

perkasa

sarawak timber industry development corporation

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quarterly magazine



**Nothing Should
Go To Waste**



Content

Editorial

03 Wood-based Sector To Generate RM8 Billion In Export Earnings By 2030

News

04 Nothing Should Go To Waste
06 Commercial Timber Species Of Sarawak
09 STIDC Contributed RM2 Million To Curb COVID-19
10 Properties And Potential Utilisation Of Planted Sungkai Wood (Peronema canescens)

Trade Statistics, Sarawak

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Editorial

In spearheading the advancement of wood-based industry of Sarawak, STIDC also embarks on the 12th Malaysia Plan (2021-2025) as well as the Sarawak Economic Action Council Plan (2021-2030) and the Timber Industry Transformation Plan (2021-2030). This is in tandem with the aspiration to ensure that the wood-based sector generate RM8 billion in export earnings by 2030.

The current export earnings momentum is RM4 billion per annum. In order to achieve the remaining RM4 billion, it is necessary to address the challenges faced by the industry which among others includes the dwindling raw materials.

Currently the annual log production from natural forests stands at 2.6 million cubic metres and might plummet further to 2 million cubic metres by 2030. In line with this, the state is embarking on planted forests with the aim to plant one million hectares of fast growing tree species by 2025 through the 43 planted forest licensees to produce two million cubic metres to 4 million cubic metres of logs per annum. This represents 85 percent of log production of Sarawak. It is also to regain our past glory of being the number one exporter of plywood and veneer in the region.

At the same time, we are collaborating with the Forest Department of Sarawak and Rubber Industry Smallholders Development Authority to transform the industry by migrating from the export of semi-finished products such as sawn timber, plywood and veneer to value-added products including furniture, oriental strained board and engineered wood products.

To complement raw materials from natural forests and planted forests, we also promote the use of non-timber including rubber wood and bamboo. Currently, there are four investors showing keen interest to invest in bamboo business in Sarawak.

It is also important to increase the conversion value of logs from RM1,190 presently to RM2,250 because more than 85 percent of our logs are used to produce primary products which is of lower value compared with value-added products in order to boost the annual export earnings from RM4 billion to RM6 billion.

The 12th Malaysia Plan as well as the Sarawak Economic Action Council Plan and the Timber Industry Transformation Plan are crucial in accelerating economic sectors and in ensuring that the wood-based sector remain resilient.

*Tuan Haji Hashim
Haji Bojet*



Nothing Should Go To Waste

Wood residues are derived from manufacturing processes either due to natural or mechanical defects. Natural defects include rots, splits, tapering and decay. Mechanical defects on the other hand are due to converting processes like trimmings, sizing, turning, profiling and drying. These residues come in different forms, shapes and sizes. Examples of wood residues are log ends, side trimming, slabs, saw dusts and sanding dusts. The average recovery rate of converting logs into primary products like plywood, veneer and sawn timber is about 50 percent depending on the quality of raw materials. In layman term, every one cubic metre of logs processed, about 0.5 cubic metre is converted into products and the remaining 0.5 cubic metre is mill residue. Wood residues must be managed properly in order to prevent safety and health issues.

In Sarawak wood residues are being processed into valuable products besides being used to generate power for wood and veneer drying, hence, nothing goes to waste. The industry also plays important role in minimising wood residues by upgrading the processing technology such as recovery lathes, efficient dryers, high precision sawing machines, end-to-end or side-to-side jointing, gluing and patching.

STIDC is promoting a tagline 'Nothing Should Go To Waste' to ensure optimum utilisation of forest resources besides encouraging the industry to produce value-added products such as fibreboard, woodchips, wood pellets, pallet blocks and core plugs using wood residues.

Currently, there are 11 woodchip mills in Sarawak. These mills employ 500 workers with the combined household income of RM18 million per

Charcoal Briquettes



Core Plugs



Fibreboard



Pallet Blocks





Particleboard



Wood Pellets



Woodchips

year. The volume of woodchips produced in 2020 was 1.2 million green metric tons while 498,212 bdt were exported, worth RM234 million.

Apart from woodchips, wood residues are also used in Sarawak to produce other products such as medium density fibreboard, particleboard, wood pellets, charcoal briquettes and packaging materials including pallet blocks and core plugs.

Other countries use woodchips to produce pulp and paper, oriented strand board, wood cement boards, wood-plastic and other composites.

The demand for timber products is overwhelming. Sarawak, however, is facing challenges to meet the demand due to dwindling raw materials. Moreover, the industry has reached the maximum installed capacity.

Because of this the timber industry is processing and optimising the utilisation of wood residues using modern technology. The overall conversion recovery rate throughout the value chain is almost 100%. The wood residues processing technology is also automated, thus, improving the productivity.

With modern technology, both big and small diameter logs from planted forests can be processed and used. The big diameter logs are used by primary industry such as sawmills, veneer and plywood mills while the small diameter logs are processed to produce value-added products like fibreboard, oriented strand board (OSB), biomass pellets, engineered wood and wood composites. This ensures optimum utilisation of logs from planted forests and gives better return to plantation owners for this capital intensive and long gestation projects.

Sarawak recorded RM234 million in export earnings from woodchips in 2020. China and Japan being the major markets contributed RM138 million and RM96 million respectively.

At the same time RM306 million worth of fibreboard was exported. The major markets were Japan (RM239 million), the Philippines (RM33 million), Vietnam (RM12 million), Indonesia (RM10 million) Taiwan (RM7 million) and Korea (RM4 million).

The export value of particleboard earned by Sarawak in 2020 was RM19 million. The main markets were Indonesia (RM6.6 million), Vietnam (RM4.5 million), the Philippines (RM3 million), Korea (RM2.8 million) and Japan (RM1.8 million).

Meanwhile, RM2 million worth of biomass pellets were exported mainly to Korea in 2020.

Sarawak also exported RM23.5 million worth of charcoal briquette in 2020. The main buyers were the Middle East (RM8.2 million), Japan (RM5.4 million), Turkey (RM3.8 million), Taiwan (RM3.4 million) and Korea (RM1.5 million).

Asia Pacific region was the main consumer of wood residue products from Sarawak which accounted for RM590 million in 2020. Japan being the largest market contributed RM343 million, representing 58 percent of the total export value. China was the second largest market with RM139 million, representing 24 percent in export value. ASEAN countries including Indonesia, Vietnam and the Philippines contributed RM69 million, representing 12 percent of the cumulative export value.

STIDC is promoting Sarawak as the leading producer of eco-friendly timber products particularly those manufactured using timber from certified natural forests and from sustainable bamboo plantations. The industry is also producing products using materials from renewable and sustainable planted forests.



Commercial Timber Species of Sarawak

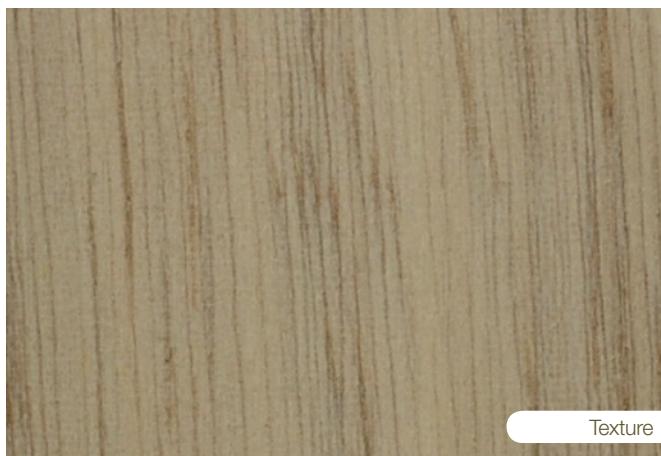
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Sarawak is covered with diverse tropical rainforests and blessed with rich natural resources including timber. Some of the tropical timber were identified as commercial timber species.

