

FRIM in FOCUS



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25 years of R&D EXCELLENCE



HIGHLIGHTS OF THE ISSUE

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5. GETTING UP CLOSE WITH THE MALAYSIAN BIODIVERSITY



The Long Journey to a Flora of Malaysia

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DR ENGGIK SOEPADMO, DR RUTH KIEW, DR SAW LENG GUAN, TAN HUI SIN & NADIAH IDRIS



Malaysia has around 15,000 species of vascular plants making it one of the countries with the richest plant diversity in the world and yet the flora is still not fully documented. Peninsular Malaysia has about 8500 species while Sabah and Sarawak have 12,000 species. Documenting the flora requires commitment from both local researchers and their collaborators from around the world. The phased approach to document the flora of Malaysia has already begun with two projects namely the

Tree Flora of Sabah and Sarawak and the Flora of Peninsular Malaysia.

The Tree Flora of Sabah and Sarawak Project initiated in 1991 is the most important modern taxonomic project for the Borneo region. The project is jointly undertaken by the Forest Research Institute Malaysia (FRIM) and the Forestry Departments of Sabah and Sarawak to provide detailed and up-to-date botanical and ecological information on the tree resources of the two states. For the past 19 years the project has received the generous support of botanists from local and overseas institutions resulting in the publication of six volumes of the Tree Flora of Sabah and Sarawak, two Botanical Gazetteers and 99 scientific papers. In the first six volumes, 1745 indigenous tree species in 72 families and 267 genera were revised. This figure represents 49.8% of the estimated total of 3500 tree species native to Sabah and Sarawak.

Of the total tree species investigated, 138 (7.9%) are new to science, and 735 (42%) are endemic to Sabah and Sarawak. It is envisaged that at least another ten years is needed to complete the remaining 1763 (50.2%) species.

The Flora of Peninsular Malaysia Project initiated in 2005 is currently funded by the Malaysian Government until the end of 2010. The new Flora includes two series with Series I covering the ferns and lycophytes (650 species) and Series II covering the seed plants (7834 species). At least 25 years is needed to complete the revision of about 8500 species. Besides revision work, activities of the Flora of Peninsular Malaysia Project also include a strong training element, an active field work programme, and the establishment of a specimen database. In line with the Malaysian Plant Red List, the



editor's note

In conjunction with Forest Research Institute Malaysia (FRIM) 25 year's anniversary on October 2010, *FRIM in Focus* (FIF) features several prominent FRIM researches and flagship projects. The seemingly short list however, does not seek to represent the entire achievement of FRIM after 25 years of inception moreover, it is only a fairly small portion of an expanding cake. From various aspects of forest products to forestry, the public has come to know about many of FRIM researches and activities featured in past issues of FIF. Many products featured in FIF during the recent three years have been commercialised while some are already in the pipeline. Notwithstanding are many commendable efforts of FRIM researchers in the introduction of new technologies and processes which have brought about many awards and recognition both local and international to the Institute and the researchers. In this issue, researches featured cover the areas of flora of Malaysia, biotechnology (including planting of karas), biodiversity and drug discovery. Here's hoping that FRIM will continue to pave its way of excellence in many more years to come!

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conservation status of each species is also being assessed. To speed up the publication of the Flora, collaboration with international experts is encouraged. To date, the first volume of each series has been published with further volumes in the pipeline.

Malaysia being widely recognised as one of the centres of biodiversity, is richly endowed with plant genetic resources. If exploited and managed wisely, these genetic resources could provide renewable products not only now but also for future generations. To make full use of this resource, Malaysia and FRIM in particular, is in need of a concerted documentation programme planned in line with national capabilities in terms of expertise, research facilities and funding.

To complete the Flora of Malaysia, we need to complete revisions of the remaining 37 families under the Tree

Flora of Sabah and Sarawak Project, finalise documentation of the Flora of Peninsular Malaysia with an estimated flora of 8500 species, update the flora checklist of Sabah and Sarawak, and embark on a Flora of Sabah and Sarawak Project (which covers non-trees) upon completion of the Tree Flora of Sabah and Sarawak Project.

1. Group photo Gunung Menkobo expedition, Sabah
2. A fruiting kelumpang (*Sterculia megistophylla*) with high potential to be introduced as an ornamental tree
3. Expedition to Pulong Tau National Park, Sarawak
4. Six published volumes of the Tree Flora of Sabah and Sarawak



NRE DAN AGENSI DI BAWAHNYA PEROLEH SIJIL 5S

Kementerian Sumber Asli dan Alam Sekitar (NRE) telah berjaya memperoleh pensijilan 5S pada 17 Ogos 2010 bersama-sama Institut Penyelidikan Perhutanan Malaysia (FRIM) yang turut memperoleh pengiktirafan tersebut pada 19 Julai 2010. NRE adalah Kementerian yang pertama memperoleh pensijilan kualiti 5S secara serentak bersama-sama agensi dan jabatan di bawahnya. Usaha mendapatkan pensijilan itu telah bermula semenjak 2009 dengan mengadakan pertandingan 5S antara bahagian dan jabatan. Hanya dalam tempoh sebulan, bermula dari 19 Julai hingga 17 Ogos 2010, NRE dan jabatan serta agensi di bawahnya telah berjaya mencipta sejarah 5S di peringkat kebangsaan. Tahniah kepada semua penjawat awam yang terlibat!

