total value of trade in 2002 would be around US$1 billion.

In 1990, the export of sawn merbau timber was 1,700 m3 with a value of USD 825,000. In 1991 the export was much larger, amounting to 17, 000 m3 with a value of USD7.8 million (National Statistics Bureau, Indonesia). An NGO, EIA (2005), estimate that the Indonesia's merbau log export volumes increased from

A phenotypically superior tree in a tree breeding programme. Glossary of Biotechnology for Food and Agriculture. Viewed on 22 January 2009. http://www.expertglossary .com

50,000 m3 in 1998 to 660,000 m3 in 2001, more than a ten-fold increase in less than four years, quoting a WWF report to the G8 (Toyne, *et al*., 2002). About 64,14 % of total merbau logs production is used as industrial raw material in Papua.

According to Customs data from China obtained by Greenpeace (2006), in 2004, China Customs recorded almost 900,000 m3 of merbau log imports. Since Indonesia has a log and sawn timber export ban, no statistics are collected by Indonesia even though these products are imported by other countries. It was alleged by EIA that China was the biggest importer of merbau from Papua, Indonesia EIA has alleged that a large quantity of merbau is smuggled out of Indonesia to be accepted legally into China. EIA (2005) reported that merbau logs are leaving Indonesia and entered China via the ports of Zhangjiagang, near Shanghai, and Shenzhen, near Hong Kong.

Policy on sustainable management of merbau

Problem rich forest resource-poor people best reflects the dynamics of the people-forest relationship in Papua. In Papua, some indigenous people remain highly dependent on forest resources. The Governor of Papua and Governor of West Papua have deeply paid attention to encourage sustainable forest management in Papua which is aimed to protect and secure availability of forest natural resources, mainly merbau trees, and to improve local community prosperity. Therefore, since August 2006 the new policy on sustainable forest management is introduced. The main aim of this policy is to eradicate poverty and to improve the economy of Papua by sustainable use of forestry resources. This policy entails the following principles viz.

(1) return forest ownership rights to the local people, this means any utilization of forest resources should significantly benefite the local community;
(2) total prohibition of log exports, with investment in forestry industry in Papua, as local fees recorded so far is only US $ 10 for every m3 harvested log;
(3) acceleration of home industry development and sustainable community logging, this means to give opportunity to the local community to invlove actively in forest resources manegement and processing;
(4) tackling land conflict through securing access to forest areas, this means outlining the institutional arrangement and benefits sharing mechanism;
(5) licenses of forest concession rights active or non active will be extended only if they develop forestry industries in Papua;
(6) rewarding forest management and tree planting by local adat community,this means all customary community groups will be encouraged to support goverment in reforestation and forest management;
(7) law enforcement through sufficient forest rangers and improvement of community awareness, this means rules and regulation should be established but most importantly enforced; and
(8) all types of forest in Papua are dedicated to save planet earth and future humanity.

In September 2007, both Governor issued new regulations limiting log shipments from Papua to other parts of Indonesia, effective implementation from the beginning of 2008, to protect Papua's forests as whole while creating incentives for in-ward investment to support development for local people and to construct/establish forestry industry for increasing added value of timber in Papua. A production quota for merbau is also another issue that should be considered, and limited diameter, in order to protect and maintain sustainability of merbau in Papua forest area, but on the other side merbau can be sustaibality managed to increase local community income

In mid March 2008, at a meeting of 40 forest sector investors and the provincial government in Jayapura, industry representatives requested Governor Suebu to weaken his policy by allowing merbau logs to be shipped to manufacturers in Java and elsewhere in Indonesia. In responding, Governor Suebu told the investors and journalists gathered how both President Susilo Bambang Yudhoyono, and Vice President Jusuf Kalla had also requested a similar revocation of the policy, but that the policy would not be withdrawn. It means that Governor Suebu has deep commitment to protect merbau from its threathen and extionction.

Conclusion

We have to say that merbau tree species has widely natural distribution and potency in all lowland tropical rain forest in Papua, and now we also encourage afforestation and reforestation program of merbau to increasing the productivity of forest, particularly merbau as endemic species of Papua.

Merbau tree species are continuing widely logged as a vital forest products to meet need of Papuan local community daily life and to support economic developing, to provide most of the domestic and international wood demands.

All policy and programs made above are aimed to protect forest resources especially merbau trees and to improve local community prosperity, and therefore, we also ask participants of this workshop to review the suggestion to list merbau in CITES III and to seek the best solution for increasing the management and productivity of *Intsia* tree species so that it can give benefit both economically, ecologically and socially in Papua

Sustainable forest management in Malaysia with reference to merbau[1]

Nazir Khan Bin Nizam Khan[2]

Abstract

Sustainable forest management, biodiversity conservation and legally sourced timber have become pertinent agendas discussed at many Multilateral Environmental Agreements (MEAs) forums, inter alia CBD, UNFCCC, CITES, ITTA/ITTO and Ramsar. They are also discussed at regional and bilateral meetings such as ASOF, ASOEN, VPA and G8 countries summit.

In this regard, the Malaysia's sustainable forest management practice is reflected, inter alia, in its National Forest Policy 1978 (NFP), National Forestry Act 1984, forest management systems and practices and its forest management certification scheme. The NFP has incorporated elements of biodiversity conservation, environmental protection and sustainable use. Coupled to this, under the Selective Management System (SMS), harvesting in the Permanent Reserved Forests (PRFs) has also taken into account the forest health, forest stocking and stand quality, and forest recovery. The cutting regimes for inland forest practiced in Peninsular Malaysia are $\geq$ 45cm dbh for Non-dipterocarp (include Merbau) and $\geq$ 50 cm dbh for Dipterocarp species. In addition, volume output per hectare is also capped and it is estimated on average, tree felled is ±15 trees per hectare. For the case of Sarawak, the cutting regimes are $\geq$ 40cm dbh for Non-dipterocarp species and $\geq$ 60cm dbh for Dipterocarp species and meanwhile for Sabah, it is 60-120cm dbh for all species.

>

In Peninsular Malaysia, forest inventories are carried out at three levels of forest management which are namely; macro, management and operational level. To date, the Forestry Department Peninsular Malaysia had carried out four (4) national forest inventories at the macro level. The Fourth National Forest Inventory (NFI 4) [2002-2004] is the follow-up inventory of NFI 1 (1970-1972), NFI 2 (1980-1982) and NFI 3 (1990-1992) which is implemented once in every ten years. In general, the main purpose of the inventory is to provide information for land use planning and formulating forest policies. Amongst others, the information collected include information on the acreage and location of forest areas in all States of Peninsular Malaysia according to the forest type stratification; changes in forest resources; standing volume of forest areas in accordance with the forest type stratification; net and gross standing volumes of specific diameter classes according to species groups/types and areas with potentials for exploitation; and on the location of rattan, bamboo, palm and pandanus resources.

The forest management which has been practiced in Malaysia for more than a century is able to achieve the conservation of species and habitat diversity. As defined in CBD, biodiversity basically make up of two components namely species and ecosystem diversity, where conserving habitat types could preserve the diverse ecosystem.

---

[1] Paper prepared for the International Merbau Workshop: Sustainable Management of Merbau for Trade, 17-19 Nov. 2008, Singapore

[2] Assistant Director International Affairs, Forestry Department Peninsular Malaysia / Ministry of Natural Resources and Environment Malaysia

This paper focuses on the sustainable management of forest resources with specific reference to Merbau (non-dipterocarp) species undertaken by Malaysia in order to ensure its sustainability.

Keywords: sustainable forest management, merbau, national forest inventory

Introduction

1. Sustainable forest management, biodiversity conservation and legally sourced timber have become pertinent agendas discussed at many Multilateral Enviornmental Agreements (MEAs) forums, inter alia Convention on Biological Diversity (CBD), United Nations Framework Convention on Climate Change (UNFCCC), International Tropical Timber Agreement (ITTA)/ International Tropical Timber Organization (ITTO) and Ramsar Convention. They are also discussed at regional and bilateral meetings such ASEAN Senior Officials on Forestry (ASOF), ASEAN Senior Officials on Environment (ASEON), Voluntary Partnership Agreement and G8 countries summit.

2. At the end of 2006, the total area of forests in Malaysia was 18.35 million hectares or 55.7% of the total land area as shown in Table 1. Recognizing the crucial role of forests not only in the production of timber, but more importantly in the conservation of soil, water and wildlife, as well as in the protection of the environment, Malaysia has designated a total of 13.43 million hectares of forested land as Permanent Reserved Forests (PRFs) or 40.8% of the total land area as shown in Table 2. Approximately 10.81 million hectares of the PRFs are production forests with the remaining 2.62 million hectares being protection forests. This protection area covers various forest types such as peat swamp forest, mangrove forest, lowland forest, hill forest and montane forest.

Table 1:
Distribution and Extent of Major Forest Types , 2006
(million hectares)

Region	Land Area	Natural Forest			Plantation Forest	Total Forested Land	Percentage Total of Forested Land
		Dry Inland Forest	Swamp Forest	Mangrove Forest			
Peninsular Malaysia	13.16	5.4	0.3	0.1	0.08	5.88	44.7
Sabah	7.49	3.67	0.12	0.36	0.19	4.34	57.9
Sarawak	12.3	6.86	0.94	0.14	0.19	8.13	66.1
Malaysia	**32.95**	**15.93**	**1.36**	**0.6**	**0.46**	**18.35**	**55.7**

Source: FDPM, FD Sabah & FD Sarawak

Table 2:
Permanent Reserved Forests (PRFs), 2006
(million hectares)

Region	Protection Forest	Production Forest	Total PRFs	Percentage %
Peninsular Malaysia	1.52	3.18	4.7	35.7
Sabah	0.59	3	3.59	47.9
Sarawak	0.51	4.63	5.14	41.8
Malaysia	2.62	10.81	13.43	40.8

Source: FDPM,FD Sabah & FD Sarawak

Silvicultural characteristics and distribution of *Instia* species

3. Instia consists of about about nine (9) species and occurs from East Africa and Madagascar towards Melanesia, Micronesia and northern Australia. Within the Malesia three (3) species are recorded. The most widespread species is *Instia bijuga*. There are two (2) commercial merbau species naturally occurring in Peninsular Malaysia, which is *I. palembanica* and *I. bijuga*. The habitat for the *I. palembanica* was found throughout the Peninsula except Perlis state in the north bordering Thailand (Wyatt-Smith, 1952), while *I. bijuga* was commonly found in the states of Johor, Kelantan, Negeri Sembilan, Pahang, Penang and Selangor. Both species are widespread in Sabah and Sarawak (Soepadmo and Saw, 2000). The silvicultural characteristics and distribution of the two (2) of the species found in Malaysia is shown in Table 3.

Table 3:
Silvicultural characteristics and distribution of *Instia* spp. in Malaysia

Species	Silvicultural Characteristics	Distribution
Instia bijuga	Medium-sized to large tree up to 50m tall, bole branchless for up to 20m and up to 60 (-250) cm in diameter.	Occurs most frequently in coastal forests and along tidal rivers but also found inland up to 600 m altitude.
Instia palembanica	Medium-sized or o large tree up to 50m tall, bole branchless for up to 22m and up to 150 cm in diameter.	Often occurs near the coast but is found inland more frequently than *I. bijuga,* up to 1,000m altitude.

Source: Plant Resources of South-East Asia (PROSEA), 1994

4. Based on the National Forest Inventory Four (NFI 4) carried out by the Forestry Department Peninsular Malaysia between 2002 and 2004, there are estimated 2.1 million trees of Merbau ≥ 30 cm diameter class in Peninsular Malaysia, with an estimated volume of 5.4 million m3 as shown in Table 4. A brief note on NFI 4 and Forest Classes are given in Appendix 1 and Appendix 2. Referring to Table 4, it can be seen that 57.8% of the total number of trees is between 30 - 45 cm diameter classes, 24.5 % is 45 - 60 cm diameter class and 17.7 % is > 60 cm diameter class. In term of timber volume, out of the total 5.4 million m3 approximately 2.9 million m3 or 54% comes from ≥ 60 cm diameter class, 1.1 million m3 or 20% comes from 45 - 60 cm diameter class and the balance 1.4 million m3 or 26% comes from 30 - 45 cm diameter class.

Table 4:
Summary of *Instia* spp. distribution in Peninsular Malaysia

Forest Classes*	Diameter Class 30-45 cm		Diameter Class 45 -60 cm		Diameter Class > 60 cm		Total	
	Stem	Volume (m3)	Stem	Volume (m3)	Stem	Volume (m3)	Stem	Volume (m3)
1	37,807	36,153	73,251	190,924	59,073	518,661	170,131	745,738
2	151,748	194,237	116,340	265,052	101,165	816,402	369,253	1,275,691
3	93,635	108,720	15,606	18,727	10,404	58,262	119,645	185,709
4	168,772	177,577	58,703	137,219	22,014	192,987	249,489	507,783
5	53,455	64,680	101,564	231,460	32,073	274,758	187,092	570,898
6	62,455	57,548	22,305	45,949	2,231	27,659	86,991	131,156
7	0	0	0	0	0	0	0	0
8	0	0	0	0	2,462	24,992	2,462	24,992
9	70,367	76,231	11,728	32,838	3,909	42,220	86,004	151,289
10	0	**0**	**0**	**0**	**0**	0	0	0
11	581,743	714,380	116,349	181,504	139,618	921,480	837,710	1,817,364
Total	**1,219,982**	**1,429,526**	**515,846**	**1,103,673**	**372,949**	**2,877,421**	**2,108,777**	**5,410,620**

Source: FDPM
* Refer to Appendix 2

5. Analysis based on data collected from 18 permanent sample plots in logged-over forests in six states in Peninsular Malaysia show a mean annual increment of 0.43 cm diameter at breast height (dbh) for Merbau. The analysis also showed highest diameter increment of 0.69 cm and 0.60 cm was observed for 55 -60 cm diameter class and 50 - 55 cm diameter class respectively. However, in larger diameter classes, the annual diameter increment declined to 0.39 cm and smaller diameter class to 0.16 cm.