Examples of the commercial timber species of Sarawak are Ara, Assam (Machang), Bajan (Mata Ulat) and Baru (Melunak).

Details of the commercial timber species of Sarawak are documented and displayed at the Timber Museum, Wisma Sumber Alam, Petra Jaya, Kuching.



Assam (Machang)

Mangifera spp., e.g. *M. foetida*, *M. longipes*, *M. quadrifida*

Anatomy

Pores - Simple perforation; medium size or moderately large; very few or few in number; mostly solitary; others in radial pairs and multiple groups up to 4 (rarely more); oblique; evenly distribute.

Wood Parenchyma - Both Apotracheal and Paratracheal. Apotracheal: Irregularly spaced concentric bands. Paratracheal.

Rays - Moderately fine; barely visible to naked eyes.

Physical Properties

Colour

- Heartwood : Light brown or Light Grey Brown or Pink Brown.
- Sapwood : Whitish and not very clearly defined.

Grain - Interlocked, but often straight in some species.

Texture - Moderately fine and even.

Confusable Woods - Kasai, Merpauh and Rengas.

Differentiation - From Kasai - by absence of vessel deposits
From Merpauh and Rengas - by the absence of horizontal canals.

Common Uses - General utilities; light to medium heavy construction; plywood; packing boxes; the streaky wood is valued for high class cabinet works and decorative furniture.



Ara

Ficus spp. *F. androchaete*; *Fannulata*; *Faurata*; *Faurita*; *F. beccarii*; *F. benjamina*; *F. bruneiensis*; *F. cereicarpa*; *F. Consociata*, etc

Anatomy

Pores - Vessels are medium-sized, moderately large or very large, very few or few in number, solitary and in radial pairs or groups of 3 to 6, usually open, but sometimes filled with gum-like deposits.

Wood Parenchyma - Abundant, conspicuous to the naked eye on all surfaces; in moderately broad to broad, more or less continuous wavy confluent layers touching the vessels on their tangential faces and sometimes enclosing the vessels.

Rays - Medium-sized, visible to the naked eye on all surfaces.

Physical Properties

Colour

- Heartwood : Light yellow-brown or in various shades of yellow to pink-grey.
- Sapwood : Not differentiated from the heartwood.

Grain - Interlocked.

Texture - Slightly coarse and uneven due to the presence of abundant parenchyma.

Common Uses - Suitable for plywood, disposable chopsticks, packing cases & wooden sandals.





Texture

Baru (Melunak)

Pentace spp., e.g. P. adenophora, P. curtisi

Anatomy

Pores - Simple perforation; medium size; some species moderately numerous; solitary and also radial pairs and multiples of up to 4; evenly distributed; tyloses fairly abundant.

Wood Parenchyma - Surrounding the pores with tendency to aliform and locally confluent combined with short apotracheal lines between the rays and occasionally terminal bands.

Rays - Moderately fine.

Physical Properties

Colour

- Heartwood : Yellow brown with pink tinge.
- Sapwood : Difficult to differentiate from heartwood.

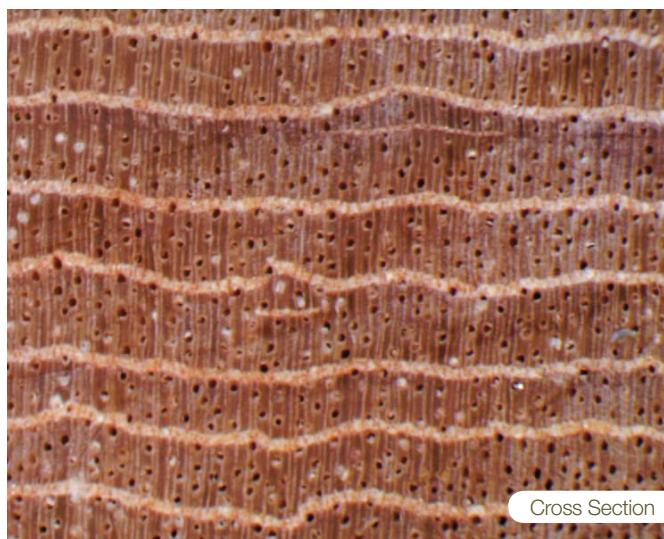
Grain - Shallowly to deeply interlocked.

Texture - Moderately fine and even.

Other Features - Ripple marks distinct.

Confusable Woods - The timber is distinctive.

Common Uses - Superior joineries; furniture; decorative works.



Cross Section

Bajan (Mata Ulat)

Kokoona spp., e.g. K. littoralis, K. ocharacea

Anatomy

Pores - Simple perforation and moderately small; moderately numerous or numerous; exclusively solitary; slightly and unevenly distributed.

Wood Parenchyma - Conspicuous long concentric bands.

Rays - Are very fine and not visible to naked eyes.

Physical Properties

Colour

- Heartwood : Yellow brown with pink tinge.
- Sapwood : Difficult to differentiate from heartwood.

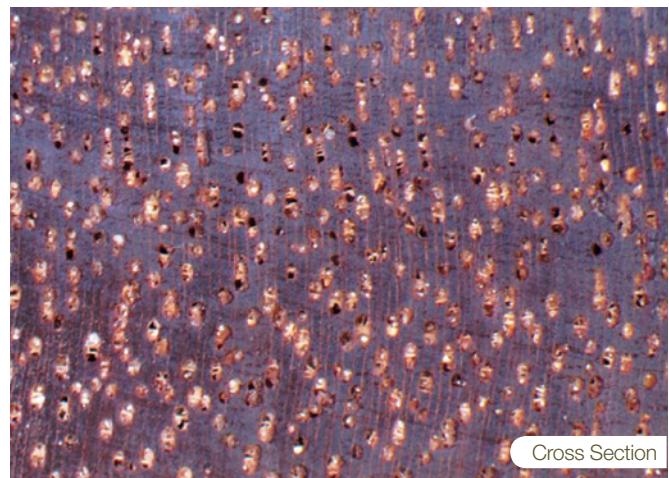
Grain - Shallowly interlocked.

Texture - Fine but uneven, due to the thick bands of wood parenchyma.

Common Uses - Decorative panelling and furniture; general utilities.



Texture



Cross Section

STIDC Contributed RM2 Million To Curb COVID-19



The Right Honourable Chief Minister of Sarawak, Datuk Patinggi (Dr) Abang Haji Abdul Rahman Zohari bin Tun Abang Haji Openg (fourth right) receiving the mock cheque from Tuan Haji Hashim Haji Bojet (third right) while The Honourable Datuk Amar Haji Awang Tengah Ali Hasan, Deputy Chief Minister of Sarawak and Chairman of STIDC Board of Management (fourth left) and the other VIPs look on.

The global communities are adversely affected directly or indirectly by the outbreak of Coronavirus (COVID-19) pandemic. The unprecedented and incessant pandemic poses negative impacts to every sphere of life.

Amid this challenging time and in the spirit of altruism, once again the Sarawak Timber Industry Development Corporation (STIDC) manifested its corporate social responsibility by contributing RM2 million to Sarawak Disaster Management Committee (SDMC) to help break the chain of this pandemic and to save lives.