1. Pengauditan dijalankan di salah sebuah makmal FRIM
2. Juruaudit dari Perbadanan Produktiviti Malaysia (MPC) (kanan sekali) menyampaikan taklimat



Treasures of the Forest Revealed

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DR NORWATI MUHAMMAD, LOK ENG HAI,
DR NORLIA BASHERUDIN & MOHD ROSLI HARON



Forest Research Institute Malaysia (FRIM) views the forest as a treasure to be conserved and explored for income generation. Essentially, FRIM biotechnology research is focused upon producing better planting materials for the forest plantation and therefore helps to reduce harvesting resources from the natural forest. In the long run, establishment of the karas plantation will serve to minimise the rapid karas destruction and exploitation of natural gaharu or agarwood. FRIM is also working to ascertain good management techniques to sustain the supply of cultivated agarwood.

Planting materials are improved through two approaches namely tree improvement and genetic engineering. Through tree improvement and marker assisted selection (MAS) techniques, better trees were produced for example, acacia hybrid which is a cross between *Acacia mangium* and *A. auriculiformis*, which grows faster and has better pulping traits.

In addition to woody species, improvements were also made on

herbal plants such as kacip fatimah and citrus whereby clone banks of these species were already established in FRIM.

Meanwhile, current technology approaches such as genetic engineering increases the production capacity for tongkat ali using the hairy root culture. Hairy root is capable of producing bioactive compounds as fast as three months compared to between five to seven years if extracted from naturally-grown tongkat ali roots. The study of tongkat ali hairy root in bioreactors is being upscaled to meet the demand of the herbal and pharmaceutical industries. Genetic engineering technology was also successful in producing the teak tree which is resistant to insects. The modified teak is able to better survive attack by its common pest which is a certain moth known as *Paliga damastesalis*.

Biotechnology also has the potential to be incorporated into green technology initiatives. For instance, the use of fungi in biopulping is currently being investigated in FRIM. Biopulping is the term used when lignocellulosic materials are being treated by biological agents prior to the mechanical or chemical pulping processes, in this case by lignin-degrading fungi. Some of the usages of biopulping include improving pulp quality, enhancing paper characteristics as well as reducing energy and chemical consumption. Five isolates of white-rot fungi that are efficient in wood degradation have been identified. In addition, the encoding genes for these lignin

degrading enzymes are currently being isolated. The cloning of these genes will be useful in establishing the optimum conditions to induce higher enzyme production in fungi and to identify the constitutive expression of the genes. FRIM is also carrying out research on green technology to add value to forest trees. The diversification of the use of acacia into bioenergy known as torrefied acacia wood (TRAW) has been completed and ready to be utilised as a source of sustainable green energy.

Biotechnology research was also developed to assist the phytosanitary certification procedures and the chain of custody. The control of illegal logging can be achieved by the detection of timber theft cases through specific biotechnological tools. Through genetic marker approach, FRIM has successfully created the DNA database of chengal (*Neobalanocarpus heimii*). The database can be applied to detect the original population of the chengal tree from a particular wood sample for the purpose of forest certification or chain of custody. For forensic applications, the original population and individuals of the illegally harvested chengal timber can now be identified. With the existence of this database, the Forestry Departments of Peninsular Malaysia, Sabah and Sarawak will have greater capacity in addressing the problem of illegal logging and finally ensure perpetual conservation and utilisation of Malaysian forest resources.



- 1 Several white rot fungi with potential for biopulping during lignin degrading test
- 2 Reduced number of acacia florets
- 3 Forty-five days after pollination
- 4 Clone bank of acacia hybrid in FRIM
- 5 Trial plot of acacia hybrid clones in FRIM Setiu Research Station
- 6 Lab-scale trial of tongkat ali root culture using air-lift: balloon-type bubble bioreactor (10 litres)

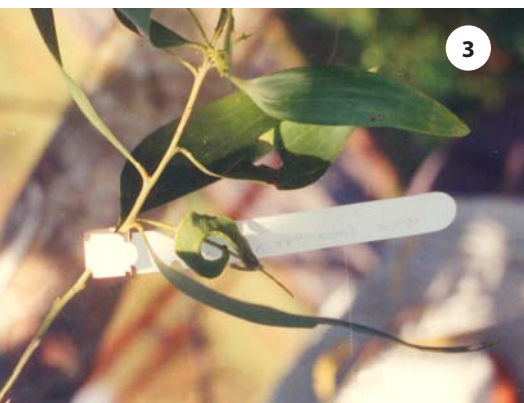


HISTORY OF FRIM BIOTECHNOLOGY RESEARCH

Biotechnology research in Forest Research Institute Malaysia (FRIM) was spearheaded by the establishment of the Biotechnology Division on 1 October 2003. Previously, researches in the area were carried out under the purview of the Natural Forest and the Forest Plantation Divisions. The Biotechnology Division was formed when the then Forest Plantation Division and the Medicinal Plants Division were merged together. With three initial research programmes, namely the Forest Biotechnology, the Medicinal Plants and the Forest Plantations Programmes, FRIM was equipped to undertake biotechnology research which was one of the main thrusts in the 8th and the 9th Malaysia Plans. Soon after in 2005, the Government announced the National Biotechnology Policy which identified biotechnology as a new engine of economic growth for Malaysia. High hopes were placed upon biotechnology as a tool to improve the quality of life by creating new wealth and income for the nation citizen. Later, in February 2008, the

Biotechnology and the Forestry and Conservation Divisions were merged together to form the Biodiversity and Biotechnology Division. In June 2008, the division was renamed as the Forestry Biotechnology Division, which consisted of the Forest Biotechnology and the Pharmaceutical, the Medicinal Plants and the Forest Plantation programmes. Subsequently, in March 2009 after a re-structuring activity, four research programmes were formed which are the Biotechnology, the Forest Plantation, the Tree Improvement and the Bio-Safety Programmes.