6. Yunus (2000) had reported the growth rates for all tree species for dryland forests is from 0.30 cm to 0.53 cm per year for diameter classes from 5 cm to more than 45 cm dbh. Shaharuddin (1997) quoted the FAO study for all species more than 30 cm diameter class in dryland forests of Peninsular Malaysia which gives an average of 0.8 cm to 1.1 cm per year and with an annual mortality of 0.9%.

Forest management

7. The Selective Management System (SMS) practiced in Peninsular Malaysia was introduced in 1978 after the Malayan Uniform System (MUS) which was found only successfully applied to lowland forest but not in hill dipterocarp forests. Mohd. Darus (1983) stated that SMS is a flexible timber harvesting regime with the objectives to safeguard the forest ecosystems, to maintain the forest productivity and to take advantage of the demands of the timber markets. Under this system of forest management, growth rates, residual stand and the required stand determine the length of the cutting cycle. By contrast higher growth rates and residual stand contents will lead to a shorter cutting cycle and higher annual coupe (Thang, 1988). In addition, under SMS, the next cut is expected in 25-55 years after the first harvesting.

8. Yunus (2000) concluded that the SMS satisfies the ecological sustainable harvest management outlined by Cannon, et. al. (1994) - 'Ecologically based on management for sustainable harvest requires, at a minimum, three (3) essential types of data: (1) the effects of logging practices on the composition and structure of the residual stand; (2) estimates of the parameters of growth and survival that determine recruitment into harvestable sizes during stand development after logging; and (3) density and composition of regeneration.'

9. In accordance to SMS, cutting limit would be prescribed for non-dipterocarp and dipterocarp species. In the case of Peninsular Malaysia, trees allowed to be harvested are not less than 45 cm dbh for non-dipterocarp (which include Merbau) and not less than 50 cm dbh for dipterocarp species. Beside the cutting limit, the forestry department also observed the maximum output of 85 m3 per hectare as part of its volume control practice. In Sarawak, the cutting limit prescribed is not less than 40 cm dbh and 60 cm dbh for non-dipterocarp and dipterocarp species respectively. For Sabah, it is not less than 60 to 120 cm dbh for all species. It has been observed that these minimum allowable cut practiced in the three regions are higher or at least equal to the allowable cut recommended by SGS Qualifier Programme for PT Diamond Raya Timber Indonesia (Anon, 2000 and Anon, 2003).

10. Malaysia realised that in order to further improve management practices and in tandem ensures sustainable management, there is a need to acquire new knowledge and more information on the distribution, status and stocking of all species including Merbau. In this regard, Malaysia has embarked in a cooperation project between CITES and ITTO starting early 2008. The project entitled "The quantification of Dry and Wet Inland *Gonystylus* spp. (Ramin), *Aquilaria* spp. (Agarwood) and *Instia* spp. (Merbau) in Peninsular Malaysia" will provide credible and reliable information to global community with regards to the three species. It is hoped that the project will ensure that the stocking and sustainability of Ramin, Agarwood and Merbau species are consistent with sustainable forest management practices.

Conclusion

10. Malaysia is fully aware of the need for effective forest management and conservation not only to ensure a sustained supply of timber but also to maintain environmental stability, provide sanctuary for wildlife and to serve as an invaluable storehouse of genetic resources useful for the improvement of its indigenous tree species, agricultural crops and livestock. Thus, the forest of Malaysia is managed under strict and technically sound forest management objectives and practices to ensure sustainable timber production, the conservation and protection of biological diversity, the rational and sustainable utilisation of the genetic resources, the maintenance of an equable climate, and, ecological and environmental balance, as sound environmental conservation is a prerequisite for sustainable forest production.

11. The practice of selective harvesting of the natural inland forests in Malaysia would ensure that the larger trees that remain would reach commercial sizes in 25 to 55 years to allow for a second round of harvesting. And the process goes on. This in itself is a form of silvicultural treatment because natural regeneration is increased by the gaps created during forest harvesting. Several studies have also indicated that regeneration of desirable species occur naturally in and around the gaps left by logging, and only when necessary, the logged-over forests are silviculturally treated to aid in their rehabilitation.

12. Finally, it can be said that the forest management which has been practiced in Malaysia for more than a century is able to achieve the conservation of species and habitat diversity. As defined in CBD, biodiversity basically make up of two components namely species and ecosystem diversity, where conserving habitat types could preserve the diverse ecosystem.

References

Anon (2000a). Planning and Implementation of Sustainable Forest Management & Management of Peat Swamp Forest, Workshop in Penang 25 - 28 May 2004. Edited by Kiam, T.S., Azmi, N., Hwai,Y.Y., Krezdorn,R and Hasse, G. Forestry Department Peninsular Malaysia, Kuala Lumpur. pg 80.

Anon (2000). Diamond Raya Forest Management Main Assessment Report. Number AD65, Issue 04, Project 6489-ID. Qualifier Programme, April 2000.

Anon (2003). Forest Management Surveillance Report for PT Diamond Raya Timber. SGS Qualifier Programme, December 2002.

Cannon, C.H., Peart, D.R., Leighton, M. and Kartawinata, K. (1994). Forest Ecology and Management. pg 67, Pp 49-68.

Mohd. Darus, H.M. (1983). Selective Management System in Peninsular Malaysia. XV Pacific Science Congress, Dunedin, New Zealand.

Shaharuddin, M.I. (1997). Technical Requirements for Successful Implementation of Selective Management System in Peninsular Malaysia. Paper presented at workshop on Selective Management System and Enrichment Planting. In: Feilberg and Sorensen, 1999.

Soerianegara & R.H.M.J. Lemmens (eds), 1994. Timber tree: major commercial timbers. In Plant Resources of South-East Asia (PROSEA) No. 5(1).

Thang, H.C. (1988). Sustained Yeild Management of Natural Forest in Peninsular Malaysia. Workshops on Forest Sector Evaluation and Industrial Planning S.E. Asia, UPM, Malaysia.

Yunus (2000). Modelling the Growth of the Logged over Inland Production Forests of Peninsular Malaysia with Forest Management Consideration. PhD Thesis. De Monfort University, UK. pg 22

Appendix 1

Brief note on the National Forest Inventory

The Fourth National Forest Inventory (NFI 4) is the follow-up inventory of NF 1 (1970-1972), NFI 2 (1980-1982) and NFI 3 (1990-1992) which is implemented once in every ten years. The NFI incorporate data from satellite imagery (LANDSAT-TM), Geographic Information System (GIS) together with the data enumerated from the established sampling units in the field.

The NFI 4 is designed as stratified satellite sampling based on randomly distributed permanent sample units. Each sample unit consists of 4 sample plots and 3 sample strips (refer to Figure 1). Each sample plot is a combination of a fixed sample circle of 4 m in radius and a point sample. Within the sample circle only commercial tree species less than 10 cm dbh (diameter at breast height) and tree more than 1.5 m in height and some key medicinal plants are assessed. The total sample area is about 0.02 hectare. Point sampling is done for all tree species ≥10 cm dbh as shown in Table 1.

Table 1:
Information to be collected per Sample Strip/Circle/Point Sample

Sample Strip	Sample Circle	Point Sample	
(4 m wide)	(r =4 m)	(basal area factor 4)	
Bamboo, rattan, palms, etc.	trees < 10 cm medicinal plants	trees > 10 cm	trees > 45 cm
Name and code	Name and code	Name and code	Name and code
Number	Number	Number	Number
No	No	No	Yes
No	No	No	All trees
No	No	Azimuth, distance	Azimuth, distance
No	No	No	Yes, specify code
No	No	No	Number and quality

Clumps of rattan, bamboo and palms are counted on 3 sample strips of 4m width (2m to each side of the centre line) connecting sample plot 1 and 2, 2 and 3, 3 and 4. The distance between the sample plots is 100m; the total sample is 0.12 hectare. During the navigation to the sample unit or at the sample unit itself, each member of the inventory crew shall report any observation made on the occurrence of rare and /or protected wildlife species to the crew. If observation on wildlife was made, then the crew leader shall record "y' in the "Pemerhatian Hidupan Liar" (Wildlife Observation) box with some description pertaining to species and type of observation made such as tracks, dung, nests, etc. (example. tapir tracks at 102o 14'12" East, 4o 16' 23" North).

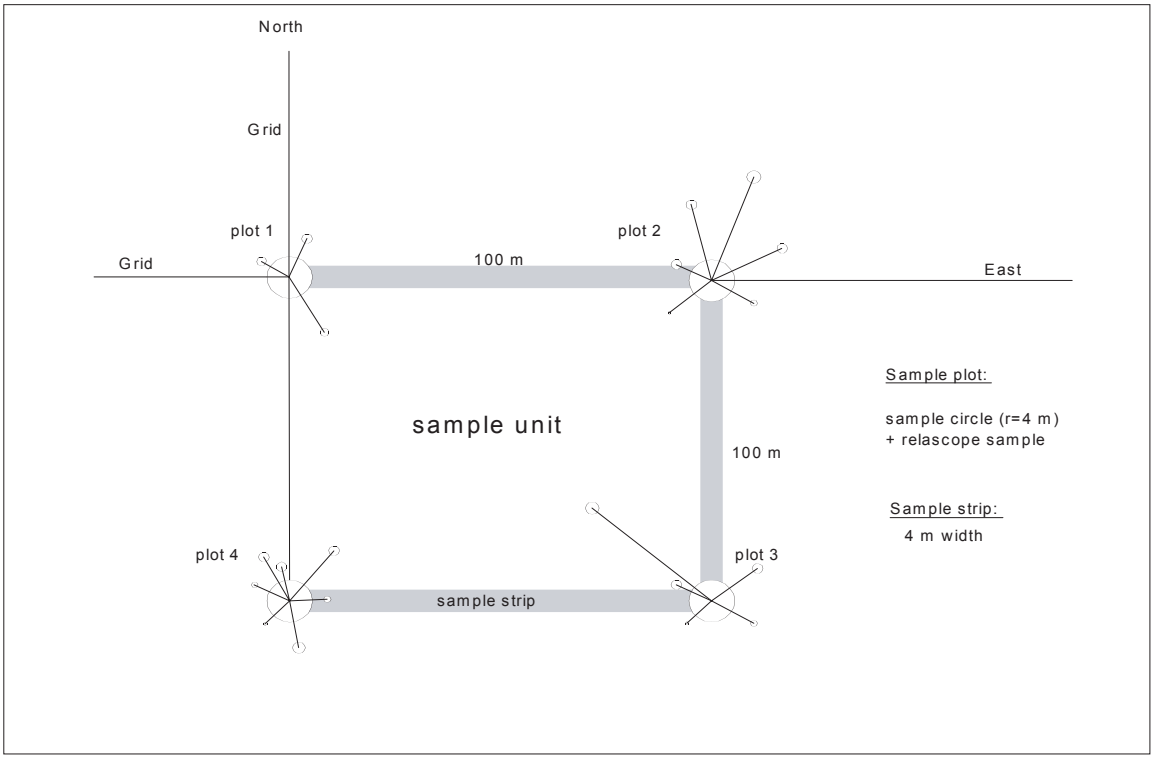
The summary of tree species, major medicinal plants, rattan and palms listed to be surveyed were as follows:

i. Tree Species
   (a) Dipterocarps : Meranti = 43 species

(b) Dipterocarps: Non-Meranti = 118 species
(c) Non-Dipterocarps = 294 species*
(* Gonystylus species is within this total species listed to be surveyed)

ii. Medicinal = 9 species
iii. Rattan = 6 species
iv. Bamboo = 6 species
v. Palms = 4 major species plus others

Figure 1:
Lay-out of sample unit



A total of 1,695 sample units or 99.1% of proposed sample units were surveyed throughout the 11 states in Peninsular Malaysia. There were 15 sample units that were not able to be surveyed due to security reasons. Once the inventory was completed, the MIDAP (Management Inventory Data Analysis Program) application was used by the Forestry Department as standard software package for the processing and statistical analysis of data collected during the NFI 4. The program was developed for the Malaysian-German Sustainable Forest Management and Conservation Project, Peninsular Malaysia.

Appendix 2

Forest Classes Used in National Forest Inventory 4

Forest Classes	Forest Types
1	Good Virgin Inland Forest
2	Poor and Moderate Inland Forest
3	Logged-over Forest (1-10 years)
4	Logged-over Forest (11-20 years)
5	Logged-over Forest (21-30 years)
6	Logged-over Forest (>30 years)
7	Virgin Peat Swamp Forest
8	Logged-over Peat Swamp Forest
9	State land Inland Forest
10	State land Peat Swamp Forest
11	Protection Forest

New Zealand's approach to addressing merbau and illegal logging

Wendy Jackson
wjackson@doc.govt.nz
CITES Management Authority
Department of Conservation
New Zealand

Illegal logging

1. Illegal logging is a significant problem for the global environment (principally through deforestation) and the global wood trade. Illegal logging takes place when timber is harvested, transported, bought or sold in violation of national laws. Illegal logging results in social conflict and violence, costs governments of producer countries billions of dollars in lost revenue, and causes considerable harm to forests and other ecosystems. Global forest resources are the most important repository of global biodiversity. Research has indicated that deforestation (both legal and illegal) contributes up to 20% of global human-induced greenhouse gas (GHG) emissions.