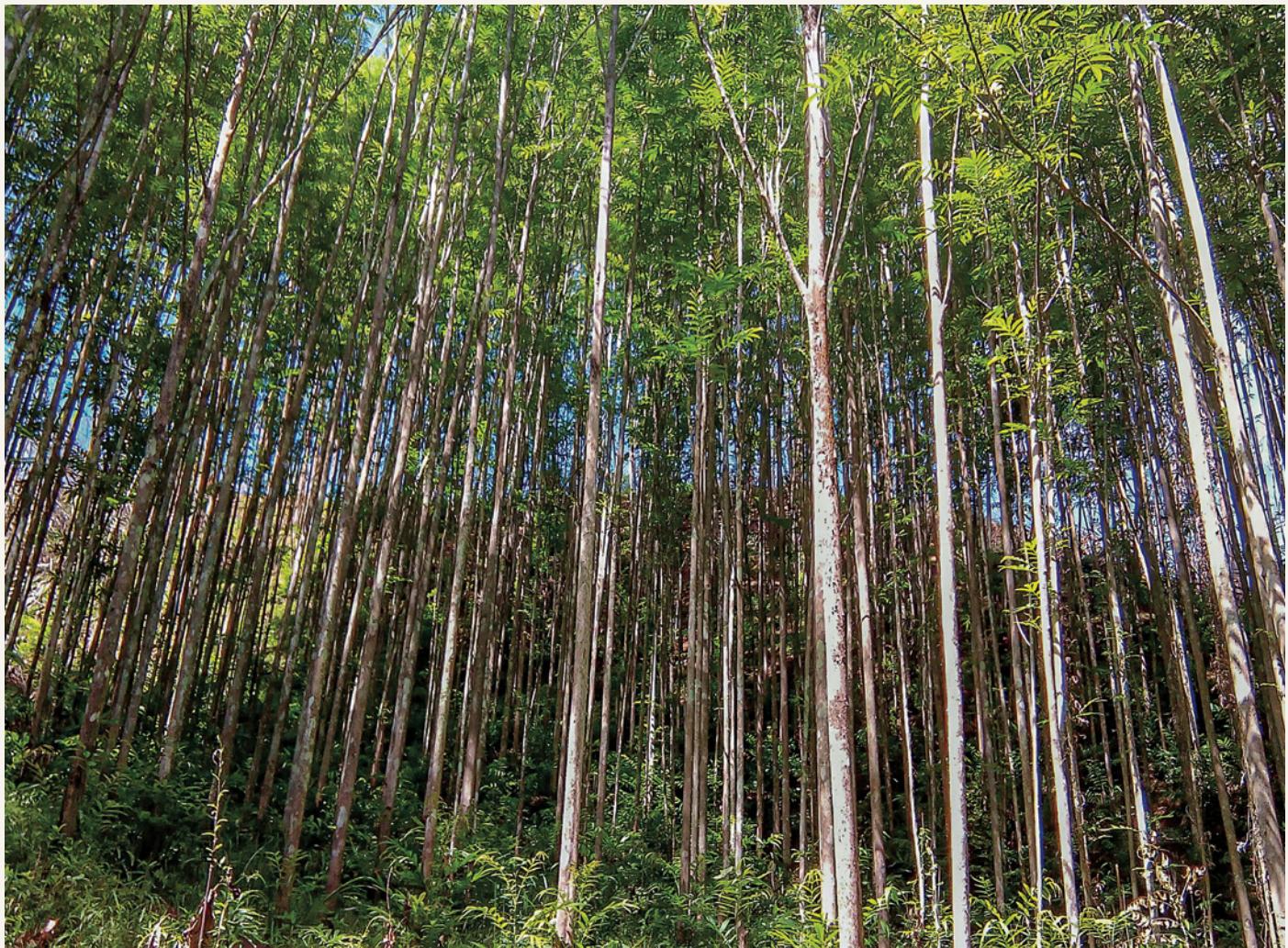
The contribution was presented by The Honourable Datuk Amar Haji Awang Tengah Ali Hasan, Deputy Chief Minister of Sarawak and Chairman of STIDC Board

of Management to The Right Honourable Chief Minister of Sarawak, Datuk Patinggi (Dr) Abang Haji Abdul Rahman Zohari bin Tun Abang Haji Openg at Wisma Bapa Malaysia, Petra Jaya, Kuching.

Last year, STIDC and the wood-based industry players of Sarawak contributed RM2 million worth of COVID-19 test kits to SDMC for similar objective. The contributions included 105,000 pieces of disposable medical masks, 10,000 pieces of isolation gown (non-sterile), 10,000 pairs of medical boots cover, 10,000 pieces of KN95 medical protective masks, 10,000 pieces of medical head cover, 5,000 pieces of protective medical coverall (sterile), 5,000 pieces of medical goggles, 5,000 pieces of face shield and 200 boxes of medical vinyl examination gloves.

Datuk Amar Haji Awang Tengah who is also the Second Minister of Urban Development and Natural Resources, and Minister of Industrial and Entrepreneur Development emphasised that the contributions were necessary to assist our selfless front-liners who risked their lives to save others. He added that the contributions also manifested the support and commitment of STIDC to help the state government in curbing COVID-19 together.

“It is hoped that more organisations and bodies would lend their helping hands and contribute. We are all in this together and let us be united and pray that we all pull through this difficult time to become stronger and more resilient,” he said.



Properties And Potential Utilisation Of Planted **Sungkai Wood** *(Peronema canescens)*

Prof. Dr Mohd Hamami Sahri

Formerly Universiti Malaysia Sabah, Jalan UMS 88400 Kota Kinabalu, SABAH

Introduction

- *Peronema canescens* is categorized as pioneer species which can be found in Peninsula Malaysia, Sumatra and Borneo Island.
- Cultivated in Thailand, Indonesia and Malaysia.
- It can grow to about 15m height and girth of 60cm with soft, scaly bole and grey bark.
- The wood is yellow in colour with quadrangular stems. (Wiart, 2006)
- Able to regrow by vegetative propagation;
- Tenacious survivors which are able to grow far from their ecological optimum. (Hatta, 1999)
- Sungkai has rapid early growth.
- Sungkai is one of the hardwood species that produces tree rings which is worth to be researched further.