Information also provided by:
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Tree Farming for Karas

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DR AHMAD ZUHAIDI YAHYA

Many names are being given to the resinous, fragrant heartwood substance including agarwood, aloeswood, eaglewood and gaharu which is formed either naturally or artificially. Locally known as gaharu, agarwood is one of the most highly sought after and valued non-wood products today. It is being used in fragrance, medicine, health drinks and various aromatherapy purposes. For religious purposes agarwood is also used to make burnt offerings, idols and rosary, as well as ornamentals in decorative carvings. Agarwood is produced primarily by *Aquilaria* and *Gyrinops* (karas) tree species in the family Thymelaeaceae. Gaharu has been traded over 2000 years, mainly to the Middle East, China, Japan and Taiwan. Concerns over the effect of trade has led to the genus being listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 2004). The purpose of the listing is to ensure that the trade is well-regulated under a system of permits on a legal and sustainable basis where there is not a trade ban.

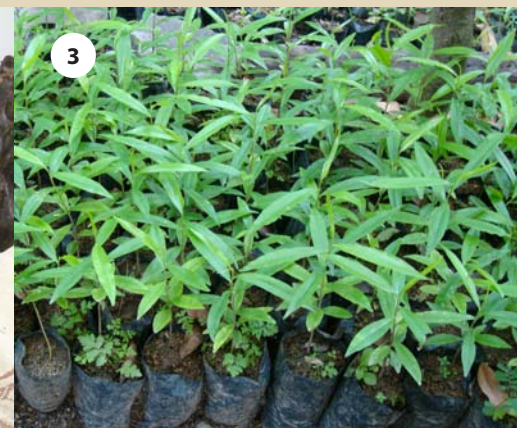
In Southeast Asian countries like Indonesia, Malaysia, Thailand and Vietnam, agarwood collection is reportedly becoming more difficult as the number of wild mature trees starts to dwindle. Without external signs to indicate the presence of agarwood, trees are being felled indiscriminately to look for the precious dark resin wood with prices comparative to gold. It is believed that the lowest grade of any species of natural Malaysian agarwood could fetch a price of USD 19/kg in

the Middle East. The high grades are normally reserved for exclusive buyers, which can cost over USD 9500/kg while the more expensive grades are also available for as expensive as USD 2800/kg. There are altogether 25 species of *Aquilaria* but only about five commercial species are found in Malaysia namely *Aquilaria malaccensis*, *A. hirta*, *A. beccariana*, *A. microcarpa* and *A. rostrata*. The main natural producing states are Kedah, Perak, Kelantan, Terengganu, Pahang, Johor and Sarawak.

Presently there are more than 1500 hectares of *Aquilaria* plantation being cultivated in Peninsular Malaysia. Most of the cultivation and studies however, are concentrated on *A. malaccensis* due to its wide distribution, availability of planting materials and good growth performance. Also being cultivated are three potential exotic species from Thailand, Cambodia and China namely *A. crassna*, *A. subintegra* and *A. sinensis*. They are being planted to meet market demands for agarwood, oil distillates or for manufacture of other value-added products. With the diminishing supply from the

wild, it is expected that agarwood produced from *Aquilaria* and *Gyrinops* plantations will play an important role in the future for ensuring sustainable supply and to meet customer demand both from the local and overseas.

Aquilaria is a large, evergreen tree which can grow up to 40 m tall with a diameter that exceeds 60 cm. The tree adapts to various habitats from rocky, sandy or calcareous, well-drained slopes and ridges to lands near swamps. In all of these conditions however, good soil drainage is strongly required. They can be shade tolerant plants during the early stage of establishment but in general open planting is still preferred. In nature young plants tend to grow in almost pure patches underneath mother trees. Seedling distribution pattern indicate that few seeds are distributed more than a few meters from the adult tree. Adult trees however, are not found in single dominant stands but mostly are unevenly dispersed throughout the habitat. Because of this habit, finding the tree would need special experience.



1. Flower of *Aquilaria malaccensis*
2. Agarwood from natural forest
3. Seedlings raised from the seeds of *Aquilaria* and *Gyrinops* species
4. *Aquilaria* plantation established in Malaysia
5. Value-added products: agarwood soaps
6. Various grades of agarwood oil available in the market

Gaharu research in Forest Research Institute Malaysia (FRIM) started as early as 1928 with the first planting plot of *Aquilaria* (karas). However, in 1994 and 1997, FRIM in collaboration with Industrial Research Limited, New Zealand and Under Inducement Project through patented technology have successfully started several agarwood projects. Research into the possibilities of artificial induction and stimulation of agarwood formation which may offer high economic returns is urgently required especially when trials indicate that proper management of forest plantations present no great difficulties. Field trials reveals that at an age of 12 years, a sizeable annual growth is achievable with a mean diameter of 18.9 cm and a total height of 14.6 m translated from a mean annual increment (MAI) diameter of 2.2 cm and a MAI total height of 1.2 m.