2. When significant amounts of illegally cut wood enter the global wood trade, it can result in depressed prices for legally harvested wood products. A study[1] completed at the end of 2004 suggests that the trade in illegal timber and timber products depresses world prices by 7-16% on average. This has been confirmed by research on the impact on the New Zealand forestry sector[2].

3. International discussion and action on illegal logging has been increasing over the past decade. In the absence of an internationally agreed coherent approach to the problem, countries have undertaken different initiatives to addressing illegal logging.

New Zealand's illegal logging policy development

4. The New Zealand Government has been working on illegal logging since mid-2004. In February 2006, the Ministry of Agriculture and Forestry (MAF) released a discussion document on policy approaches towards addressing this issue[3]. Included in this discussion document is the New Zealand definition of illegal logging, which covers all phases from harvesting through to processing and trade: "Illegal logging takes place when timber is harvested, transported, brought or sold in violation of national laws".

---

1 Seneca Creek Associates and Wood Resources International, "Illegal logging and global wood markets: The competitive impacts on the US wood products industry", prepared for American Forest and Paper Association, November 2004.

2 Turner, J., Katz, A., Buongiorno, J., Implications for the New Zealand Wood Products Sector of Trade Distortions due to Illegal Logging (July 2007) ://www.maf.govt.nz/forestry/illegal-logging/trade-distortion-implications/index.htm

3 The proposed New Zealand approach towards addressing illegal logging and associated trade activities, MAF Discussion Paper No: 2006/01, http://www.maf.govt.nz/forestry/illegal-logging/illegal-logging-discussion-paper/index.htm

5. Following on from consultations in November 2006 based on the discussion document, the Government approved the New Zealand policy to address illegal logging and associated trade, focusing on a suite of actions to be taken at domestic, bilateral, regional and international levels.

6. Specific actions, taken between end-2006 and May 2008 and that stemm from the agreed illegal logging policy, include:

- establishing the MAF illegal logging website as a resource;
- stakeholder consultation, including workshops on developing approaches to address the sale of illegally-sourced timber;
- implementing the Government's Timber and Wood Products Procurement Policy, which requires Government departments to seek legally-sourced (and sustainable-produced) timber and wood products including paper - as verified by the UK-based Central Point of Expertise in Timber (CPET) Procurement, among other legality verification schemes;
- undertaking economic research to understand the impact of global trade in illegal wood on New Zealand wood producers; and
- undertaking research on domestic policy options to address the sale of illegally-sourced timber in New Zealand[4].

7. In May 2008, the Government defined New Zealand's international forestry strategy as being three-pronged and focusing on the following objectives:

- reducing deforestation and forest degradation;
- addressing trade in illegal timber and wood products; and
- capacity-building and technology transfer for sustainable forest management in developing countries.

It was agreed that acting on all these components together has the potential to make a significant difference to the global environment and the global wood markets.

8. At this point, the Government agreed to a number of international and domestic actions to address illegal logging generally, with policy approaches targeting one species - merbau (otherwise known as kwila). The focus on merbau came as a result of findings from MAF-commissioned research undertaken in 2007[5]. The research showed that despite the small levels of suspicious timber imported into New Zealand[6] , merbau represented 80 percent of this timber. Because of its durable characteristics, merbau is

---

4 One domestic approach that was considered was introducing a requirement for suppliers of timber and wood products in New Zealand to produce a declaration of conformity with the laws and regulations of the country of origin of all timber imports. However, in May 2008 the Government decided not to pursue this option further as it was considered by stakeholders to be too onerous and disproportionate to the problem.

5 'Research into labelling of legal timber products and policy options to improve the legality of timber products in New Zealand', Prepared by Ogle Consulting Ltd, March 2008 http://www.maf.govt.nz/forestry/illegal-logging/labelling-of-illegal-timber-products/legality-of-timber-final.pdf

6 In the year ending 2007, New Zealand imported only 2 percent of its domestic sawn timber consumption, i.e. 54,000 m3. It is estimated that of this, 13 percent (7,000 m3) valued at around NZ$ 8.4 million may have been illegally sourced. This means that only 0.26 percent of domestic sawn-timber consumption may have come from illegal sources. Sawn merbau timber is estimated to comprise 80 percent (5,600 m3) of that suspicious timber.

commonly used for decking, flooring and outdoor furniture in New Zealand. Merbau is consumed in New Zealand and is not re-exported.

9. Identifying merbau as the main species of concern for New Zealand prompted the inclusion of merbau-specific tariff codes for timber and furniture in the Harmonised Tariff Codes of New Zealand in late 2007 and early 2008. Through use of these codes, trade statistics have since been recorded. The relevant import statistics indicate that the main source of merbau timber is Indonesia (accounting for over 80 percent of the volume, valued at approximately NZ$ 8 million). According to the data, the main source of merbau outdoor furniture imports is China.

10. The May 2008 package identified the following three priority areas for policy approaches, focusing on merbau:

- investigation of the feasibility and practicality of introducing mandatory labelling at the point-of-sale of all merbau products sold in New Zealand, requiring disclosure of species and whether the supplier has verification of the legality of the wood;
- a consumer awareness campaign focusing on illegally-logged merbau and the development of a voluntary pan-industry code of practice to encourage verification of the legality of merbau imports; and
- Ministerial-level bilateral engagement with selected key countries, with the aim of discussing bilateral mechanisms to prevent illegally-logged merbau from entering New Zealand.

11. In addition, the Government agreed to other measures considered as part of the longer term international strategy, to be pursued over the next 12-18 months.

Mandatory provision of information at the point-of-sale regarding the legality of kwila/merbau timber and timber products

12. Following from the May 2008 decision, an assessment of the feasibility and practicality of mandatory labelling for legality at the point-of-sale for all merbau products was undertaken. Based on this assessment, a set of policy options were developed and these were presented to the Government for its decision.

13. In October 2008, the Government decided to introduce a new requirement for all sellers of merbau to clearly display whether they have information about the legality of the timber and timber products from a legality certification or verification scheme which is recognised by the New Zealand Government.

14. The policy is intended to enable informed consumer choice and will not preclude the importation or sale of merbau that is not accompanied by evidence of legality. It is expected that the mandatory provision of information scheme will be formally introduced in around two years' time - the time needed to develop and implement the policy. The New Zealand Government will develop a set of objective criteria against which legality certification/verification schemes will be assessed. Stakeholders and trading partners will be consulted on these criteria as the policy is developed.

Consumer awareness

15. MAF has been raising consumer awareness about the legality issues associated with merbau timber and timber products. As part of this work, MAF is focusing on educating household and industry consumers about the kind of products that can contain illegally-logged timber and how they can buy responsibly.

16. The Government is yet to engage with industry on the voluntary pan-industry code of practice to encourage certification of the legality of merbau imports. However, as a result of consumer concerns about legality, some major furniture retail chains in New Zealand have already pledged to stop importing outdoor merbau furniture[7]. The New Zealand Government does not offer any incentives to industry that voluntarily require legality certification or verification for merbau products.

Ministerial bilateral engagement

17. With regard to ministerial engagement, the former-Minister of Forestry met with counterparts from Malaysia, Indonesia, Papua New Guinea and the Solomon Islands to discuss the possibility of bilateral mechanisms to prevent illegally-sourced wood products entering New Zealand.

18. In the context of the bilaterals the former-Minister:

- briefed his counterparts on New Zealand's planned domestic approaches;
- sought high-level commitment to bilateral development of mechanisms to address illegal logging;
- sought support for a CITES listing of merbau; and
- discussed possible regional initiatives, including re-energising the East Asia Pacific Forestry Law Enforcement and Governance (EAP FLEG) process.

19. Officials have begun follow-up actions resulting from the bilateral discussions and work in these areas will continue.

20. The former-Minister of Forestry also discussed New Zealand's policy approach with the Australian Minister of Forestry and at the Closer Economic Relations (CER) Ministerial meeting held in August 2008. At this occasion, the Ministers of Forestry welcomed the close dialogue underway around initiatives to counter illegal logging in the region and agreed to deepen the engagement between the two countries on this issue.

Other Activities

- Commissioning research to substantiate a proposal to list merbau on Appendix II of the Convention on International Trade in Endangered Species (CITES).

---

7 In late July 2008 major furniture retail chains including Big Save, Harvey Norman, Briscoes, Farmers and the Warehouse pledged to discontinue imports of outdoor merbau furniture, a commercial decision taken in response to consumer concerns.

21. New Zealand is interested in working with range States to achieve a listing for merbau under CITES. New Zealand is funding research to substantiate a proposal to have merbau included on Appendix II of CITES. This work is currently underway, and is due to be completed by the end of March 2009. The research will be developed in consultation with ranges states. In mid-February 2009, New Zealand will be circulating a draft of the proposal for comments by range State government. Once completed, the New Zealand government will engage with range State governments in order to ascertain the level of support for the listing, in time to meet the CITES Secretariat deadline of August 2009 for including this proposal on the agenda at the next Conference of the Parties (CoP15) scheduled to take place in January 2010.

22. An Appendix-II listing will mean traded merbau is accompanied by CITES documentation that ensures trade does not threaten the long-term survival of the species. This will help New Zealand achieve its objective of preventing the importation of illegally sourced merbau timber and timber products.

- Commissioning research to assess what further steps can be taken at a global level to effectively address international trade in illegally-sourced wood.

23. MAF has commissioned research on further international action required to reduce illegal logging and on the development of an action plan to provide conceptual leadership in this regard. MAF hopes to use this action plan as a basis for discussion by interested countries.

24. MAF was motivated to undertake this research based on its impression that a great deal is known about the problem and much action is being undertaken by countries to address it; however, what appears to be missing is a "game plan" for how to systematically address the issue in a global and coordinated fashion. The research is being undertaken by Chatham House (a leading global thinktank on illegal logging) and will be completed by the end of April 2009.

- Active support for regional and multilateral solutions to address the trade in illegal wood products

25. New Zealand is keen to reinvigorate the World Bank East Asia Pacific Forest Law Enforcement and Governance (EAP FLEG) process to encourage enhanced multilateral cooperation and action on illegal logging in the region.

26. New Zealand has contributed funding to two International Tropical Timber Organisation (ITTO) projects that focus on law enforcement and trade in CITES-listed timber species.

27. New Zealand has been an active participant in negotiations under the UNFCCC on the Reducing Emissions from Deforestation and Degradation (REDD) international financial mechanism, which will provide funding to preserve forest cover, thereby creating an incentive for nations to reduce the drivers of deforestation, including illegal logging.

28. Further information on New Zealand's illegal logging policy and work programme can be found on the MAF illegal logging website (http://www.maf.govt.nz/forestry/illegal-logging/), which contains research, cabinet papers and press releases and is regularly updated with policy developments. The MAF illegal logging website also contains contact details of government officials working in this area and links to the Government Timber and Wood Procurement policy.

International Tropical Timber Organization (ITTO) Support in the Management and Conservation of CITES-listed Timber Species in Southeast Asia[1] .

Thang Hooi Chiew[2] .

1.0 Introduction

1.1 In response to calls made in both the International Tropical Timber Organization (ITTO) Council and CITES Conference of Parties for support to range states for implementation of CITES listings, and in particular to support a work program element of the ITTO and the listing of commercial timber species in CITES which is a relatively recent phenomenon that brings with it new challenges both of a technical and institutional nature for organizations involved in forest management and timber trade, the ITTO is currently implementing a project in "Ensuring International Trade in CITES-listed Timber Species is Consistent with their Sustainable Management and Conservation," jointly with the CITES Secretariat. Funding for this project is primarily by the European Commission with additional support from the USA, Japan, New Zealand and Norway. The project will be implemented over a period of 42 months and is expected to conclude in 2010.

1.2 Implementation of the activities under this ITTO project will be guided by an Advisory Committee which meets at least once a year. This Advisory Committee comprises representatives from the ITTO and CITES Secretariats, donors, one or more of the regional coordinators, and at least one primary range state representative from the three tropical regions. The Advisory Committee may play a role in recommending proposals for consideration under the project. However, the final authority for approving the funding proposals rests with the Executive Director of ITTO.

1.3 Currently to coordinate, monitor and oversee the activities implemented under the project, three regional coordinators have been appointed, one each in Asia, Africa and Latin America. The latter is also given the responsibility to oversee the activities implemented across the three regions, including the development of a website for the project.

1.4 The overall objective of the project is to ensure that continuing international trade in CITES-listed timber species is consistent with their sustainable management and conservation. The specific objective is to assist national authorities to meet the scientific, administrative and legal requirements for managing and regulating trade in Pericopsis elata (Afrormosia) found in Central Africa, Swietenia macrophylla (Bigleaf mahogany) found in Latin America, and Gonystylus spp. (Ramin) found in Southeast Asia and, in particular, to develop guidance to ensure that their utilization is not detrimental to the survival of CITES-listed timber species.

1.5 The activities that could be considered for support and funding by ITTO in Asia under the project would include the following:

---

1 Paper presented at the International Merbau Workshop: Sustainabilty of Merbau for Trade, Singapore, 17-18 November, 2008.

2 ITTO Project Coordinator for Asia for the ITTO project in "Ensuring International Trade in CITES-listed Timber Species is Consistent with their Sustainable Management and Conservation".

(i) more in-depth information on the location, distribution, stocking and the management and protection status of Ramin, including forest inventory designs and the use of global positioning system (GPS) and geographical information system (GIS) in tree location mapping;

(ii) growth and yield studies of Ramin, stand dynamic and their responses to silvicultural interventions, including plantation performance;

(iii) non-detriment findings, including forest management plans that document the data and criteria used in setting export quotas and levels of sustainable use, both for domestic and export;

(iv) cost-effective monitoring and tracking systems, including the use of deoxyribonucleic acid (DNA) identification techniques, for all Ramin products, other than seed, seedlings and genetic material;

(v) holding of national fora and Regional Working Groups to create greater awareness among all stakeholders on the importance of sustainable use of Ramin and the possible consequences of loss of the species, including assisting in convening meetings of the Tri-National Task Force on Trade in Ramin;

(vi) conducting training workshops for relevant staff and capacity-building in key CITES compliance areas, including Customs personnel;

(vii) preparing 'outreach materials' including technical guides and materials constituting a "tool box" for range states and trading partners; and

(viii) developing an integrated website to disseminate project outputs and findings.