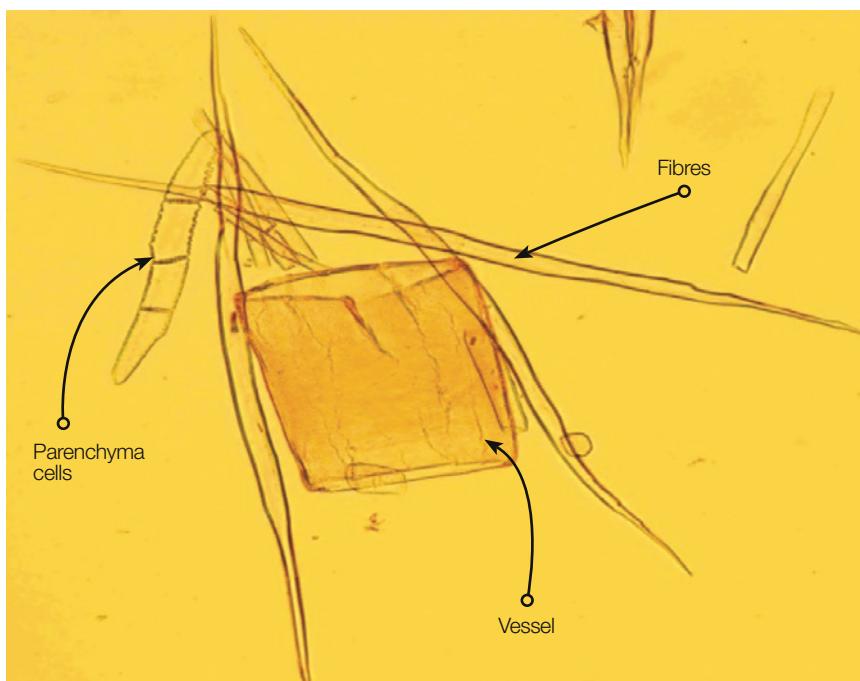
Life Cycle of Sungkai Timber



Wood Features/Properties

- General**
Possess a distinct growth ring boundaries. Wood nearly ring porous with conspicuous growth increments. Sapwood and hardwood possess similar colour, i.e light brown.
- Vessels**
Vessels in multiples, commonly short (2-3 vessels) radial rows. Average tangential vessel diameter of early wood 180-260 μm and in late wood 100-170 μm .
- Perforation plates simple**
Inter vessel pits alternate, average diameter (vertical) 2-4 μm . Vessel-ray pits with distinct borders, similar to inter vessel pits.
- Tyloses in vessels absent**
Virtuous silica sometime present in the vessels.

Cells Types Within Sungkai



Inherent Properties of 13 Years Old Sungkai Planted In Sabah

PROPERTIES PORTION	Anatomical*		Physical**		Chemical Constituents***		
	Fibre Length	Fibre Wall Thickness	Density / S.G	Shringkage Swelling	Holocellulose	Alpha-cellulose	Lignin
Unit	Micron	Micron	g/cm ³	%	%	%	%
Top	1159.76	3.79	0.45	5.23	3.57	79.18	46.41
Middle	1052.92	3.64	0.47	6.04	2.25	73.83	45.19
Bottom	1097.20	3.92	0.48	6.36	2.83	82.17	51.58
Average	1103.29	3.78	0.467	5.87	2.88	78.19	47.72
							26.97

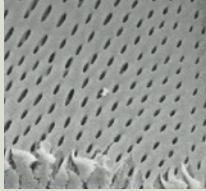
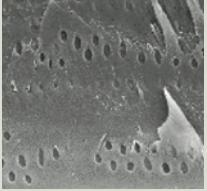
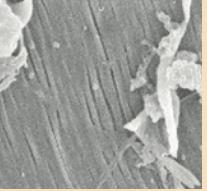
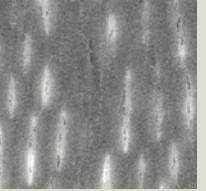
*Anatomical Studies~ Salmiyati Marsuki , (2014) & Siti Saerah Zakaria (2016)

**Physical ~ Alfreedo Anthony Sanan; (2014)

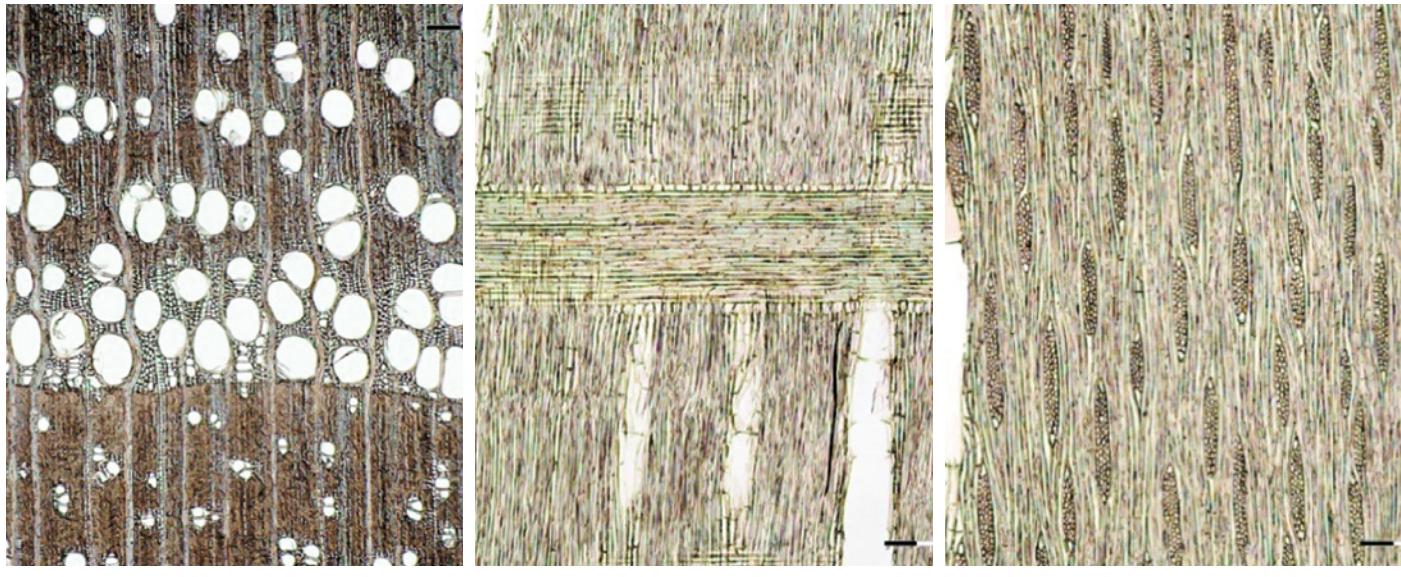
***Chemical Constituents~ Parween A/L Kelappan (2015)

++Research was conducted on 6 sampled trees (Diameter ranging from 20cm – 25cm)

The Vessel Pitting Pattern of Some Plantation Timber Species In Malaysia

SPECIES ANATOMICAL FEATURES	<i>Acacia hybrid</i>	<i>Tectona grandis</i>	<i>Peronema canescens</i>	<i>Hevea brasiliensis</i>	<i>Neolamarckia cadamba</i>
Vessel diameter (µm)	Large with range 100-200	Large with range 100-200	Large with range 100-200	Large with range 100-200	Very large with range larger than 200
Vessel type	Diffuse porous wood	Diffuse porous wood	Ring porous wood	Diffuse porous wood	Diffuse porous wood
Vessel arrangement	Arranged in solitary and in grouped of two, radial multiple	Arranged in solitary and commonly 3 vessels arranged in oblique manner	Arranged in multiple of 2 to 3 and some in solitary, short radial row	Arranged in solitary and grouped in multiples of 2	Arranged in solitary and grouped in multiples of two
Inter vessel pitting pattern	Arranged in alternate	Arranged in alternate	Arranged in alternate	Arranged in alternate and is vested	Arranged in alternate and is vested
Shape of inter vessel wall pitting	Oval in shape	Oval to round in shape	Elongated	The shape is not distinct	Oval in shape
					

Micro Structure of Sungkai Wood • Sungkai (*Peronema canescens*)