Agarwood plantation industry in the future will

play a significant role to establish the source of agarwood. It is a promising industry and a potential lucrative business. Due to the high prices and demand for premium quality agarwood, its trade can offer high economic returns. This is a good reason for the private and government sectors to participate actively in the establishment of agarwood plantation. Artificial induction and stimulation techniques could be used to supplement the production of agarwood. In both areas, local expertise particularly from FRIM is available to assist those who intend to venture into the planting and processing of agarwood.

STESEN PENYELIDIKAN FRIM MARAN TERIMA PENSIJILAN SKIM ORGANIK MALAYSIA

Stesen Penyelidikan FRIM Maran telah menerima penganugerahan pensijilan Skim Organik Malaysia (SOM) oleh Jabatan Pertanian Malaysia pada 15 Julai 2010 untuk plot patawali. SOM ialah sebuah program pensijilan yang dibangunkan oleh Jabatan Pertanian untuk mengiktiraf ladang-ladang yang diusahakan secara organik mengikut kriteria dan keperluan yang telah ditetapkan dalam Standard Skim Organik Malaysia (SOM).

1&2 Plot patawali di Stesen Penyelidikan FRIM Maran
Gambar : Mohd Shahidan Mohd Arshad



FRIM 25 tahun



6 Jun 2010 Mini Jamboree: Green Cycle II

- Penggemar basikal gunung memulakan cabaran Green Cycle II



12 Julai 2010 Lawatan ke KBG

- Isteri Ketua Setiausaha (KSU) Kementerian Sumber Asli dan Alam Sekitar (NRE) (kanan) di Taman Botani Kepong (KBG)

13 Julai 2010 Lawatan PUSPANITA ke FRIM

- Lawatan Yang DiPertua PUSPANITA peringkat nasional, Puan Sri Wan Noorlina Wan Hussin (tengah) ke FRIM



Peristiwa Sambutan FRIM 25 Tahun

Gambar: YUSNI IDRIS



26-29 Julai 2010

Bengkel Teknik-teknik Pengurusan dan Pemuliharaan Hutan Bakau Serantau

- Peserta bengkel semasa lawatan ke kawasan bakau di Kuala Sepetang

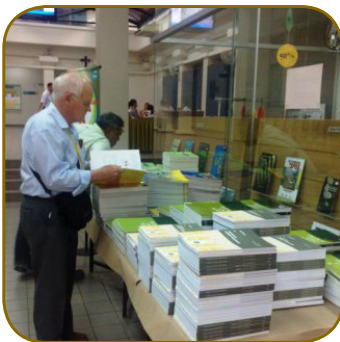
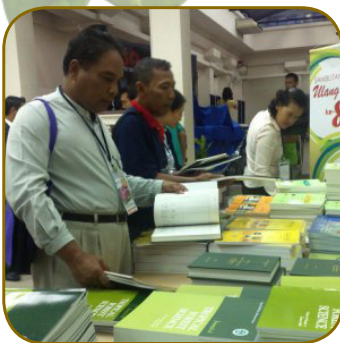
25 Julai 2010 Jacob's Walk of Life

- Pelepasan peserta larian Jacob's Walk of Life



18 Julai 2010 Hari Anugerah FRIM





Ogos 2010

Ulang Tahun ke-8 Kedai Buku FRIM

- Pemberian buku percuma di sepanjang sambutan ulang tahun ke-8 Kedai Buku FRIM

2-5 Ogos 2010

Simposium Antarabangsa Kelip- kelip Kali ke-2

- Majlis perasmian Simposium pada 2 Ogos 2010

3-4 Ogos 2010

Seminar Tumbuhan Ubatan dan Beraroma 2010

- Tan Sri Datuk Seri Panglima Joseph Kurup, Timbalan Menteri Sumber Asli dan Alam Sekitar sedang berucap



16 Ogos 2010

Lawatan Menteri Muda Alam Sekitar

- Menteri Muda Alam Sekitar, Sarawak, Datuk Peter Nansian Anak Ngusie (tiga dari kanan) di KBG

7 Ogos 2010

Karnival Islam FRIM 2010

- Mengacau dodol adalah antara aktiviti yang dijalankan sempena Karnival Islam FRIM

12 Ogos 2010

Mesyuarat MFRDB

- Pengerusi MFRDB yang baru dilantik, Hajah Nancy Shukri mempengerusikan mesyuaratnya yang pertama