1.6 The direct beneficiaries of the project are the public authorities and private sector in the main range states where the CITES-listed timber species occur, namely, Cameroon, Congo, Democratic Republic of Congo, Bolivia, Brazil, Peru, Indonesia, and Malaysia, where the expected benefits are:

(i) improved management and regulations of trade of the CITES-listed species;

(ii) improved management and conservation of the CITES-listed species;

(iii) increased regional cooperation in research, silviculture and compliance; and

(iv) enhanced coherent policy framework through integration of knowledge on sustainable management and species conservation.

1.7 For other countries that are parties to CITES, especially countries where these CITES-listed species occur and/or trade in these species, they will benefit from improved capacity to manage and regulate trade in CITES-listed species, and an increased in awareness of and a greater capacity for compliance with CITES, as well as participation in workshops and seminars.

2.0 Current activities

2.1 A total of five Activities from Malaysia were approved by ITTO for implementation in 2008. They are as follows:

(i) "Non-detriment Findings Report on Gonystylus bancanus - A Quantitative Assessment of *G. bancanus* in two selected Permanent Forests of Sarawak";

(ii) "The Quantification of Dry and Wet Inland *Gonystylus* spp. (Ramin), *Aquilaria* spp. (Agarwood) and *Intsia* spp. (Merbau) in Peninsular Malaysia";

(iii) "Generation of spatial distribution maps of Gonystylus bancanus (Ramin) using hyperspectral technology and determination of sustainable level of harvest of Ramin in production forests of Peninsular Malaysia";

(iv) "The Development of *Gonystylus* spp. (Ramin) Timber Monitoring System Using Radio Frequency Identification (RFID) in Peninsular Malaysia"; and

(v) "Developing DNA Database for *Gonystylus bancanus* in Sarawak".

2.2 The five Activities will be implemented over periods varying from 8 to 24 months as in Annex 1, which also includes the agencies responsible for their implementation. The total approved budget is US$ 722,388 with the contribution from ITTO amounting to US$ 443,570, and the in-kind contribution from Malaysia at US$ 278,818.

2.3 In brief, the objective(s) and expected outputs of each of the five approved Activities for implementation in Malaysia in 2008 are as follows:

(i) the objective of the Activity on "Non-detriment Findings Report on *Gonystylus bancanus* - A Quantitative Assessment of G. bancanus in two selected Permanent Forests of Sarawak" is to collect data on the status and stocking of G. bancanus in the production forests of Sarawak; while the expected outputs are (a) status and stocking of *G. bancanus*, and (b) sustainable harvest quota of *G. bancanus*;

(ii) the objectives of the Activity in "The Quantification of Dry and Wet Inland *Gonystylus* spp. (Ramin), *Aquilaria* spp. (Agarwood) and *Intsia* spp. (Merbau) in Peninsular Malaysia" are
(a) to collect information on the distribution, status and stocking of dry and wet inland *Gonystylus* spp., *Aquilaria* spp. and *Intsia* spp. and
(b) to establish ten permanent sample plots to monitor the growth, mortality and recruitment of Gonystylus spp.; while the expected outputs are
(a) an assessment of the distribution and stocking of dry and wet inland *Gonystylus* spp., *Aquilaria* spp. and *Intsia* spp.,
(b) the future sustainable harvest level of *Gonystylus* spp., *Aquilaria* spp. and *Intsia* spp., and
(c) sufficient and credible information on the stocking and growth of *Gonystylus* spp. to further enhance sustainable harvest prediction;

(iii) the objectives of the Activity in the "Generation of spatial distribution maps of *Gonystylus bancanus* (Ramin) using hyperspectral technology and determination of sustainable level of harvest of Ramin in production forests of Peninsular Malaysia" are

(a) to generate spatial distribution maps through the use of hyperspectral technology and non-spatial information of Ramin, and

(b) to determine the sustainable level of harvest for Ramin in production forests; while the expected outputs are

(a) spectral library of the species,

(b) spatial distribution maps of Ramin species,

(c) non-spatial data and information on Ramin species,

(d) population dynamic, and

(e) sustainable harvest levels of Ramin in the production forests of Peninsular Malaysia;

(iv) the objectives of the Activity in "The Development of *Gonystylus* spp. (Ramin) Timber Monitoring System Using Radio Frequency Identification (RFID) in Peninsular Malaysia" are

(a) to develop a customized cost-effective Gonystylus spp. timber monitoring system using radio frequency identification (RFID), and

(b) to develop an automated detection and notification mechanism for tracing non-compliances using gentry (gate) system; while the expected outputs are

(a) more rapid issuance of removal passes during the transport of timber from logging areas to mills using a customized cost-effective RFID based timber monitoring system, and (b) better forest enforcement and detection of non-compliance using the customized electronic data logger and gentry (gate); and

(v) the objectives of the Activity in "Developing DNA Database for *Gonystylus bancanus* in Sarawak" are

(a) to study the genetic variation and differentiation of *G. bancanus* population in Sarawak, and

(b) to develop a DNA database for G. bancanus to enhance efforts in tracing and tracking of *G. bancanus* timber; while the expected outputs are

(a) DNA for population of the peat swamp forests with *G. bancanus* trees extracted,

(b) genetic variation and genetic differences within and among population determined, and

(c) genotype profile of sampled trees for each population established.

2.4 In the case of Indonesia, a total of four Activities were approved by ITTO for implementation in 2008 which are as follows:

(i) "Improving inventory design to estimate growing stock of Ramin (*Gonystylus bancanus*) in Indonesia";

(ii) "Assessing silvicultural system on Ramin: Review on the current practice and re-vitalization of existing permanent sample plots";

(iii) "Exploratory assessment on the population distribution and potential uses of Non-*Gonystylus bancanus* species in Indonesia"; and

(iv) "Identification of Information Gaps towards the Sustainable Forest Management of Ramin and Thematic Programs to be Included in the 2009 and 2010 Work Program of the ITTO-CITES Project - Ensuring international trade in CITES-listed timber species is consistent with their sustainable management and conservation".

2.5 All the Activities will be implemented over a period of 12 months, except for the Activity on "Identification of Information Gaps towards the Sustainable Forest Management of Ramin and Thematic Programs to be Included in the 2009 and 2010 Work Program of the ITTO-CITES Project" which will be conducted through a 2-day national workshop as in **Annex 2**, which also includes the agencies responsible for their implementation.

2.6 The total approved budget for the four projects is US$ 440,898 with the contribution from ITTO being US$ 357,895, while the in-kind contribution from Indonesia is valued at US$ 83,003.

2.7 In brief, the objective(s) and the expected outputs of each of the four approved Activities for implementation in Indonesia in 2008 are as follows:

(i) the objective of the Activity in "Improving Inventory Design to estimate Growing Stock of Ramin *(Gonystylus bancanus*) in Indonesia" is to develop an inventory design using satellite technology for estimating the standing stock of Ramin, as well as the other species found growing in the peat swamp forests in Sumatra and Kalimantan; while the expected outputs are

(a) an inventory design developed to estimate standing stock of species in peat swamp forests, and

(b) an estimate of the standing stock of Ramin;

(ii) the objectives of the Activity in "Assessing Silvicultural System on Ramin: Review on the Current Practice and Re-vitalization of existing Permanent Sample Plots" are (a) to review and evaluate the silvicultural system and its practice, and (b) to re-vitalize the existing permanent sample plots of Ramin so as to obtain a better understanding on the population dynamic, growth and yield of Ramin and the other species found growing in peat swamp forests; while the expected outputs are

(a) a review and revision of the silvicultural system and practice, with specific reference to Ramin and the other species found in peat swamp forests, and

(b) a re-design of the permanent sample plots for Ramin and the other species found in the peat swamp forests in Sumatra and Kalimantan;

(iii) the objective of the Activity in "Exploratory Assessment on the Population Distribution and Potential Uses of *Non-Gonystylus bancanus* species in Indonesia" is to explore the current status of non-*G. bancanus* species in Indonesia and contribute to the conservation of Ramin species; while the expected outputs are

(a) a state-of-the-art review on *Gonystylus* species other than *G. bancanus*, and

(b) an assessment of the current growing stock, population distribution and habitats of non-*G. bancanus* species; and

(iv) the objectives of the Activity on "Identification of Information Gaps towards the Sustainable Forest Management of Ramin and Thematic Programs to be Included in the 2009 and 2010 Work Program of the ITTO-CITES Project" are

(a) to identify information gaps on resource base, production and trade of G. bancanus, including administrative and legal provisions, as well as other enabling conditions required for achieving sustainable management of Ramin, and

(b) the thematic programs to be included in the 2009/2010 Work Program of Indonesia.

2.8 The ITTO has also approved in principle two other Activities for implementation in 2009, namely, a 4-day Malaysian "National Workshop on Enforcement Compliance for Trade in Ramin (*Gonystylus* spp.)", and a 5-day "International Ramin Workshop - Identification, Tracking and Challenges".

2.9 The objectives of the "National Workshop on Enforcement Compliance for Trade in Ramin (Gonystylus spp.)" are (a) to acquire better knowledge and understanding of CITES requirements and implementation of Ramin as well as other CITES-listed species, (b) to deliberate on issues and problem of different enforcement mechanisms by the various agencies in handling Ramin and other CITES-listed species, (c) to further understand Malaysia's International Trade in Endangered Species Act 2007, and (d) to create proper enforcement mechanisms, including deliberation on the establishment of a Malaysian Coordinating Unit for enforcement of matters under CITES.

2.10 The proposed "International Ramin Workshop - Identification, Tracking and Challenges" will enhance information and knowledge exchange in Ramin identification with regard to trade and implementation of the CITES Appendix II listings, and identify potential cost-effective regulatory system(s) in product tracking for field testing and identification. The expected outputs of the workshop are

(a) refined methodology and technology as appropriate for the relevant countries,

(b) identified gaps in current enforcing capacity relating to trade and CITES implementation, and

(c) recommended affordable and appropriate technologies and tools for transfer by technology providers to producer countries.

2.11 Notwithstanding the above, Malaysia has submitted a project on "The Promotion of Sustainable Management of Merbau (*Intsia* spp.) and Ramin (*Gonystylus* spp.) in Indonesia and Malaysia" for support and funding from ITTO. The objective of the proposed project is to promote sustainable utilization and conservation of Merbau and Ramin in production forests of Malaysia and Indonesia. More specifically, the proposed project aims to generate spatial distribution maps through the use of hyperspectral technology and non-information of Merbau and Ramin in a cost-effective manner, and to determine the sustainable level of harvest for Merbau and Ramin in Malaysia and Indonesia. However, after an assessment of the proposed project, ITTO recommended that a pre-project proposal be prepared for submission based on the project proposal as it was felt that there is a need for a comprehensive review of the feasibility of applying airborne remote sensing hyperspectral technique for the identification of Merbau and Ramin trees in tropical rain forests; and that additional information on biometric modeling of the current stocking of Merbau and Ramin species and population dynamic in Malaysia and Indonesia is required.

2.12 Indonesia has also submitted a project proposal on "Capacity Building of Local Governments to Monitor and Evaluate the Progress of Sustainable Forest Management" as a follow-up to the completed ITTO project on "Training of Trainers for Sustainable Forest Management" and the on-going ITTO project on the "Application of Internal Monitoring of Sustainable Forest Management Performance at

Forest Management Unit Level". These completed, on-going and proposed projects would greatly strengthen the management and conservation of tree species at the local level, especially threatened species such as Merbau.

2.13 At the request of the Government of Papua New Guinea (PNG), ITTO had mounted a mission to PNG in January 2008 to elaborate on a "Multipurpose Forest Inventory as a Tool for Sustainable Forest Management". The objectives are to identify the implications for inventory design and implementation of the information needs of policymakers and stakeholders for forest use over and above timber harvesting, and to develop an action plan for a Multipurpose National Forest Inventory (MNFI) in PNG. This is in view that there is a clear and urgent need for a MNFI in PNG to provide updated information on the various aspects of its natural and planted forests, such as wood, non- timber forest products, plant and animal biodiversity, biomass, carbon stocks, and socio-economic indicators related to people living in or near the vicinity of forest. This MNFI will enhance the management and conservation of forest species, including Merbau, and will also serve as a baseline for the design and implementation of future national development plan, taking into account its obligations as a Party to international agreements and conventions.

3.0 Implications for merbau conservation and sustainable use

3.1 Except for the Activity on "Identification of Information Gaps towards the Sustainable Forest Management of Ramin and Thematic Programs to be Included in the 2009 and 2010 Work Program of the ITTO-CITES Project", the expected findings and results of the eight Activities that are going to be implemented in Malaysia and Indonesia under the current ITTO project will provide, among others, the added knowledge, technical know-how and capabilities of countries to better conserve and manage Merbau species, as well as to ensure that its utilization is sustainable in the long term.

3.2 More specifically, the experience gained in (a) the preparation of non-detriment findings and determination of sustainable harvest levels; (b) the use of airborne remote sensing hyperspectral technique for tree identification in tropical rain forests and the generation of spatial distribution maps; (c) the development of timber tracking and monitoring system using Radio Frequency Identification (RFID) to enhance forest enforcement and detection of non-compliance under existing country legislation and regulations; (d) the development of DNA database, including determination of genetic variation and genetic differences, as well as genotype profile of sampled trees; (e) improved cost-effective inventory design using satellite technology; and (f) the establishment of permanent sample plots to monitor growth and yield of tree species which are highly applicable for managing, conserving and protecting Merbau species, will greatly enhance its sustainable utilization.