Cross - section

Radial section

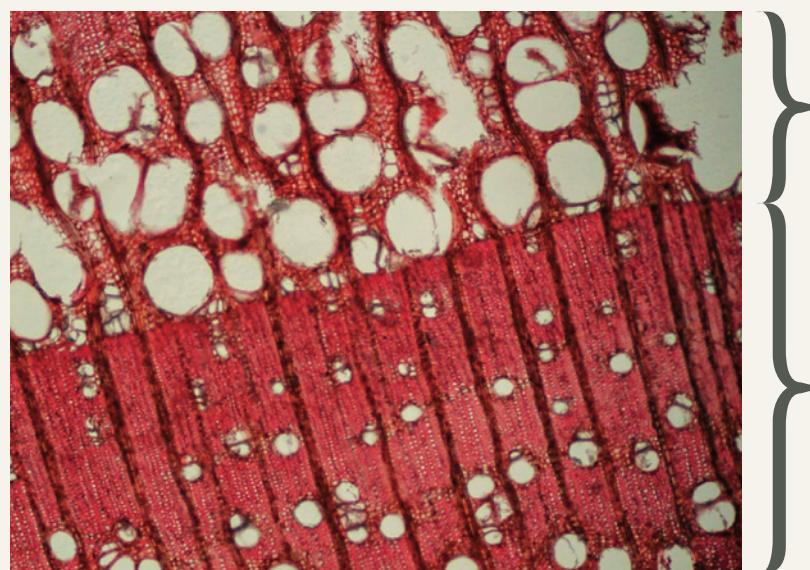
Tangential section

Fibre Dimensions

- Fibres.
- Fibres wall thickness ranging from $3.5\mu\text{m}$ - $4.9\mu\text{m}$.
- Average fibre length 900 - $1600\ \mu\text{m}$.
- Fibre pits mainly restricted to radial walls, simple to minutely bordered and non-septate.
- Axial parenchyma. Axial parenchyma banded and of Paratracheal type.
- The slenderness ratio (SR) > 1.0 and runkel ratio (RR) < 1.0 and is suitable for paper making.

Formation Of Growth Ring

- One ring will be counted as a year of growth. This is often used to indicate the age of a tree.
- Sungkai exhibits growth rings as they are ring-porous: larger pores in early state of growing season and smaller pores later.
- The width in the early wood and late wood relies on the moisture availability in the beginning and later of the season.
- Latewood is built by thicker cell wall.



Earlywood Vs Latewood

Early wood

Late wood

Cross section of growth ring showing the early wood and late wood portion (Salmiyati, 2015)

Physical Characteristics

- The most important properties are wood density as every types of wood have their very own density.
- Density is defined as mass or weight per unit volume which is often expressed as:
 - grams per cubic centimeter (g cm^{-3})
 - kilograms per cubic meter (kg m^{-3}), or
 - pounds per cubic foot (lb ft^{-3}).

Density of Sungkai Wood

- The highest density value is at the bottom part of tree which is 0.47 g/cm^3 .
- The density of Sungkai wood were lower compared with other plantation species such as teak and rubber wood.
- The average density for Sungkai is in the range of 470 kg/m^3 to 530 kg/m^3 .

Wood Shrinkage & Swelling

- Wood properties such as ring width, structural elements and shrinkage & swelling will also vary from the bottom to the top, same thing happens for the radial wood properties.

- Wood is also known to have hygroscopic properties i.e it depends on the surrounding moisture content to either absorb or desorb the moisture from the surrounding.
- Moisture is being stored in both fiber cavities and fiber walls. When water goes out from the wood will reduce the thickness of fiber walls and lead to shrinkage.
- Moisture is removed first from the fiber cavities followed by water in the fiber walls. When the cavities are emptied, shrinkage is usually occurred due to the structure and orientation of micro fibril in the cell wall.

Processing & Machining Properties

- As carpentry materials, sungkai wood quality is quite nice and preferred by the workers due to easy to work or process.
- Sungkai wood can be planed, shaped and turned with moderate results, but can be drilled and sanded with ease.
- Wood working properties is rated as moderately easy except that the saw may blunt easily due to the presence of silica.

Properties of Some Timber Species Planted In Malaysia

SPECIES PROPERTIES	<i>Acacia mangium</i>	<i>Acacia auriculiformis</i>	<i>Acacia Hybrida)</i>	<i>Az. excelsab</i>	<i>Peronema canescens</i>	<i>Hevea brasiliensis</i>
Anatomy: ¹⁾						
Fiber length (L), μm	927	953	991	975	1103	1214
Fiber diameter (D), μm	12.4	17.41	14.73	16.8		23.5
Cell wall thickness (W), μm	2.44	2.59	3.77	2.83	3.78	6.37
Physical: ²⁾						
Density, kg/m^3	590	810	560	501	467	560-650
Air-dry Shrinkage (T), %	1.99	4.47*	n.a	2.71	2.71	2.51
Air-dry Shrinkage (R), %	1.27	3.32*	n.a	1.80	--	--
Total Shrinkage (R), %	n.a	2.71*)	2.9	3.92	2.88	1.61
Mechanical: ⁴⁾						
MOR, N/mm^2	62.76	97.1	94.01	83.3	62.4	66
MOE, N/mm^2	9529	8886	9075	9075	8184	9240
Compression // to grain, N/mm^2	42.86	40.76	46.5	44.8	43.2	32
Shear, N/mm^2	15.06	13.32	10.89	13.7	--	11

Sources: ¹⁾ Azrina (2002); Haifah (2002); Izani (2006); ²⁾ Leong (2002); Wong (2002); Hamami et al.(2016)

Mechanical Properties of Sungkai

TEST	Tree Parts	Sample No. (n)	Average N/mm ²	Std. Dev.	Min N/mm ²	Max N/mm ²
Static Bending (MOR)	Base	30	155	17	119	195
	Top	30	144	14	121	178
	Branch	30	144	24	106	212
Static Bending (MOE)	Base	30	1414	152	1193	1711
	Top	30	1367	126	1076	1571
	Branch	30	1474	290	1008	2429
Comp.II to grain (MOR)	Base	30	1524	151	1218	1880
	Top	30	1491	171	1006	1821
	Branch	30	1523	175	1057	1744
Comp. II to grain (MOE)	Base	30	5242	954	3227	6852
	Top	30	4922	1392	493	7178
	Branch	30	5454	987	319	6736

Average Values of MOR and MOE of Sungkai Wood from Static Bending and Compression II to the Grain Alfreedo, 2014).

- Planing and turning give moderate results whereas boring and sanding are good.
- Drying Properties:
The sungkai wood should be dried slowly. Too fast drying will risk to get cracked and hairline problem.
- Gluing Properties:
Sungkai wood is classified as small diameter species i.e, suitable for furniture making , manufacturing of veneer & plywood, medium density fibre board, laminated veneer lumber and glued laminated lumber (GLULAM).
- Wood gluing properties is the most important properties in manufacturing wood composite products.
- The making of wood composite is one of the most productive ways in wood consumption, By gluing through lamination, *Peronema canescens*, can be converted into longer pieces and wider surfaces with higher strength.

Finishing For Sungkai Wood

- With proper finishing materials and processes, the wide range of colours and finishing models can be generated.
- Sungkai wood has nice grain and colour and a

transparent colour finishing is the best choice for it. The natural clean looked or the antique transparent finish can be used to maximize the beauty of the wood.

- The wood has less, small and shallow pores. The close pores finish can be produced with relatively easy.
- The pores and grain can be filled with one layer filler application. If we used the catalyzed coating, the close pores finish without filler application can be used.