6 Sept 2010

Lawatan Menteri Pertanian Congo

- Lawatan Menteri Pertanian Congo ke Galeri FRIM



7 Sept 2010

Majlis Sumbangan Hari Raya

- Dato' Dr Abd Rashid Ab Malik (kanan) tiba di Wad Kanak-kanak Hospital Selayang

Unraveling New Treatments for Neglected Diseases

DR GETHA KRISHNASAMY | getha@frim.gov.my , LILI SAHIRA HUSIN

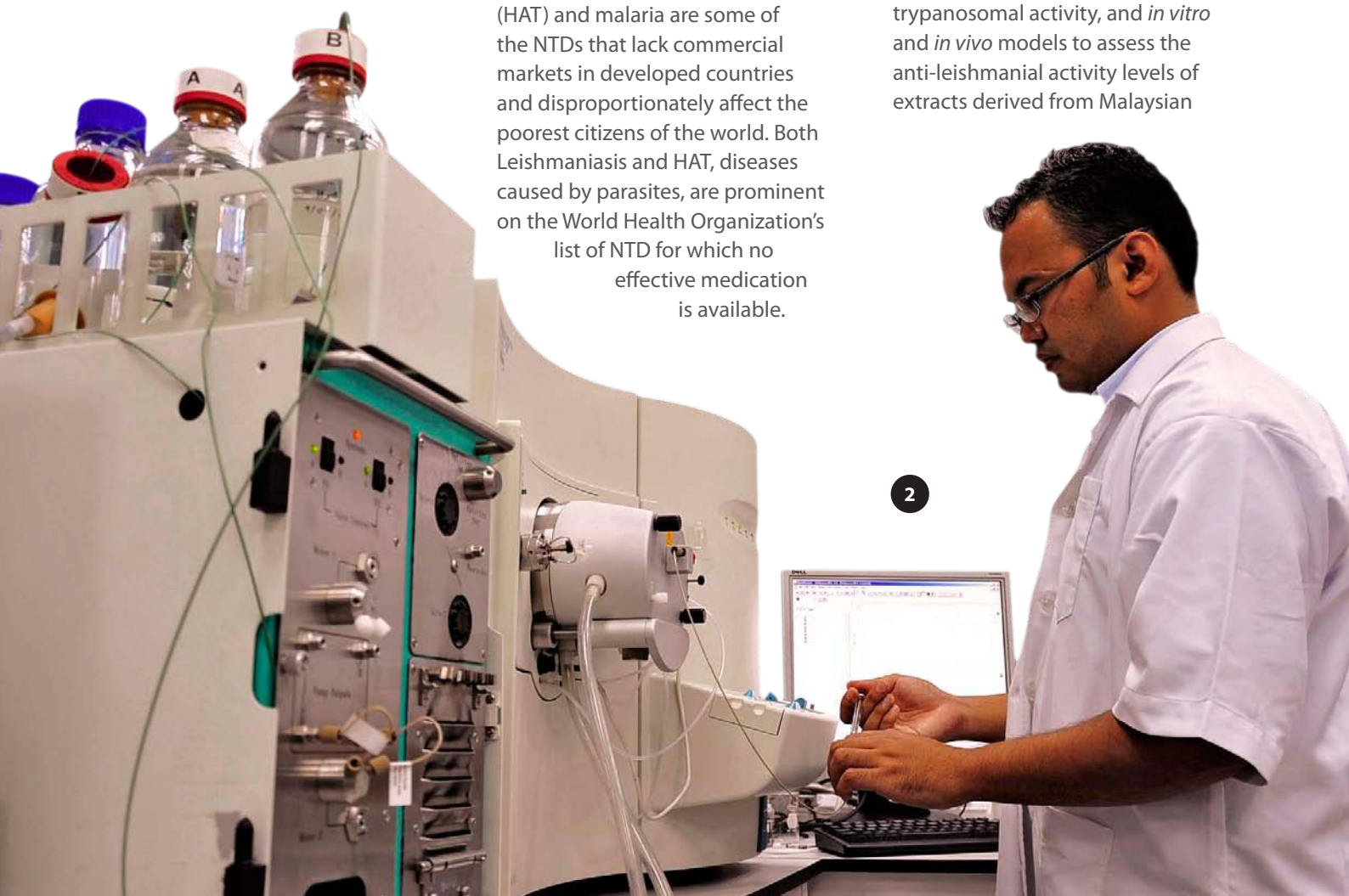
The Drug Discovery Centre of Forest Research Institute Malaysia (FRIM) (earlier known as Centre for Proteomics Research, and later as Pharmaceutical Branch under the Forest Biotechnology Division) is dedicated mainly to natural product-based drug discovery research. Also known as random screening, natural product drug discovery involves many steps such as screening of bioresources for drug candidates, identification of active candidates, characterisation and identification of hit compounds, lead compound optimisation and validation assays for

therapeutic efficacy. The advantages of hit and lead compounds of natural product origin are that they have high chemical diversity, structural uniqueness, high potency and selectivity.

In an effort to meet the demands of our nation for sustainable utilisation of biodiversity for future benefit of human kind, FRIM has established a research group to study the natural resources for active compounds to treat neglected tropical diseases (NTD). Leishmaniasis, Chagas disease, human African trypanosomiasis (HAT) and malaria are some of the NTDs that lack commercial markets in developed countries and disproportionately affect the poorest citizens of the world. Both Leishmaniasis and HAT, diseases caused by parasites, are prominent on the World Health Organization's list of NTD for which no effective medication is available.

Therefore, there is an urgent need for new molecules against these diseases which are safe, effective, cheap and easy-to-administer and for new leads with novel mechanisms of action. Nature with its numerous plants and microorganisms is a potential source of such new drugs since it contains a countless quantity of molecules with a great variety of structures and pharmacological activities.

In close cooperation with the Drugs for Neglected Diseases Initiative (DNDi), FRIM research team uses an *in vitro* model to assess the anti-trypanosomal activity, and *in vitro* and *in vivo* models to assess the anti-leishmanial activity levels of extracts derived from Malaysian





1. Diagnosing human African trypanosomiasis (HAT) in Africa
Photo: Dr D Robert, DNDi
2. Studying the structures of active compounds isolated from plants and microbes *Photo: Asmar Hassan*
3. Anti-trypanosomal assay conducted in a Biosafety Cabinet Level III *Photo: Asmar Hassan*
4. HAT transmitted by tsetse fly *Photo: Dr D Robert, DNDi*

soil microbes and plant species. The DNDi is an independent, non-profit product development partnership, working to research and develop new and improved treatments for NTD. Founded in 2003 by the humanitarian organisation Medecins Sans Frontieres along with five public research institutions in Brazil, France, India, Kenya, and Malaysia, DNDi has the strongest and most comprehensive kinetoplastid drug portfolio in history. Through these international collaboration efforts, scientists at FRIM will play an indispensable role in the identification of novel molecules from Malaysian biodiversity that could be used for the therapy of neglected diseases.