3.3 In addition, the quantification of Merbau species in Peninsular Malaysia will provide an assessment of its current status, stocking, distribution and sustainable harvest level. This will further enhance the future sustainability of Merbau species in the Peninsula.

3.4 The completed ITTO project on "Training of Trainers for Sustainable Forest Management" and the on-going ITTO project on the "Application of Internal Monitoring of Sustainable Forest Management Performance at Forest Management Unit Level", as well as the proposed project on "Capacity Building of Local Governments to Monitor and Evaluate the Progress of Sustainable Forest Management" in Indonesia will contribute to sustainable forest management at local level, and hence, ensuring the sustainability of Merbau wood products.

3.5 The proposed Multipurpose National Forest Inventory in PNG will provide the methodologies for the assessment of plant and animal biodiversity, including Merbau species, carbon stocks and other attributes related to tropical forest goods and services, and of forest degradation which are currently not fully operational at affordable costs.

4.0 Conclusions

4.1 For the 2009/2010 work program for Malaysia, the Government of Malaysia intends to conduct the "National Workshop on Enforcement Compliance for Trade in Ramin" that was approved in principle by ITTO in 2008; and to submit proposals for a study on the recovery rate of exportable Ramin sawn timber; a study on genetics of *G. bancanus*, especially in Sabah and Sarawak, in the context of establishing an integrated genetic database of *G. bancanus* for Malaysia; and assistance for the Fourth Meeting of the Tri-National Task Force on Trade in Ramin that will be held in Malaysia in 2009.

4.2 In the case of Indonesia, the type of activities to be proposed under its 2009/2010 work program for support and funding from ITTO will be based on the outcomes of the 2-day national workshop on the "Identification of Information Gaps towards the Sustainable Forest Management of Ramin and Thematic Programs to be Included in the 2009 and 2010 Work Program of the ITTO-CITES Project" scheduled to be held later this year.

4.3 In 2009, TRAFFIC Southeast Asia will implement the proposed "International Ramin Workshop - Identification, Tracking and Challenges" that was approved in principle by ITTO earlier this year. TRAFFIC Southeast Asia also intends to submit to ITTO a proposed activity on "Genetic identification of Ramin wood products - development and implementation in Southeast Asia" which will be jointly organized with the TRACE Wildlife Forensics Network. This proposed activity will further develop a novel Ramin genetic identification test in order to allow wood and processed wood products to be identified in Southeast Asian laboratories, and to investigate the potential for DNA analysis to enable individual Ramin species to be identified and samples traced back to their geographic origin within Southeast Asia. The findings of this proposed activity will also be highly applicable in tracing the origin of Merbau wood products in trade.

4.4 Both Malaysia and Indonesia have expressed the wish to have Merbau species included under the ITTO project. However, this is not possible as its current scope only covers CITES-listed timber species and, as such, both countries hope that Merbau species will be included in the project if it is extended beyond 2010.

Annex 1

Approved Malaysian Activities for 2008

No.	Activity Title	Submitted by	Executing Agency	Implementing Agency	Duration (months)
1	Non-detriment Findings Report on *Gonystylus bancanus* – A Quantitative Assessment of *G. bancanus* in two selected Permanent Forests of Sarawak.	Government of Malaysia.	Ministry of Natural Resources and Environment Malaysia.	Forest Department Sarawak and Sarawak Forestry Corporation.	12
2	The Quantification of Dry and Wet Inland *Gonystylus* spp. (Ramin), *Aquilaria* spp. (Agarwood) and *Intsia* spp. (Merbau) in Peninsular Malaysia.	Government of Malaysia.	Ministry of Natural Resources and Environment Malaysia.	Forestry Department Peninsular Malaysia (FDPM).	15
3	Generation of spatial distribution maps of *Gonystylus bancanus* (Ramin) using hyperspectral technology and determination of sustainable level of harvest of Ramin in production forests of Peninsular Malaysia.	Government of Malaysia.	Ministry of Natural Resources and Environment Malaysia.	Forest Research Institute Malaysia (FRIM).	24
4	The Development of *Gonystylus* spp. (Ramin) Timber Monitoring System Using Radio Frequency Identification (RFID) in Peninsular Malaysia.	Government of Malaysia.	Ministry of Natural Resources and Environment Malaysia.	Forestry Department Peninsular Malaysia (FDPM).	8
5	Developing DNA Database for *Gonystylus bancanus* in Sarawak.	Government of Malaysia.	Ministry of Natural Resources and Environment Malaysia.	Forest Department Sarawak and Sarawak Forestry Corporation.	12

Annex 2

Approved Indonesian Activities for 2008

No.	Activity Title	Submitted By	Executing Agency	Implementing Agency	Duration
1	Improving inventory design to estimate growing stock of Ramin (*Gonystylus bancanus*) in Indonesia.	Government of Indonesia.	Forestry Research and Development Agency (FORDA).	SEAMEO-BIOTROP[3]	12 months.
2	Assessing silvicultural system on Ramin: Review on the current practice and re-vitalization of existing permanent sample plots.	Government of Indonesia.	Forestry Research and Development Agency (FORDA).	Center for Forest and Nature Conservation Research and Development (CFNCRD).	12 months.
3	Exploratory assessment on the population distribution and potential uses of Non-*Gonystylus bancanus* species in Indonesia.	Government of Indonesia.	Forestry Research and Development Agency (FORDA).	Center for Forest and Nature Conservation Research and Development (CFNCRD).	12 months.
4	Identification of information gaps towards the SFM of Ramin and thematic programs to be included in the 2009 and 2010 Work Program of the ITTO-CITES Project- "*Ensuring international trade in CITES-listed timber species is consistent with their sustainable*	Government of Indonesia.	Forestry Research and Development Agency (FORDA).	Center for Forest and Nature Conservation Research and Development (CFNCRD).	2 days (national workshop) .

3 Southeast Asian Ministers of Education Organization, Regional Center for Tropical Biology.

Merbau Industry in Malaysia in Perspective[1]

Siti Syaliza Mustapha
Executive, Public & Corporate Affairs
Malaysian Timber Council

Introduction

Intsia spp. is generally known as Kwila in countries such as New Zealand and Papua New Guinea but it is commonly called Merbau in Malaysia, a genus widely distributed throughout the country, mainly in the lowland areas and along rivers.

Merbau wood is classified as a heavy hard wood. Its sapwood is pale yellow in colour with yellowish or orange-brown heartwood when fresh that darkens to brown or dark red-brown on exposure. It has coarse but even texture with interlocked grains and seasons slowly without any degrade.

Second only to Balau (*Shorea* spp.) in its excellent material quality and working properties, Merbau, though often sought for its weathering durability and high resistance to marine borers and termite attacks, is notably one of a high class in that the species is suitable for a wide variety range of use - outdoor and general construction uses such as decking, exterior joinery, window frame and door as well indoor furniture, flooring and decorative work. It is no surprise that the Merbau tree receives stark attention and interests as much as it does from both the business community and the civil society groups in the international scene, perhaps apart from the reasons behind the geopolitical and socio-economic environment of the species' locality.

This paper puts into perspective the significance of Merbau industry for the country, supported by a strong holistic management policy against the backdrop of constantly changing and challenging market sentiments and demands.

Merbau Industry in Malaysia

By and large, the Merbau industry in Malaysia thrives from a sustained supply of raw material from the forests within the country, mainly from the timber producing states in the Peninsular Malaysia. Based on the statistics recorded by the Forestry Department of Peninsular Malaysia[2] , for year 2000-2007 the production of Merbau timber fluctuates evenly, averaging at approximately 89,500m³/year (see Table 1).

---

[1] Paper prepared for the International Merbau Workshop: Sustainable Management of Merbau for Trade, 17-19 November 2008, Singapore

[2] The Forestry Department of Peninsular Malaysia also often compiles statistics and information for the whole country, including Sabah and Sarawak

Table 1:
Production of Merbau logs, 2000-2007 (m³)

Year	Total
2000	100,549
2001	72,978
2002	84,611
2003	77,751
2004	90,543
2005	89,312
2006	107,112
2007	93,197

Source: Forestry Department of Peninsular Malaysia

The main export of Merbau products from Malaysia are sawntimber, decking and flooring[3] , in a volume more or less evenly spread over the past four years at least, as shown below on Table 2. The average volume of Merbau sawntimber export per year is about 21,500m³. Data on further processed products such as moulding, window frame or furniture is not available as species distinction for each product exported will require extensive capacity and resources. Needless to mention, the volume of Merbau export in the form of further processed products is not as significant.

Europe is the major market for Merbau sawntimber from Malaysia, where the niche market is in The Netherlands and Belgium; followed by China, Germany, Australia and the Scandinavian countries of Sweden and Norway (see Figure 1).

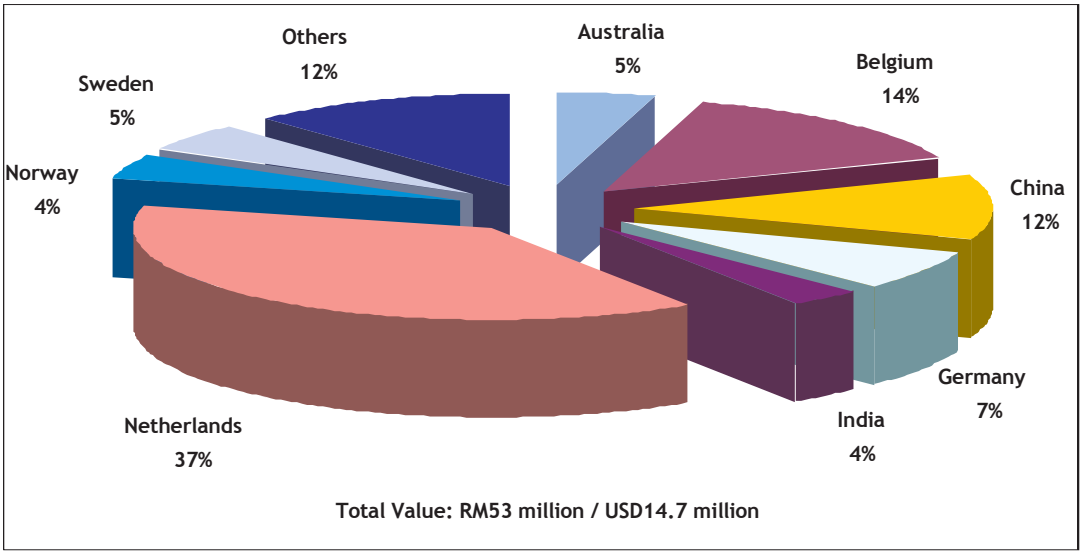
Table 2:
Export of Merbau Sawntimber from Malaysia (2004 - 2007)

Year	Volume (m³)	FOB Value (RM)
2004	21,518	46,197,052
2005	20,502	57,765,080
2006	19,603	56,114,011
2007	24,505	52,960,719

Source: Malaysian Timber Industry Board (MTIB)

3 Decking and solid flooring are often categorised as 'sawntimber' in export statistics

Figure 1:
Major markets for Merbau sawntimber, 2007



Source: Malaysian Timber Industry Board (MTIB)

Malaysia's timber trade

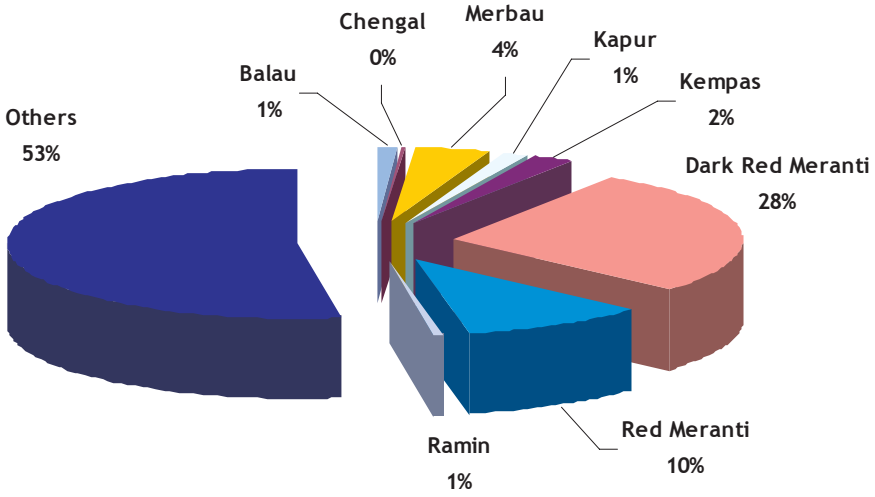
Malaysia has been producing tropical hardwood product for more than a century and remains one of the world's leading exporters of tropical hardwood products until today. While Merbau has always been a commercially important species, export statistics for the year 2007 shows that it accounts for only about 4% of the total value of approximately USD300 million of all sawntimber export from Peninsular Malaysia [4](see Figure 2).

Meanwhile, sawntimber export accounts for only about 14% from the total export of timber products worth USD6.3 billion (Figure 3). Japan is the biggest importer of timber products from Malaysia, followed by USA and South Korea as shown in Table 3.

As an important contributor to the socio-economic development of the country, the forestry and timber industry provides employment to about 270,000 people and accounts for 30% of total export earnings in the commodity sector, next to the oil palm industry.