Natural Durability

- The timber is rated as moderately durable with an average service life in contact with ground of about 3 years.
- It is readily attacked by pin-hole beetles but is believed to be moderately resistant to dry wood termites and resistant to attacks by powder-post beetles good.
- The wood is also susceptible to insects pests. The chemical treatment with the insect repellent is recommended to increase the durability of the wood.
- Not recommended for use in areas exposed to the sun with high intensity for too long and also use in place of direct contact with the soil.

Sungkai~potential Uses



Sungkai
Sawnwood



Sungkai is a popular species for solid components of indoor furniture, wood furnishings and wood flooring



Sungkai
Veneer



Sungkai wood has beautiful pattern of wood grain suitable for veneer and plywood



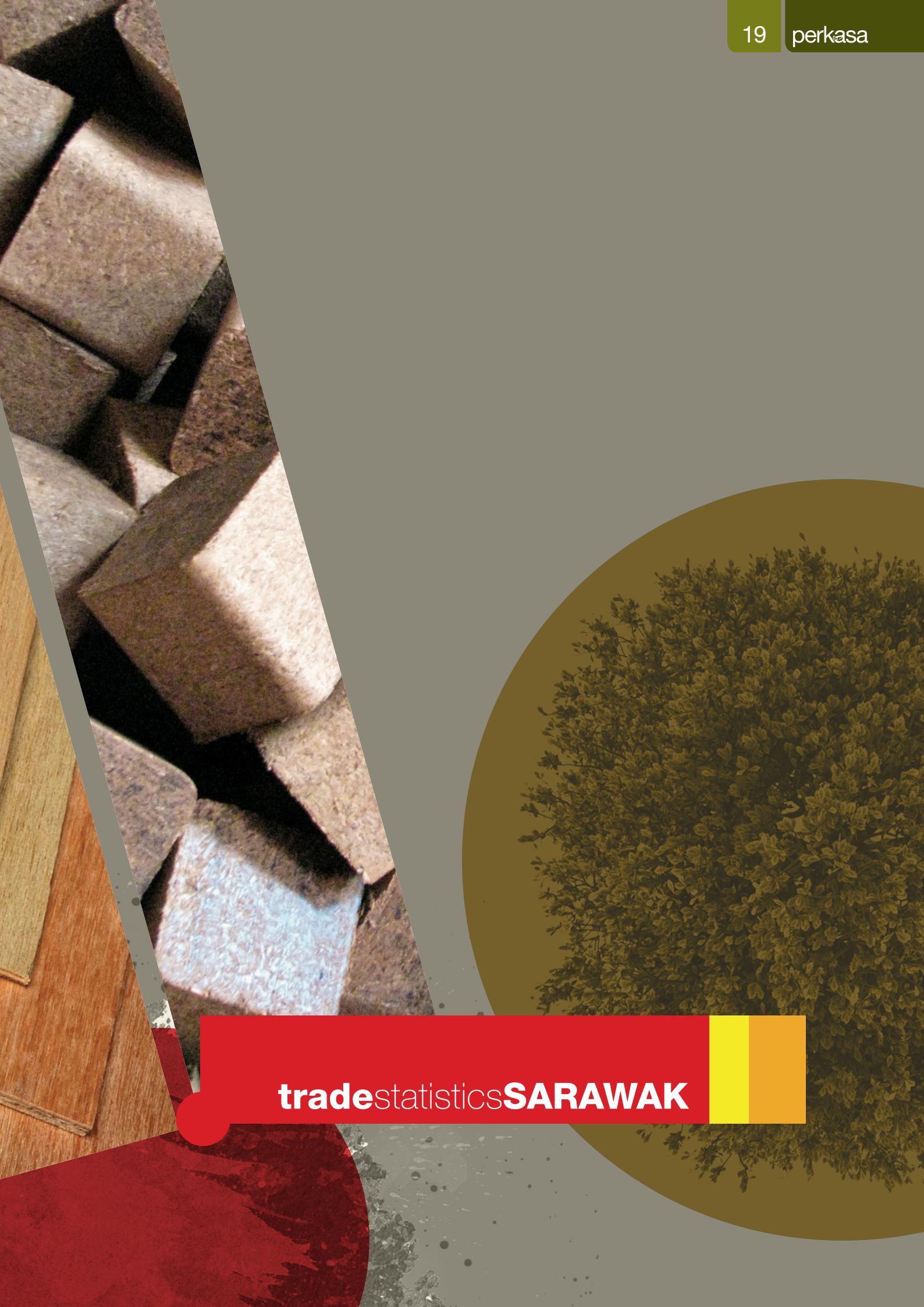
Guitar made from combination of sungkai, teak and surian woods



List Of Research Topics On Sungkai (*Peronema canescens*) Conducted By Universiti Malaysia Sabah And Sabapuri Nursery

Research at Bachelor Level (Undergraduate) (2014-2016)			
1	Struktur Anatomi Dan Dimensi Serat Kayu Sungkai <i>Peronema canescens</i>	Salmiyati Binti Marsuki (2014/2015)	Prof. Dr Mohd Hamami Sahri
2	Ciri-Ciri Fizikal Dan Mekanikal Kayu Sungkai (<i>Peronema canescens</i>)	Alfreedo Anthony Sanan (2014/2015)	Prof. Dr Mohd Hamami Sahri
3	Kekuatan Ricih 2-Lapis Papan Laminasi <i>Peronema canescens</i> Menggunakan Polyurethane (PU) dan Polyvinyl Acetate (PVAc)	Ong Shu Ting (2015)	Prof. Dr Mohd Hamami Sahri
4	The Variations Of Density And Shrinkage In 13 Year Old Planted Sungkai (<i>Peronema canescens</i>)	Lai Mei Theng (2015)	Prof. Dr Mohd Hamami Sahri
5	The Chemical Composition Of Different Parts Of Planted <i>Peronema Canescens</i> Jack In Sabah	Parween A/L Kelappan (2015)	Prof. Dr Mohd Hamami Sahri
6	Variasi Panjang Serat Kayu Sungkai Mengikut Tinggi Dan Diameter Batang	Siti Sarah Binti Zakaria (2015)	Prof. Dr Mohd Hamami Sahri
7	Pola Taburan Pit Pada Kayu Awal Dan Kayu Akhir Spesis Kayu Sungkai	Ahmad Hasif Bin Abdul Rahman (2016)	Prof. Dr Mohd Hamami Sahri
8	Prestasi Pertumbuhan Anak Benih Sungkai (<i>Peronema canescens</i>) Di Tapak Semaian Telipok	Siti Khatijah Ibrahim (2016)	Prof. Dr Mohd Hamami Sahri
9	Inter Vessel Pitting Of Selected Fast Growing Plantation Species From Sabah	Nurhisma Atiqah Binti Badrolhisam (2016)	Prof. Dr Mohd Hamami Sahri
10	Ring Width And Density Variations In Earlywood And Latewood Of 10 Years Old Planted Sungkai (<i>Peronema canescens</i>)	Yeow Yi Juen (2016)	Prof. Dr Mohd Hamami Sahri
11	Kesan Penggunaan Jenis Baja Yang Berbeza Terhadap Kadar Pertumbuhan Pokok Sungkai (<i>Peronema canescens</i>)	Nurul Zawanah Binti Samsudin (2016)	Assoc. Prof. Dr Normah Awang Besar