MEMPERKASAKAN PENGURUSAN HUTAN SECARA BERKEKALAN

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WAN MOHD SHUKRI WAN AHMAD

Seminar Projek-projek Penyelidikan FRIM ke Arah Pengurusan Hutan Secara Berkekalan yang telah diadakan pada 3 hingga 5 Ogos 2010 di Kuantan, Pahang bertujuan untuk berkongsi maklumat penyelidikan di samping mendapatkan maklum balas serta mengenal pasti keperluan penyelidikan di masa hadapan. Seminar anjuran Institut Penyelidikan Perhutanan Malaysia (FRIM) tersebut telah dirasmikan oleh Dato' Hj Azmi Che Mat, Timbalan Ketua Setiausaha II, Kementerian Sumber Asli dan Alam Sekitar (NRE). Sebanyak 13 kertas kerja daripada pelbagai disiplin telah dibentangkan oleh pegawai penyelidik FRIM yang mencakupi penemuan-penemuan terkini dalam kaedah pengurusan hutan. Lapan daripada kertas kerja yang dibentangkan telah dicadangkan kepada Jawatankuasa Penyelarasan Penyelidikan Perhutanan yang dipengerusikan oleh Jabatan Perhutanan Semenanjung Malaysia. Dua kertas kerja pula telah dipilih untuk dikemukakan kepada Persidangan Pengarah-pengarah Perhutanan Malaysia.

1. Perasmian Seminar oleh Timbalan Ketua Setiausaha II, Kementerian Sumber Asli dan Alam Sekitar (NRE), Dato' Hj Azmi Che Mat
2. Ketua Pengarah Institut Penyelidikan Perhutanan Malaysia (FRIM), Dato' Dr Abdul Latif Mohmod sedang menyampaikan ucapan
3. Pembentangan kertas kerja oleh pegawai FRIM
4. Sesi soal jawab



Getting Up Close with the Malaysian Biodiversity

JAYARADHA VEERASAMY | jayaradha_undpbiod@frim.gov.my

The biological diversity and richness of the Malaysian forest is known worldwide. Forests are vital habitats for many different types of flora and fauna species; they provide major ecosystem functions such as water-catchment areas and acting as a gene bank for many of the commercial crops. The beauty of the vast green and lush landscapes allures tourists from all around the world to witness the magnificence of the Malaysian tropical forests.

Forests are also vital for the production of high-valued tropical timber. These forestry activities if not managed well will have an impact on the biological diversity, climate, water resources and ecotourism. The Conservation of Biological Diversity through Improved Forest Planning Tools Project aims to address the issue of better forest management in production forests through the creation of decision-making tools. These tools in-turn will help policy makers to incorporate the conservation of biodiversity into mainstream forest management while optimising forest production.

This project will showcase Malaysia as a leader in the areas of sustainable tropical forest management. The Ministry of Natural Resources and Environment (NRE) is the executing agency for the project while project implementation is being carried out by the Forest Research Institute Malaysia (FRIM). Financial support is provided by the Global Environmental Facility (GEF) through the United Nations Development Programme (UNDP). This project is co-funded by





the International Tropical Timber Organisation (ITTO).

The Malaysian Government and other stakeholders such as the Forestry Department of Peninsular Malaysia (especially the Perak Forestry Department), Perak Integrated Timber Complex (PITC) and Perak State Economic Development Corporation (SEDC) are major contributors to the project. The project will cost approximately USD 5.7 million and will be implemented over five years. Local researchers from FRIM and public universities will collaborate with researchers from Harvard University, University of Miami and Duke University. The project will work in consultation with major local Civil Societies in implementing its activities and a panel of international advisors will be established to review its overall effectiveness. The local indigenous (Orang Asli) and rural communities residing adjacent to the project site will also benefit from this long-sighted project.

The project aims to create a range of decision-making models using data derived from research activities in the PITC concession that can be



1. Logs being taken out of the Perak Integrated Timber Complex Concessionaire where the project pilot study site is situated
2. Continuous consultation is being held with the Forestry Department of Peninsular Malaysia to ensure tools developed will be practical and user-friendly for end users
3. A research officer pinning a moth for assessment of pre-logging biodiversity

used in concessions in Malaysia and other tropical countries. These decision-making tools will take into account the variation that exist across the tropical countries in terms of forests characteristics, available ecological and economic data, forest management procedures and capacity.

The major aim of the project however, is the development of tools that will allow policy makers to incorporate ecological and economic aspects into forest production systems. These tools will then help policy makers in arriving at an optimised solution to managing forests in the most sustainable way. It will also look into enhancing and disseminating knowledge and capacity building of the Forestry Department and other stakeholders such as logging concession owners. Most importantly decision-making tools created here can be applied in other tropical countries.

It is envisaged that at the end of the project the following objectives will be achieved i) methods of assessing biodiversity and economic valuation of the forest; ii) better understanding of harvesting impacts on biodiversity; iii) decision-making models for policy makers in the management of production forests with due consideration given to biodiversity; iv) capacity building of local counterparts and forest managers in the use of such tools; v) disseminating knowledge to other tropical countries and enhancing Malaysia's role as a pioneer in tropical forests management.