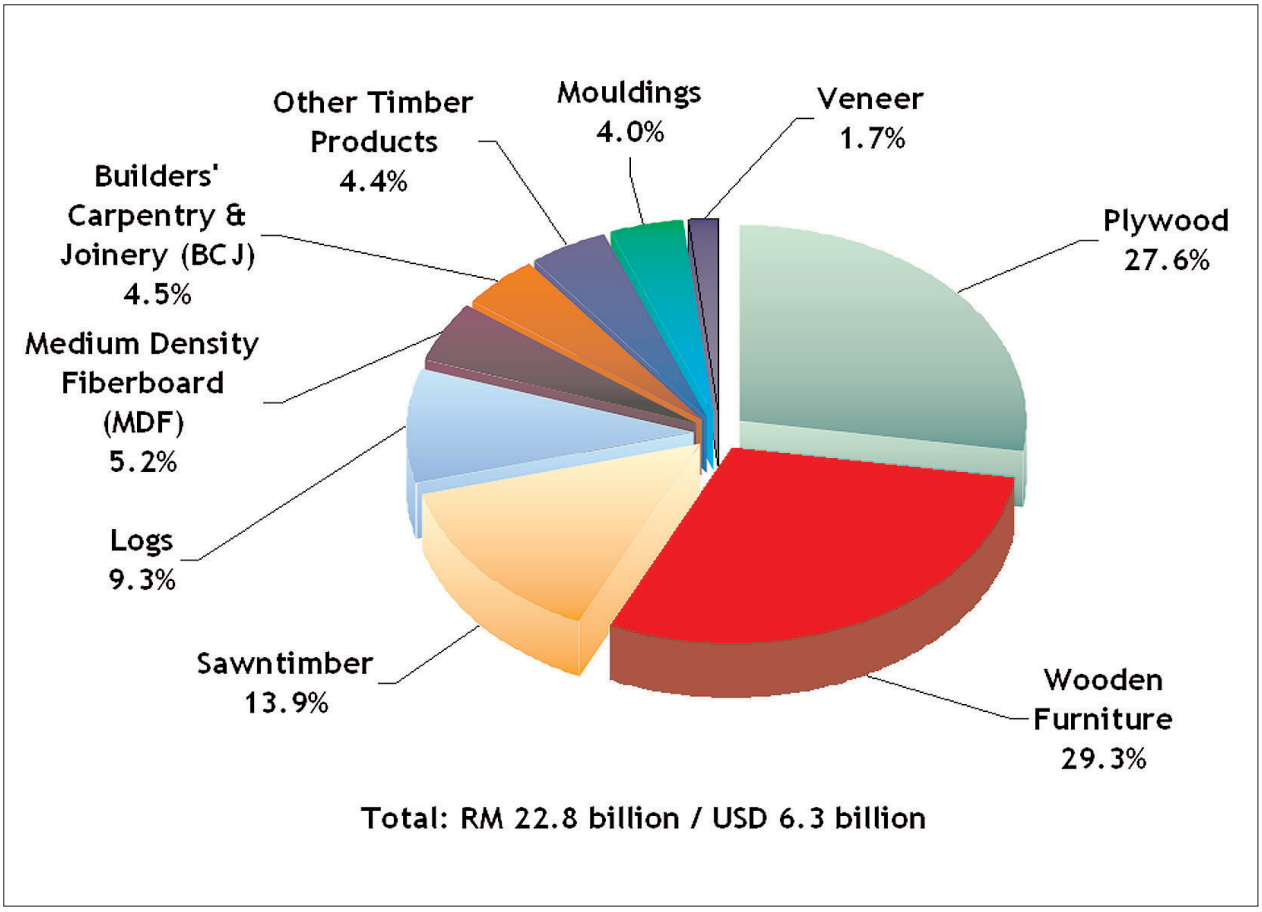
[4] Merbau sawntimber is mainly exported from Peninsular Malaysia.

Figure 2:
Export of Sawntimber from Peninsular Malaysia by Selected Species, 2007



Source: Malaysian Timber Industry Board (MTIB)

Figure 3:
Export of Timber Products from Malaysia, 2007



Source: Malaysian Timber Industry Board (MTIB)

Table 3:
Major Export Markets for Timber Products, 2007

Countries	2007	%
Japan	4,868.13	21.4
USA	2,912.79	12.8
South Korea	1,147.45	5
China	1,118.41	4.9
United Kingdom	1,093.02	4.8
Taiwan	1,047.55	4.6
India	1,045.39	4.6
Australia	947.85	4.2
UAE	854.05	3.8
Netherlands	747.04	3.3
Others	6,942	30.6
Total	**22,723.92**	100

Source: Malaysian Timber Industry Board (MTIB)

Sustainable forestry

With land area of about 32.95 million hectares, Malaysia enjoys a high percentage of forested land among other developing timber producing countries such as Brazil, Indonesia and Thailand. About 56% (18.35 million hectares) of its land area is covered by natural forests, that increases to about 75% if tree crops such as rubber, oil palm, cocoa and coconut are taken into consideration.

Of the total 18.35 million hectares of forested land, over 73% or 13.43 million hectares are gazetted as Permanent Reserved Forests (PRFs) under the National Forestry Act, 1984 and relevant state enactments and ordinances. Another 1.53 million hectares outside the PRFs are gazetted as National Parks and Wildlife Sanctuaries and is totally protected under various legislations.

Within the PRF, 10.81 million hectares are classified as production forests where commercial harvesting of timber according to a predetermined rotational cycle is permitted. The remaining 2.62 million hectares are designated as protection forests, including but not limited to riverine areas and buffer zones.

Sustaining the industry

Over the recent years, production of logs has been decreasing steadily, mainly due to imposition of tougher laws, policies and regulations governing forest harvesting. Malaysia's forest policies have always emphasized the balance between protection and production. This will not only ensure sustainable supply of material towards socio-economic development of the country but also maintain the ecological balance of the environment.

Table 4:
Projected average sustainable annual log production from natural forests under five year plans

Period	Million m^3
2006-2010	16.1
2011-2015	14.91
2010-2020	14.91

Source: Forestry Department of Peninsular Malaysia

The key to maintaining this balance is sustainable forest management (SFM), which has long been practised and continuously improved. The coordination of a common approach to forest management is facilitated through the National Forestry Council (NFC), established by the National Land Council in 1972, chaired by the Deputy Prime Minister. The NFC brings together the Chief Ministers of the 13 states of Malaysia along with representation by the heads of all forestry department in Peninsular Malaysia, Sabah and Sarawak, as well as relevant Federal Ministers responsible for Natural Resources and Environment, Finance, Trade and Plantation Industries and Commodities, amongst others to formulate forest sector policies and the control of utilisation of land.

Along with the regulatory bodies and other implementing agencies such as the Forestry Department of each state, Sarawak Forestry Corporation (SFC), Malaysian Timber Industry Board (MTIB) and Sarawak Timber Industry Development Corporation (STIDC), SFM can be implemented and the corresponding sustainable timber trade can be maintained.

Satisfying market demands

Timber trade in the international market is riddled with impediments, both tariff and non-tariff barriers, from various technical requirements to specific requirements and sometimes hindrances based on subjective sentiments on legality and sustainability status of timber. This includes but is not limited to diversity of standards, import restrictions by importing countries such as Norway, Australia and various local councils in Europe, requirement for specific and costly verification and certification as well as commitment to intergovernmental bodies such as CITES.

Malaysia is proud of its commitment and achievement in SFM and strongly holds to the belief that SFM, which may only be accomplished through good governance, is the answer to ensure benefits to all parties. Based on this notion, the Malaysian Timber Certification Council was set up in 1999 to develop and operate a voluntary national timber certification scheme in Malaysia.

The Malaysian Timber Certification Scheme (MTCS) began operation in October 2001 using a phased approach due to the greater challenges encountered in managing the complex tropical forests. The standard initially used for assessing Forest Management Units (FMUs) for the purpose of certification was the Malaysian Criteria, Indicators, Activities and Standards of Performance for Forest Management Certification [MC&I(2001)] which is based on the 1998 ITTO Criteria and Indicators for Sustainable Management of Natural Tropical Forests.

During the second phase of the implementation of the MTCS beginning late 2005, MTCC has been using the Malaysian Criteria and Indicators for forest management certification [MC&I(2002)] which contains nine principles, 47 criteria and 6 indicators. For chain-of-custody (CoC) certification, the standard used has been the Requirements for Chain-of-Custody Certification (RCOC).

To date, over 4.4 million hectares of forests have been certified under the MC&I (2002), while 125 companies are now holders of the Certificate for Chain-of-Custody.

Having a robust system coupled with relentless outreach programmes, the MTCS has gained wide recognition internationally. The following relevant bodies have accepted the MTCS as providing proof of sustainability, or legality at the very least:

- The Danish Ministry of the Environment in its document entitled Purchasing Tropical Timber-Environmental Guidelines;
- The Department for Environment Food & Rural Affairs (DEFRA), United Kingdom;
- The Ministry of Agriculture and Forestry, New Zealand;
- The Royal Horticultural Society (RHS) of UK;
- The French Ministry of Environment and Sustainable Development and the Ministry of Agriculture, Food and Rural Affairs;
- Forestry Agency, Ministry of Agriculture, Forestry and Fisheries, Japan;
- The Netherlands Keurhout Protocol for Sustainable Forest management (KH-SFM and the Keurhout Protocol for Legal Origin (KH-LET); and
- The Free and Hanseatic City of Hamburg, Germany.

Conclusion

The key principle in sustaining the viability of forest ecosystems, which includes management of all species, Merbau or otherwise, lies in the holistic management of the forests.

Malaysia is well on its way to achieve SFM, paving a solid foundation for a robust timber industry that will in turn provide wholesome benefits to the country.

The Australia Overview on Imported Timber Products

Paul Elsmore
Executive Director
Simmonds Lumber Group

The objectives of this paper are to provide background into the Australian Timber Importers Federation inc (ATIF) and summarise activity by the Australian Government and the Australian forest industry to develop a policy and related statutory measures to ensure that timber and wood products imported into Australia are legally sourced.

Merbau imports into Australia

2006 - 2007 40,000 m3
Approx dollar value $75 million, AUD

Australian Timber Importers Federation Inc

The Australian Timber Importers Federation Inc (ATIF) has been established for more than 20 years and represents the timber importer/wholesaler sector of the timber industry. The ATIF coordinates the activities of timber importers and wholesalers and identifies and manages those issues that are of National significance to this sector of the industry.

The ATIF liases with the Australian Federal Government on issues of relevance to members, such as tropical timber importers; certification of timber imports as to source; matters related to bio security; trade instruments and trade performance. The ATIF also acts to facilitate market access for its members and their products and raises issues that are considered to restrict fair trade practices.

The ATIF has the following commercial and technical credentials:

- Members are major timber importers with substantial individual and collective expertise.
- Well established links with industry associations in Papua New Guinea, Indonesia and Malaysia.
- Well established links with Australian based South East Asian trade commissioners and commercial interests.
- On going dialogue with relevant industry organizations beyond South East Asia.
- Working relationships with other Australian timber and forest industry association.

The ATIF recognizes that the Australian Governments policy and supporting statements emphasize the desirability of working with industry to develop policy and statutory instruments to establish and enforce the legality of imported forest products and to promote the production and purchase of legal forest products.

Australian Government illegal logging policy development

The current Australian Government (elected late 2007) has commenced working with industry and South East Asian governments to "crack down" on illegal logging and to encourage the sourcing of forest products from sustainable forest management practices. According to the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF), new work will be required to implement election commitments to identify illegally logged timber and restrict its import into Australia.

Unlike the previous Government that resolved to support self-regulatory measures by the industry to control illegal logging activity, the present Government considers that new regulation or amendments to existing regulations will be required to implement their policy objectives.

According to the Australian Government, illegal logging and illegal trade in forest products is a consequence of a complex set of interrelated legal, political, social and economic factors. It is primarily a symptom of unclear or poorly enforced forest tenure, weak political institutions, corruption, inadequate natural resource planning and monitoring and lax enforcement of sovereign laws and regulations. The term "illegal logging" clearly signifies legal abuses, but the types of activities considered to be illegal vary widely. The Australian Government defines illegal logging as taking place when timber is harvested, transported, bought or sold in violation of national and/or international laws.

The Australian Government considers illegal logging and trade in associated timber and wood products to be a significant concern to environmentalists and industry alike. It causes environmental, social and economic damage by endangering plant and animal life, contributes to greenhouse gas emissions land biodiversity loss and depletes natural resources. Illegal logging also deprives local communities of their legitimate ownership rights, denies them opportunities to maintain their traditional lifestyles and to improve their economic welfare. Illegal logging also undermines sustainable industry development, provides unfair competition to legitimate timber enterprises and causes significant revenue losses to governments, communities and industry.

To meet election commitments the Government has proposed a policy and statutory frame work that:

1. Permits only legally verified imports of specified timber and wood products.
2. Requires disclosure of information on species, country of origin and compliance with the applicable laws of the country of origin of specified timber and products in Australia.
3. Builds capacity of South East Asian regional governments to reduce illegal logging and implement sustainable forest practices.
4. Supports the development and adoption of forest certification and product chain of custody schemes that verify compliant timber and wood products with the applicable laws of the country of origin.
5. Argues that the market-based incentives aimed at reducing emissions from deforestation and forest degradation should be included in future international climate change agreements.

Support for South East Asian regional forest industry capacity building through skills-based training, technology transfer, information exchange and research is also being provided through the Asia Pacific Forestry Skills and Capacity Building Programme (APFSCBP) and Overseas Development Aid programmes. The Government will seek increased cooperation and support for programmes to restrict illegal logging and promote sustainable forest management through intergovernmental forums.