trade statistics SARAWAK

Table 1
Export Summary Of Timber And Timber Products From Sarawak

Products	2021 ^p January - June			2020 ^a January - June			% Change 2021 / 2020	
	Volume (M ³)	FOB Value (RM'000)	Value %	Volume (M ³)	FOB Value (RM'000)	Value %	Volume	Value
PLYWOOD	527,550	1,044,530	56.70	566,967	1,115,892	56.69	(6.95)	(6.40)
LOGS	293,950	255,195	13.85	530,815	226,581	11.51	(44.62)	12.63
SAWNTIMBER	84,999	156,298	8.48	135,498	231,415	11.76	(37.27)	(32.46)
FIBREBOARD	81,647	147,398	8.00	87,393	147,553	7.50	(6.57)	(0.11)
VENeer	16,878	23,122	1.26	18,985	26,227	1.33	(11.09)	(11.84)
DOORSKIN	19,284	43,535	2.36	12,418	27,888	1.42	55.29	56.11
LAMINATED BOARD/FLOORING	4,529	17,421	0.95	3,091	11,255	0.57	46.49	54.78
PARTICLEBOARD	4,202	3,270	0.18	14,800	9,852	0.50	(71.61)	(66.81)
DOOR PANELS & FRAMES	4,769	7,686	0.42	6,083	9,926	0.50	(21.61)	(22.57)
MOULDING	1,924	4,968	0.27	2,441	5,747	0.29	(21.18)	(13.55)
OTHER PRODUCTS*	13,838	19,318	1.05	17,243	22,344	1.14	(19.75)	(13.55)
OTHER PRODUCTS**[Units]	1,510,707	24,395	1.32	1,252,372	19,515	0.99	20.63	25.01
OTHER PRODUCTS***[Kgm]	-	-	-	42	8	0.00	(100.00)	(100.00)
BRIQUETTE & CHARCAOL (Tonne)	3,780	8,147	0.44	4,649	10,225	0.52	(18.69)	(20.32)
WOOD PELLETS [Tonne]	673	247	0.01	3,125	1,764	0.09	(78.48)	(85.97)
WOODCHIP [Tonne]	197,211	86,788	4.71	215,657	102,289	5.20	(8.55)	(15.15)
TOTAL (m³) (RM)	1,053,567	1,842,317	100	1,395,733	1,968,481	100	(24.52)	(6.41)

***Other Timber Products:**

- Barecore
- Blockboard
- Chopping Board
- Densified Wood
- Dowels
- Finger jointed
- Lamin Board
- Laminated beam/post
- Laminated Veneer Cross Band (LVB)
- Laminated Veneer Lumber (LVL)
- Railways sleepers
- Wooden panels
- Wooden Handle
- Wooden Fence
- Wooden lattice
- Wooden stakes

****Other Timber Products:**

- Furniture & Furniture parts
- Wooden Pallets

*****Other Timber Products:**

- Handicraft

Notes:

- > Fibreboard include MDF and HDF
- > Total of volume (m³) does not includes woodchips (tonne) and other product (units)
- > a = actual data & total does not include application/permit to transport goods within the Federation [Customs Declaration Form No.3 (CDF3)]
- > p = preliminary data & total does not include application/permit to transport goods within the Federation [Customs Declaration Form No.3 (CDF3)]

**Export Value (%) Of Major Timber & Timber Products
From Sarawak (RM'000) : 2021 / 2020**

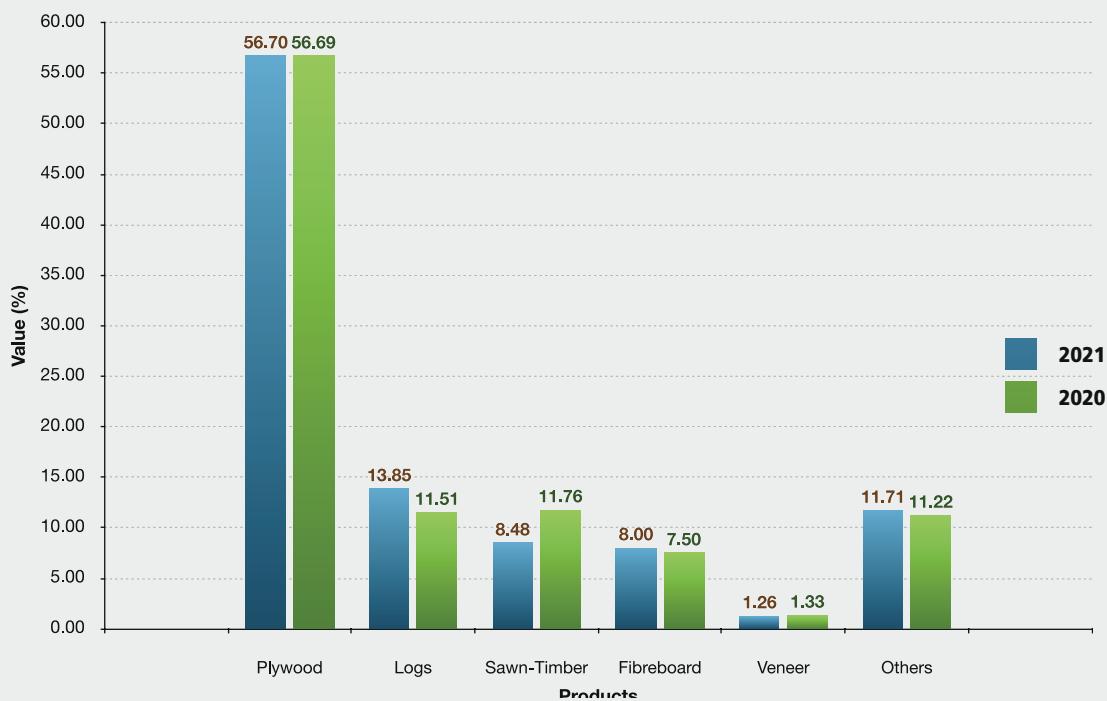


Table 2
Export Of Plywood By Country Of Destinations

Destinations	2021 ^b January - June			2020 ^a January - June			% Change 2021 / 2020	
	Volume (M ³)	FOB Value (RM'000)	Value %	Volume (M ³)	FOB Value (RM'000)	Value %	Volume	Value
JAPAN	370,598	767,053	73.44	357,613	770,052	69.01	3.63	(0.39)
MIDDLE EAST	60,585	95,043	9.10	79,598	122,280	10.96	(23.89)	(22.27)
TAIWAN	32,334	50,842	4.87	51,488	78,559	7.04	(37.20)	(35.28)
UNITED STATES	21,043	49,759	4.76	2,998	6,769	0.61	601.82	635.10
KOREA	22,506	37,346	3.58	45,154	76,179	6.83	(50.16)	(50.98)
AUSTRALIA	3,832	10,102	0.97	4,842	11,815	1.06	(20.86)	(14.50)
MEXICO	3,815	8,360	0.80	2,653	5,670	0.51	43.81	47.45
INDIA	2,851	6,587	0.63	2,805	6,606	0.59	1.63	(0.28)
VIETNAM	1,623	4,128	0.40	2,135	4,486	0.40	(23.95)	(7.97)
CHINA	2,091	3,926	0.38	2,258	4,479	0.40	(7.41)	(12.35)
OTHERS*	6,272	11,384	1.09	15,423	28,995	2.60	(59.33)	(60.74)
TOTAL	527,550	1,044,530	100	566,967	1,115,892	100	(6.95)	(6.40)

***Other Destinations:**

- BRUNEI DARUSSALAM
- PHILIPPINES
- THAILAND
- HONG KONG
- SINGAPORE
- DJIBOUTI
- CANADA
- NEW ZEALAND
- BANGLADESH
- PAPUA NEW GUINEA
- CAMBODIA
- MALDIVES
- PUERTO RICO
- SOMALIA