PUSAT PENDIDIKAN ALAM SEKITAR FRIM

Di samping menikmati alam sekitar yang indah di Institut Penyelidikan Perhutanan Malaysia (FRIM), pengunjung khususnya kanak-kanak kini berpeluang mendapatkan maklumat serta menjalankan pelbagai aktiviti berkaitan alam sekitar di Pusat Pendidikan Alam Sekitar atau lebih dikenali dengan nama Environment Education Centre (EEC). Pusat ini yang terletak berdekatan dengan kawasan riadah air terjun Sg Kroh telah dirasmikan pada 3 Jun 2010 oleh Dato' Dr Abd Latif Mohmod, Ketua Pengarah FRIM. Pembangunan pusat ini oleh FRIM turut mendapat kerjasama daripada syarikat swasta iaitu Tetra Pak (Malaysia) Sdn Bhd.

1. Aktiviti menanam pokok sempena pelancaran Pusat Penyelidikan Alam Sekitar FRIM
2. Bergambar kenangan bersama Ketua Pengarah FRIM (berbaju hitam)



EAS Strategic Options 2010/September No: 06

ISSUE

How can forest industry contribute to achieving the status of a high income nation by 2020?

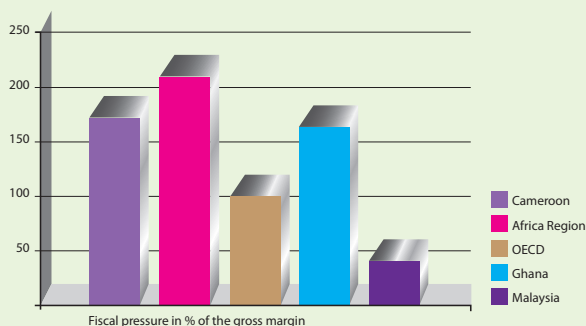
What are the existing advantages and disadvantages of doing business in Malaysia which can help us to attain this objective?

The World Bank analyses on a global basis the various advantages of doing business in various countries are good references for policy and decision-makers in Malaysia. It is important to compare Malaysia with other timber producing countries exporting similar timber products to the same international markets, especially the European market. Ghana and Cameroon are two other tropical timber producers that have achieved their own FLEGT agreements, therefore giving them definitive appeal to the European market. In this context, selected business indicators are considered here to illustrate the challenges of Malaysian competitiveness towards attaining higher value path in international timber trade.

PROBLEM/OPPORTUNITY

The general fiscal pressure in Malaysia is less than 50% of that of Organisation for Economic Co-operation and Development (OECD) countries, and much lower than that of the best competitors from Africa (i.e. one-fourth of the fiscal pressure of Ghana). This is definitely one of the advantages of Malaysia to engage on higher value path through private investments and other industry improvements. This factor is also very attractive for the foreign investments, in the timber industry as well as in other sectors (refers Figure 1).

Figure 1: General fiscal pressure on industries in different parts of the world in comparison to OECD countries (basis 100)



Source: *Doing business*, World Bank, <http://www.doingbusiness.org/>

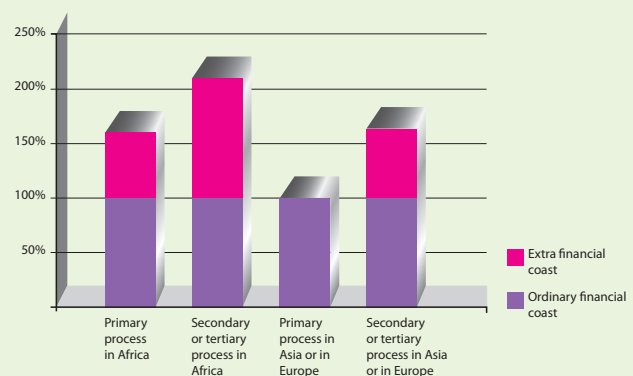
For the development of any new business strategy, it is critical to consider the direct and indirect financial costs. The financial costs are the true engines of any business development.

In this regard, African countries suffer a lot of political uncertainties and incur much higher financial costs. This factor favours foreign big groups because they can borrow money on international financial markets, and disfavours local companies. Conversely, Malaysia presents the same financial costs as OECD countries because of similar economic and political stability. Thus, Malaysian companies and foreign investors share benefit of the same financial environment.

Indirect financial costs are typically heavier for secondary and tertiary processing companies than for the primary processing companies, by multiplier effect because of the structure of the timber industry and marketing practices (i.e. buying raw material at 15 days, and selling the finished product at 30 days, stocks, shipping delays, etc.).

In this regard as well, Malaysia is aligned with OECD countries, while African companies are disadvantaged. Because of the multiplier effect, OECD countries and Malaysia face one-third only of the extra financial costs that African industries when going to secondary and tertiary processing (refer Figure 2).

Figure 2: Financial rigidity in timber industry according to the processing stage, in different parts of the world



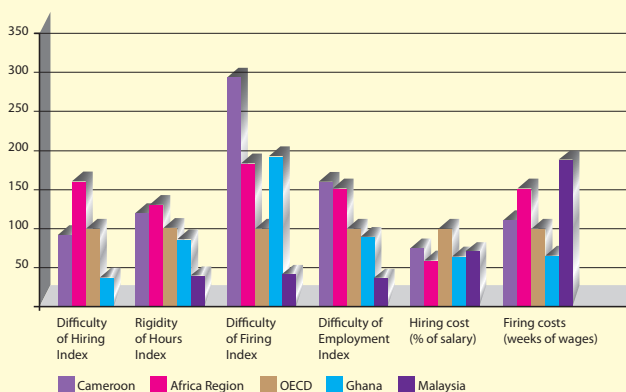
Source: *Fiscal Audit of Cameroon 2006*. Karsenty, A; Roda, JM; Milol, A; Foschivé, E

Malaysia's New Economic Model (NEM) for Forest Industry: What Factors to Look At?