The Australian Government views forest certification and product chain of custody schemes as an important part of the long-term solution to illegal logging. While implementation of forest certification schemes has progressed well in Australia, uptake among countries in the Asia Pacific region has been slower. Australia's support for forest certification in these countries will be provided through bilateral and multi lateral processes and the Government will continue to work with industry and certifying organizations to promote the adoption of these schemes.

At present, no criminal law provisions create an offence for the importation of illegally logged timber and wood products into Australia. New regulation or amendments to existing regulations will move in this direction. It is proposed that the Government will support the policy measures by establishing regulations that will:

1. Require Australian wholesalers, including importers and retailers to provide proof of compliance with domestic laws in country of origin of imported timber and wood products.
2. Require Australian wholesalers and retailers to provide proof of legal compliance of domestically produced timber and wood products; requiring disclosure of information on species, origin and certification/verification documentation.
3. Include penalties for breaches of legislation, such as penalties for failure to disclose information on the legality, species or country of origin of timber and wood products where misleading or false information is provided.

Key Australian forest industry association, notable the ATIF, the National Association of Forest Industries (NAFI) and the Australian Plantation Products and Paper Council (A3P) are participating in the Australian Government's illegal logging policy development process.

In addition to this participation, the detail supportive work that would inform the Governments illegal logging policy process has been outlined to the Government. This work would build on the Forest and Wood Products Australia (FWPA) research programme being undertaking to assist to give effect to the Governments broad policy direction.

Essentially the FWPA research will examine current practices in countries comparable to Australia to verify legality mechanisms of imported timber and wood products, including third party verification and other procedures.

Some of the policy development related work that could be carried out by relevant industry associations or others, includes the following projects:

Marketplace Compliance and Support

This project is in part motivated by recognition that there would be cost burden to the timber supply chain of compliance with Government policy and regulation measures.

The project would be directed at producing a report on ways to:

1. Assist marketplace acceptance and the cost impost of "certified" timber products.
2. Inform consumers about the merits of purchasing such "certified" products.

The project and recommended actions would gain leveridge from the FWPA wood promotion campaign and other initiatives to promote a defined suite of timber and other product categories in the marketplace.

The project would seek to identify measures that could be put in place, how this would be done, what the costs would be. It would also identify other positive means to reinforce the merits of regulations, encourage compliance and customer support.

Investigations of Certification Schemes

This project would be undertaken in recognition that "qualifying" certification schemes are the basis of the regulation mechanism proposed by the Government. It will, therefore, be essential to fully understand the "suitability" of the various schemes presently in operation or proposed.

This project would build on and amplify schemes and methodologies available for emerging that are likely to be detailed in the current FWPA research project. It could also assist in ascertaining whether or not there was merit in developing an Australian specific scheme designed especially to meet Government regulation requirements and timber importing business realities.

Information collection, storage and disclosure

This project would be directed at identifying and testing practical issues related to timber information disclosure and how the mechanism might work. Disclosure, costs, traceability and accessibility are the sort of information that could be examined. This project would necessitate consultation within the timber supply chain and possible the examination of non timber product types that appear to have the similar information disclosure statements.

This project would also need to have regard to suggested species naming requirements and current practices of using local and trade names, noting that some trade names encompass several species, sometimes from more than one country.

An important underpinning of the Australian Government policy approach is the principal of equity with domestically produced timber. It will be important therefore, to understand how this requirement operates and what measures might be prescribed to meet regulations requirements, while at the same time ensuring relative consistency with domestically produced timber labeling and information disclosing requirements.
Consultation with Supplier Countries

This project would be in part directed at minimising the possibility of adverse reaction being fed back to the Australian Government from the Supplier country government.

Understanding and cooperative implementation of regulation requirements will e aided by early consultative dialogue with supplier country exporting companies and industry associations. Dialogue with supplier country exporting countries and industry associations would assist in the development of necessary positive supplier support and understanding of "qualifying" verification mechanisms. It would also serve to brief suppliers about the origins, intent and mechanisms central to the Government's policy

and assist in building supplier country cooperation in a way that would assist successful policy implementation.

An Introduction to China's Merbau Trade

Lin Xiaping,
Vice Secretary-General,
China Timber Distribution Association

It is my pleasure to be here today to give you an introduction to China's Merbau trade. My presentation will cover four aspects, namely:

1. Overview of China's timber consumption
2. China's timber imports in recent years
3. China's Merbau imports
4. Conclusion and suggestions

China's Timber Consumption

First, an overview of China's timber consumption. Amid China's rapid economic growth and the country's emergence as a global base for timber processing - as evidenced by the sharp rise in China's exports of furniture and other wooden products in the past two years - China's demand for timber has been increasing at a fast pace. China is now the world's largest exporter of round logs, sawn timber and other wooden products.

In 2007, China's timber consumption stood at 351 million cubic metres. Of this total, 28% or 98.28 million cubic metres was used for the pulp and paper industry, 25% or 87.75 million cubic metres for building materials in construction and renovation, and 13% or 45.63% for furniture making. China also consumed timber in other areas, such as for agricultural purposes (31.59 cubic metres), fuel (10.53 cubic metres) and miscellaneous (10.53 cubic metres).

To put it differently, 19% or 66.6 million cubic metres of all timber consumed by China went into the making of wooden products for exports such as furniture, window panes, wooden flooring and plywood. Overall, 57% or some 200 million cubic metres of China's timber consumption was for building materials, furniture and other wooden products.

In 2007, excluding the 98.28 cubic metres of timber that was used for the pulp and paper industry, other industries such as construction and renovation, furniture and assorted wooden products consumed a combined 230 million cubic metres of timber. China's on its own produced 190 million cubic metres of timber, including 68.74 million cubic metres of commercial-grade timber, 44 million cubic metres from over-quota harvesting, 44 million cubic metres from contracted production by private farmers and 36.58 million cubic metres from fibreboard. An imbalance between supply and demand left China short of 40

million cubic metres of timber. Since China does not have enough forestry resources to satisfy its demand, the import of wooden materials will become a must for the future expansion of China's exports and domestic consumption.

China's Imports of Round Logs and Sawn Timber

We now turn to China's timber imports in recent years. In 2007, China imported 37.09 million cubic metres of round logs worth US$5.35 billion (of which 22.6% or 8.4 million cubic metres was of tropical origin) and 6.49 million cubic metres of sawn timber valued at US$1.76 billion (of which 33% or 2.15 cubic metres was of tropical origin).

Between 2005 and 2007, China's imports of round logs had been increasing at above 9.5% annually. For sawn timber, the imports hovered at the six million cubic metres level each year, except in 2007, when it grew by 6.9% from 2006. Since the beginning of 2008, however, the global economic slowdown has taken its toll on China's timber imports. China's cumulative imports of round logs for the first nine months of 2008 fell by 19% to 23.15 million cubic metres compared with the corresponding period a year before while its sawn timber imports dropped by 6.9% to 5.13 million cubic metres.

China sourced for round logs from some 90 countries and territories worldwide. At 25.40 million cubic metres, Russia was the largest seller with a 68.5% share of China's total imports. This was followed by Papua New Guinea at 2.34 million cubic metres (representing a 6.3% share), Malaysia 1.33 million cubic metres (3.5%), New Zealand 1.27 million cubic metres (3.4%), Gabon 1.15 million cubic metres (3%) and the Solomon Islands 1.05 million cubic metres (2.8%). The six countries together accounted for 87.7% or 32.54 million cubic metres of China's round log imports.

Since 2004, there has been a change in the composition of countries exporting round logs to China. Round log imports from Asian countries had been on a decline while imports from Oceanian and Sub-Saharan African countries had been on a growth path. In 2007, China's round log imports from Asian countries totalled 2.54 million cubic metres, a 38% fall from 2004. Meanwhile, China's round log imports from Oceania stood at 5.15 million cubic metres in 2007, which was a 78% surge from 2004. Similarly, China's round log imports from Sub-Saharan Africa grew by 79% to 2.55 million cubic metres over the four-year period. The increase in supply from Oceania and Sub-Saharan Africa offset the shortfall caused by Asia's decreasing wood resources.

Of all Asian countries from which China traditionally obtained its supply of round logs, Malaysia recorded the steepest fall in exports to China in percentage terms. In 2007, Malaysia sold only 1.33 million cubic metres of round logs to China, representing a 54.6% fall from 2.93 million cubic metres in 2003. As for Myanmar, its exports of round logs to China also dropped by 36% to 0.72 million cubic metres in 2007 from 1.13 million cub metres in 2005. Apart from the devastating effect of the Asian tsunami in 2004, another reason for the decline in round log exports from Asian countries was the introduction of new export quotas.

In contrast, round log imports from Papua New Guinea and the Solomon Islands increased steadily. By 2007, Papua New Guinea had sold 71% more round log to China from 2003, when it exported 1.37 million cubic metres, and replaced Malaysia as the second largest seller.

Due to higher export duties imposed by Russia on its timber, China increased its imports from North America. Round log imports from North America grew by 33% in 2007 from 2006. In particular, imports from Canada increased by 35%.

For sawn timber, China's imports had been relatively stable between 2004 and 2007, settling at around six million cubic metres per annum. Prices were also quite stable. In 2007, China imported 6.49 million cubic metres of sawn timber, representing a 7% increase from 2006. Of this total, 43% or 2.8 million cubic metres were coniferous woods while 56.7% or 3.69 million cubic metres were deciduous woods. Within the deciduous mix, 2.15 million cubic metres were from tropical forests (accounting for 33% of China's sawn timber imports) while 1.53 cubic metres were from non-tropical forests (23.6%).

In 2007, among the top nine exporters of sawn timber to China, Russia alone sold 1.59 million cubic metres, making it the largest seller with a 24.5% share of total China's imports. This was followed by United States of America (1.07 million cubic metres, representing a 16% share), Thailand (0.69 million cubic metres, 10.6%), Canada (0.67 million cubic metres, 10.3%), Malaysia (0.31 million cubic metres, 4.8%) and Brazil (0.28 million cubic metres, 4.3%). The top nine exporting countries sold a combined 5.39 million cubic metres of sawn timber to China, representing 83% of the latter's total imports.

As a result of China's policy aimed at boosting its timber processing industry, China imported 35% more sawn timber from Russia in 2007 compared with the previous year. During the same period, China's sawn timber imports from America grew by 5% while its imports from Canada rose by 70%.

Meanwhile, sawn timber imports from Thailand, Malaysia and Indonesia witnessed negative growth. Compared with 2006, Thailand's sawn timber exports to China dropped by 2.8% in 2007 and Malaysia's exports fell by 17.4%. This paled in comparison with Indonesia, whose sawn timber exports to China plunged by 42.2%, making it only the eighth largest seller at 0.26 million cubic metres in 2007. This was a sharp departure from the scenario in 2003, when Indonesia was China's most important source of supply, selling 109 million cubic metres of sawn timber then.

China's Merbau Imports

Having looked at China's timber imports in general, we will now look specifically at the Merbau imports.

In China, Merbau is used mainly for the manufacturing of solid wood flooring, laminate wood flooring, door, staircase, veneer board and ships. As China's economic wealth trickles down to the households, wood flooring has become a must-have in home decoration these days. Besides having good strength properties, Merbau has attractive colour variability and growth rings. These qualities, coupled with the affordability of Merbau, make it popular among Chinese consumers. Such strong demand makes China one of the world's key markets for Merbau products.

Year 2001 marked the beginning of the fast growth era for solid wood flooring sales in China, leading to rapid development of the country's wood flooring industry. In 2001, China's sales of solid wood flooring (including exports) exceeded 60 million cubic metres. Sales over the next years grew by over 25% per annum, reaching 100 million cubic metres in 2004. This coincided with a time when China consumed more merbau.

In 2007, China imported Merbau worth US$49.64 million. Of this, 72,000 cubic metres were round logs (valued at US$28.58 million), accounting for 0.89% of all tropical round logs imported by China. Another 33,700 cubic metres were sawn timber (valued at US$21.06 million), making up 2% of all tropical sawn timber imported by China.

Between 2003 and 2008, China imported the most Merbau in 2004. For that year, China imported 890,000 cubic metres of Merbau, representing a 39% increase over 2003. In 2005, China's Merbau imports dropped drastically by 87%, to 120,000 cubic metres. This further dipped to the lowest point at 62,000 cubic metres in 2006, before it rebounded by 15.7% in 2007. For the first nine months of 2008, China imported 82,000 cubic metres of Merbau, a 37% increase from the corresponding period a year before. The cumulative imports for the first nine months alone exceeded imports for the whole of 2007.

Prior to 2006, China imported Merbau round logs mainly from Malaysia, Papua New Guinea and Indonesia. Of the three countries, Malaysia was the largest exporter in 2004, supplying 870,000 cubic metres or 98% of the total imported by China. Since then, China has sourced for Merbau from more countries, ranging from the Solomon Islands, Madagascar, Mozambique, Congo, Togo to Samoa, Guinea, the Philippines and Togo. In 2007, topping the list of Merbau exporters to China was Papua New Guinea, which sold 57,000 cubic metres or 79% of the total imported by China. Malaysia came in second, with 7,350 cubic metres (10%), followed by Indonesia's 6,956 cubic metres (9.6%), the Solomon Islands' 325 cubic metres (0.45%), Samoa's 82 cubic metres (0.1%) and Laos' 30 cubic metres (0.04%).

As Merbau round logs become increasingly scarce, China has resorted to importing more Merbau sawn timber to satisfy its demand. China's imports of Merbau sawn timber increased by 69% to 46,000 cubic metres in 2006 from 27,000 cubic metres in 2005. The figure dropped by 27% to 33,700 cubic metres in 2007. But for the first eight months of 2008, it has rebounded by 111% to 51,000 cubic metres compared with the corresponding period a year before. China's cumulative imports of Merbau sawn timber for the first eight months of 2008 alone already topped imports for the whole of 2007by 52%.

China currently imports Merbau sawn timber from well over 20 countries - more than the number of countries from which China buys Merbau round logs. The number one exporter to China in 2007 was Indonesia, which sold China 29,000 cubic metres of Merbau sawn timber or 87% of the total it imported. Malaysia was the second largest exporter, with 3,436 cubic metres (or 10% of China's total imports), followed by the Solomon Islands' 615 cubic metres (1.8%) and Papua New Guinea's 220 cubic metres (0.65%). Since 2007, China's Merbau sawn timber imports from the Solomon Islands had grown the fastest compared with other countries. From 137 cubic metres in 2006, it grew 349% to 615 cubic metres in 2007. For the first nine months of 2008, the imports from the Solomon Islands grew by 310% to 1,277 cubic metres over the corresponding period a year before.

With the decline in Merbau stocks, prices for round logs and sawn timber have both risen. According to statistics by China's customs, Merbau round logs sold for an average price of US$200 (above 1,000 renminbi) per cubic metre in 2005 but this soared to about US$475 (above 3,000 renminbi) per cubic metre in 2007. Likewise, Merbau sawn timber was priced at US$444 (above 3,000 renminbi) per cubic metre in 2005 before the price climbed to US$589 (above 4,000 renminbi) per cubic metre in 2007. In July 2008, Zhangjiagang City of Jiangsu Province, China's main gateway through which tropical timber is imported, reported paying between 3,000 and 4,800 renminbi per cubic metre for Merbau round logs. Two months later, on the timber market in the Guangzhou City, the same material fetched above 5,000 renminbi per

cubic metre while ring-width A-grade smooth-four-sides wood (measuring 2.2 to 5 metres in length and 4 to 5 centimetres in width) was priced at between 8,200 and 8,600 renminbi.

Since the beginning of 2005, China has imported far less Merbau round logs than before. Meanwhile, China imported more Merbau sawn timber, resulting in better prices. The reasons for this phenomenon are as follows:

1. Dwindling Merbau stocks - The Indonesian tsunami in 2004 wrecked quite a few Southeast Asian countries and in the process, drastically lowered the production quantity of Merbau wood in the affected areas. Also, in 2005, the Indonesian government imposed logging and export quotas for Merbau round logs as part of its effort to tackle illegal logging. As a result, Indonesia stopped exporting Merbau round logs and replaced these with sawn timber. On China's end, this was reflected in the higher imports of Merbau sawn timber, sourced from various countries and regions besides traditional supplying countries like Malaysia.

2. Change of tax policy - Since 2005, China's government made a series of adjustments to taxes on timber products. Not only was the tax rebate for exports of solid wood flooring and one-time-use wooden products cancelled, the government also introduced a 5% consumption tax, cut the export tax rebate for furniture from 11% to 9% and lowered a similar rebate for plywood to 5%. Consequently, production and sales of China's solid wood flooring fell drastically, by 29% in 2005 compared with the previous year. Merbau is the most common material used in solid wood flooring. So it was no surprise that lower production and sales of solid wood flooring affected China's demand for and imports of Merbau.

3. Higher prices for Merbau - Affordability has been one of the main reasons which Chinese home-owners like Merbau wood flooring. When Merbau flooring first entered China's market, it was priced at about 100 renminbi per square metre. As Merbau became harder to get, prices for Merbau wood flooring rose steadily. It is now selling for 300 to 400 renminbi per square metre, more expensive than its peers in the same specification category such as Kempas and Ash solid wood floorings. With little difference between their prices, consumers naturally turn to wood flooring of higher grades if they were to spend the same amount of money on Merbau flooring.

4. Substitute product for solid wood flooring - Laminate flooring is gaining acceptance among Chinese consumers at the expense of solid wood flooring. In 2000, China's wood flooring market was dominated by engineered wood and solid wood. As a new entrant at the time, laminate wood flooring had a mere 4% share compared with the two. This changed dramatically over the next few years. In 2004, engineered wood flooring recorded 75 million square metres in sales, representing a 53% share of the overall wood flooring market. Some 60 million square metres of solid wood flooring were sold, accounting for 43% of the total market (it was 50% in 2000). Remarkably, laminate flooring posted sales of 40 million squares, enjoying a 14% share of the market. In 2007, the market share of engineered wood flooring expanded further to 63% (with sales of 220 million square metres) while that of laminate flooring surged to reach 20% (with sales of 70 million squares metres). Amid a shift in consumer preferences and new tax policies, the sales of solid wood flooring dropped to 50 million square metres, with it market share falling to 15% in 2007. This reduced China's demand for Merbau.

5. The decision by the home-improvement chain B&Q to join the boycott in Merbau flooring sales in China has also affected the country's demand for Merbau.

Conclusion and Suggestions

The figures presented so far point to a few conclusions:

1. China is committed to sustainable development and environmental protection. Through taxation and other policy adjustments, the country has reduced the production and consumption of solid wood flooring, contributing to the preservation of Merbau.

2. It is easy to find substitutes to Merbau in timber processing and as such, the inclusion of Merbau on the CITES Appendices has little impact on China's timber processing industry. Businesses and consumers will turn to alternative options.

3. As a global timber processing base and a major trading country, China sources for timber materials from over 90 countries and territories. For Chinese enterprises to effectively monitor the legality of the timber that they purchase, there has to be better cooperation between governments and industries.

Several suggestions are made here in response to the conclusions:

1. In the event that a timber species is added to the CITES Appendices in the future, ample time must be factored in for notification and implementation so that businesses can facilitate a transition plan and manage their inventory effectively in order to minimise their losses.

2. Research and development of reconstituted decorative wood must be stepped up to satisfy consumers' demand while preserving the endangered species.

3. We need a proper understanding on the reasonable use of timber resources and sustainable development. Compared with steel and cement, timber resources have a shorter growth cycle when it comes to production and can be recycled with minimal pollution. Forests are also instrumental in absorbing carbon dioxide and releasing oxygen. Reasonable use of timber resources thus is a positive for forestry development and improvement of our environment. We should fight illegal and excessive logging but we should not swing to the other end and ban logging blindly either. Finding a balance between the two is a question we need to address from now on.

Overview of DNA Timber Tracking - Current Implementation and Future Potential

Darren Thomas
Double Helix Tracking Technologies

Introduction

Double Helix Tracking Technologies Pte Ltd (DHTT) is a technology service provider to the timber industry. The company is developing a system to track timber through the supply chain using the unique DNA of individual trees. To date, this technology has been incorporated into a legality assessment system (Certisource) which evaluates the legality of forest concessions in Papua, Indonesia. 'DNA Verification' is then used in combination with a traditional document based Chain-of-Custody system to track the legally harvested timber from the concession to the processing factory up to the point of export.

The system is currently in commercial operation. Simmonds Lumber, an Australian timber importer, has been using DHTT's services since March 2007 to verify the origin of Merbau timber from concessions in Papua, Indonesia through to sawmills in Java, Indonesia. With the support of Simmonds Lumber, DHTT has been able to gradually improve the technology whilst demonstrating that the concept of DNA Timber Tracking is operationally and economically viable.
The presentation will focus on:

- An overview of the potential applications of DNA 'fingerprinting' and DNA 'barcoding' in the timber industry;
- How DHTT's DNA Verification system currently works;
- Current technological and operational limitations;
- How DHTT intend to improve the system through continued research and development;
- How the technology would be used as part of a concerted strategy to promote the sustainable management of Merbau in Indonesia and PNG.

Technology Overview

Trees, like humans and all other living things have DNA. DNA testing has been used for human and animal forensic methods for many years but is only now being explored for use in the timber trade.

There are two main DNA based techniques of particular relevance to timber:

- *DNA 'Fingerprinting'*: This refers to the method of identifying genetic markers unique to individual trees. These markers can be used to track logs and timber products through the timber supply chain.
- *DNA 'Barcoding'*: This technique focuses on identifying the genetic profile for a particular species rather than individual specimens. In the timber industry, it is useful for identification of shipments of timber where the species is unknown or suspect.

At DHTT, our mission is to develop the ability to analyse a wood sample taken from a piece of timber at any point in the supply chain (even the retail outlet) and identify its geographic origin. In this way we hope to differentiate between timber products from well-managed forest sources and products from undesirable sources. There is still a long way to go before realizing this goal, but we have already reached significant developmental milestones including DNA Fingerprinting of Merbau timber.

Presentation Outline

1. Current Implementation

Technology has progressed to the point that we are now able to use DNA timber tracking to strengthen existing document-based Chain-of-Custody systems. Such document systems rely on a paper-trail to track timber through the supply chain but are at high risk of fraud, allowing unknown, unwanted sources of timber to enter the supply chain.

By overlaying a system of DNA Verification on top of the document process, fraud can be detected and subsequently deterred. As such, DNA Verification is complementary to existing Chain-of-Custody systems already in use in many supply chains and can be regarded as a type of quality control technology.

Our immediate objective is now to prove the feasibility of DNA Verification across three dimensions:

1. *Scientific validity*: is our methodology scientifically sound?
2. *Operational feasibility*: can our methodology be implemented in the field?
3. *Economic viability*: can the above be achieved whilst remaining affordable to the industry?

Through our work with Simmonds Lumber and other partners, we are progressing well towards achieving all three targets. During the presentation, we will explain our current operational process and scientific methodology and how it addresses all three conditions above.

2. Current Limitations

There are three immediate avenues for continued development that will be explored during the presentation. These are:

1. *Improving DNA extraction from timber*: Extracting DNA from wood is particularly challenging as DNA tends to degrade the more that the timber is processed (sawn, dried, treated). Obtaining DNA of sufficient quality from final wood products is difficult (but not impossible). Currently, we can extract DNA from the raw log and also from sawn timber. Further work is required to extend this ability all along the supply chain.

2. *Improving accuracy of DNA analysis*: There are different methods to identify and analyse DNA markers as well as evaluate the results. DHTT is constantly working to implement and improve upon the best possible method that will work on processed timber samples and degraded DNA.

3. *Improving access to forest for targeted DNA sampling*: Ideally, DNA samples need to be taken as close to stump as possible to minimize the risk of log swapping during harvesting. Our access to forest concessions is already good, enabling us to take samples from the log pond and accessible parts of the concession for stump samples whenever necessary. To improve the system and take a higher proportion of samples closer to the stump requires closer cooperation with Forest Management Units in line with improved forest management practices for cruising and harvesting.

3. Supporting Merbau Sustainability

- Where efforts are being made to promote sustainable management of Merbau stocks, DNA Verification can complement and strengthen existing forest management and Chain-of-Custody systems. It would have most impact where the risk of fraud was highest.
- Effective implementation would exclude illegal timber from supply chains under verification. If implemented on a large enough scale, it would eliminate the market for illegal merbau and ensure that only well-managed sources have market access.
- DHTT is currently working to implement further field pilots with forestry consultants and auditors to prove that DNA Verification can easily integrate with internationally recognized legality assessment programmes and be economically viable.
- DNA Verification could be used as part of a broader system of national or regional merbau trade control. DHTT would welcome an opportunity to work on such a project.
- With further development, DNA Fingerprinting and Barcoding techniques could be used as evidence to support enforcement of regulations and legislation to control trade in Merbau.

Annex 8:

Cases of illegal merbau trade since November 2001

Source: www.eia-international.org/www.telapak.org, viewed January 2006

January 2004: Police in Bintuni, West Papua, arrest 15 Malaysians for illegal logging and seize 10 000m3 of merbau logs and heavy equipment imported from Malaysia.

December 2003: The Indonesian navy intercepts the cargo vessel Bravery Falcon loading merbau logs off the island of Daram, West Papua. The vessel is found to be flying a false Indonesian flag and has 17 000m^3 of merbau logs on board. The crew state the intended destination is China. In the same month police in the Aifat district, near Sorong, seize a barge carrying 400 merbau logs with a volume of 9000m^3.

October 2003: Vessel Irawati is reported to be sailing from West Papua to Singapore with a load of 10 000m^3 of merbau logs.

September 2003: Vessel Lok Prakesh reportedly sailing from West Papua to the port of Zhangjiagang in China with a cargo of 9000m^3 of merbau logs.

February 2003: EIA/Telapak field investigation documents 2700m^3 of cut merbau logs awaiting collection at a loading point in Srer, in the Seremuk district of West Papua. Research shows there are no legal permits for logging operations in the area.

January 2003: Police raid a logging camp in Manokwari district, West Papua, and discover 16 000m^3 of illegal merbau logs. The operation results in the arrest of nine Malaysians linked to the company PT Rimba Kayu Arthamas.

November 2002: The Indonesian navy intercepts the vessel Surabaya Express off the island of Madura, north of Java. The vessel is carrying 5 000m^3 of illegal merbau logs from the Serui district of West Papua.

October 2002: EIA/Telapak field investigation discovers large merbau logs awaiting loading inside a nature reserve the island of Batanta, Raja Ampat.

TRAFFIC, the wildlife trade monitoring network, works to ensure that trade in wild plants and animals is not a threat to the conservation of nature. It has offices covering most parts of the world and works in close co-operation with the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

For further information contact:

The Director
TRAFFIC Southeast Asia
Unit 9-3A, 3rd Floor
Jalan SS23/11, Taman SEA
Petaling Jaya, Selangor
Malaysia
Telephone: (603) 7880 3940
Fax: (603) 7882 0171
Email: tsea@po.jaring.my

The Executive Director
TRAFFIC International
219a Huntingdon Road
Cambridge CB3 0DL
United Kingdom
Telephone: (44) 1223 277427
Fax: (44) 1223 277237
Email: traffic@traffic.org

TRAFFIC
the wildlife trade monitoring network
is a joint programme of
WWF IUCN

March 2009