For international competitiveness, all labour factors are very important. These factors give indication both on the flexibility of the production (ability of industry to adapt to shocks and crises as well as to engage in new paths) and on the cost of this flexibility in production. Among our selected cases, Figure 3 shows that Malaysia ranks the best for the rigidity of work period index (45% of OECD level and one-third of African level), for the difficulty to contract termination (40% of OECD level, around one-fourth of African competitors), and for the global rigidity of the employment (30% of OECD level, one-fifth of African competitors). Conversely, the labour cost index does not show a significant difference between Malaysia and African countries, all of them being almost half less costly than OECD countries.

Finally, Malaysia shows exceptionally high cost of labour contract termination (almost double that of OECD countries and 25 to 100% more than African countries). This index is not a handicap per se when the global economy is stable and predictable. With globalisation shaping the international conditions and markets change rapidly, it adds a very significant cost to the production. In this regard, Malaysia is way behind its competitors.

Figure 3: General labour competitiveness indexes in different parts of the world in comparison to OECD countries (basis 100)



Source: *Doing business*, World Bank, <http://www.doingbusiness.org/>

OPTIONS

The Malaysian fiscal pressure, because of tax incentives, is definitely an advantage for the timber industries to achieve higher economic value paths. Similarly, employment rigidity is very competitive in Malaysia. These policies should be maintained.

The Malaysian financial environment is comparable to that of OECD countries, making Malaysia a good place for companies to obtain finances for business investments and improvements. Similarly, labour costs are comparable to a few other competing countries. These advantages should be maintained as well.

Labour cost of contract termination is exceptionally high in Malaysia compared to all the other countries. Since globalisation is asking continuously for more flexibility, this factor is going to become a critical burden on Malaysian timber industries competitiveness. Such a situation needs to be reviewed.

For previous issues of EAS Strategic Options please visit www.frim.gov.my/index2cfm?menu=knowledge-technology

FURTHER INFORMATION

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FRIM Shines at IUFRO and FesSTIS



Photo 1&2:
The XXIII IUFRO World Congress Website

IUFRO 2010

Two researchers from the Forest Research Institute Malaysia (FRIM), Dr Nor Azah Mohamad Ali and Tnah Lee Hong received awards for their scientific works at the XXII International Union of Forest Research Organisations (IUFRO) World Congress, held from 23 to 28 August 2010 in Seoul, Republic of Korea.

Dr Nor Azah, who is the FRIM Scientist of the Year in 2009, was among 11 scientists from around the world who received the IUFRO Scientific Achievement Award at the Opening Ceremony of the Congress on 23 August 2010.

Meanwhile, another FRIM Research Officer, Tnah Lee Hong, who is attached to the Institute's Genetic Laboratory, received the Student Award for Excellence in Forest Sciences the following day (24 August 2010). She is one of the three winners for this category.

FRIM delivered altogether eight oral and five poster presentations during the Congress. The highlight of the event however was the election of Dr Lee Su See, FRIM Senior Scientist, as one of the Vice-Presidents of IUFRO.

FesSTIS 2010

The Forest Research Institute Malaysia (FRIM) team won the first place at the Selangor Science Technology and Innovation Festival 2010 (FesSTIS) for the Selangor Excellent Innovation Award 2010 under the category of innovation for industrial use.

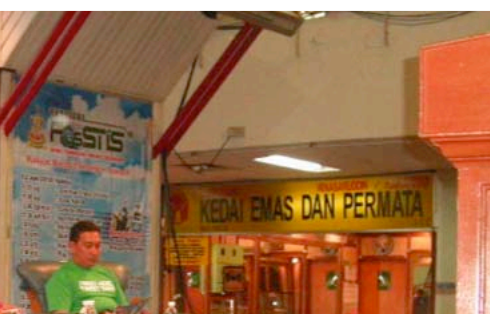
The research team led by Hashim Wan Samsi that developed the Engineered Flooring from Oil Palm Trunk received the trophy, cash prize of RM 8000 and certificates from the Selangor Menteri Besar, Tan Sri Abdul Khalid Ibrahim, on 12 June 2010.

This year's festival, held from 11 to 13 June at the PKNS Complex in Shah Alam and themed "Rakyat kreatif Selangor inovatif" (Creative rakyat, innovative Selangor), attracted the participation of many inventors, innovators and researchers. The main objective of the FesSTIS'10 was to enhance creativity amongst the youth in Selangor to encourage production of high quality products for for end commercialisation.

Adapted from articles from FRIM Corporate Communications Unit, visit www.frim.gov.my for further information



Photo 3&4 : Puad Elham



1. Dr Nor Azah Mohd Ali (second from left) receiving the IUFRO Scientific Achievement Award
2. Tnah Lee Hong (left) with the Student Award for Excellence in Forest Sciences and Dr Lee Su See, the new Vice-President of IUFRO
3. The opening ceremony of FesSTIS 2010
4. FRIM research officers posing with the award won during FesSTIS 2010