Export Value (%) Of Plywood To Major Destinations
: 2021 / 2020

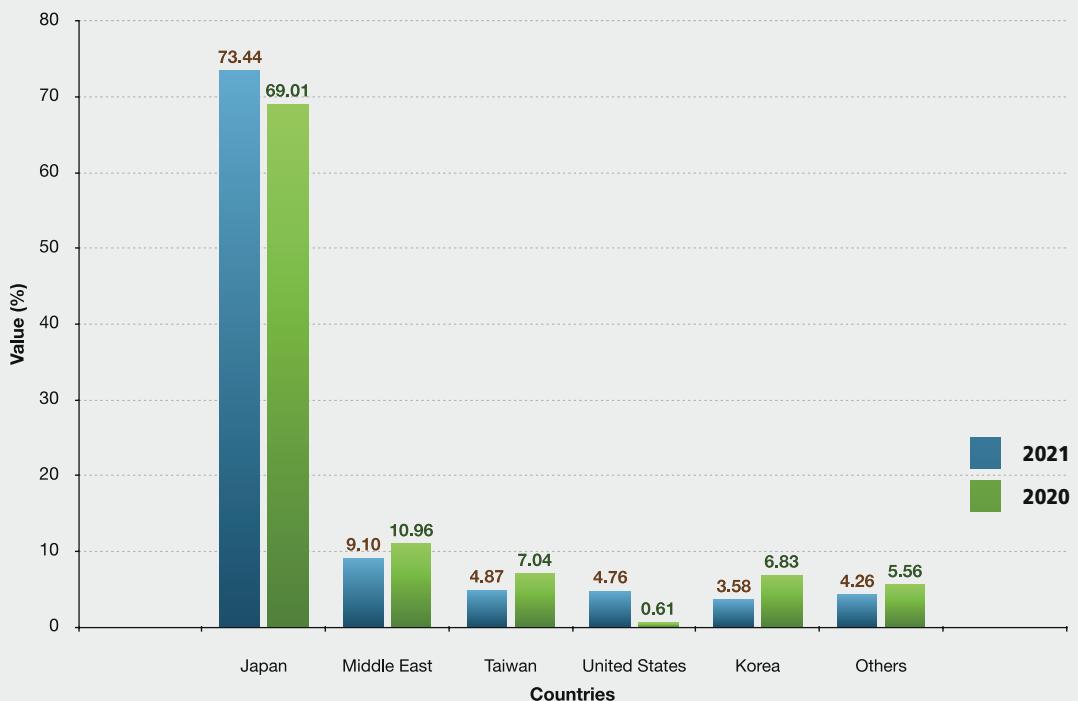


Table 3
Export Of Logs By Country Of Destinations

Destinations	2021 ^b January - June			2020 ^a January - June			% Change 2021 / 2020	
	Volume (M ³)	FOB Value (RM'000)	Value %	Volume (M ³)	FOB Value (RM'000)	Value %	Volume	Value
INDIA	253,833	218,490	85.62	117,295	91,517	40.39	116.40	138.74
TAIWAN	27,514	25,063	9.82	29,347	24,896	10.99	(6.25)	0.67
JAPAN	7,894	8,300	3.25	17,352	14,029	6.19	(54.51)	(40.84)
VIETNAM	4,709	3,343	1.31	13,522	9,632	4.25	(65.18)	(65.30)
INDONESIA	-	-	-	353,298	86,507	38.18	(100.00)	(100.00)
TOTAL	293,950	255,195	100	530,815	226,581	100	(44.62)	12.63

Export Value (%) Of Logs To Major Destinations
: 2021 / 2020

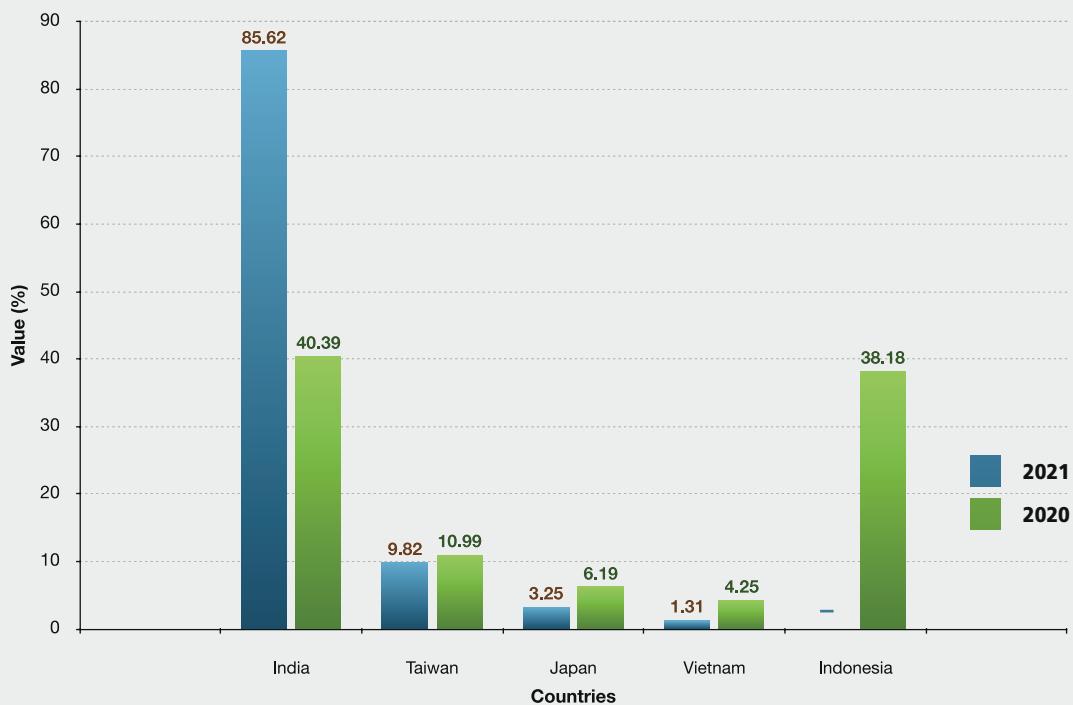


Table 4
Export Of Sawn-Timber By Country Of Destinations

Destinations	2021 ^b January - June			2020 ^a January - June			% Change 2021 / 2020	
	Volume (M ³)	FOB Value (RM'000)	Value %	Volume (M ³)	FOB Value (RM'000)	Value %	Volume	Value
MIDDLE EAST	26,392	54,925	35.14	50,103	96,731	41.80	(47.33)	(43.22)
PHILIPPINES	26,180	44,711	28.61	32,007	47,770	20.64	(18.21)	(6.40)
TAIWAN	12,451	22,721	14.54	18,862	30,913	13.36	(33.99)	(26.50)
THAILAND	5,722	7,935	5.08	15,256	19,503	8.43	(62.50)	(59.31)
JAPAN	3,169	7,830	5.01	4,597	11,707	5.06	(31.06)	(33.12)
CHINA	4,559	6,215	3.98	3,259	5,940	2.57	39.91	4.63
KOREA	2,759	4,516	2.89	5,992	9,761	4.22	(53.96)	(53.74)
SRI LANKA	1,407	3,070	1.96	1,604	3,476	1.50	(12.29)	(11.68)
SOUTH AFRICA	1,233	2,404	1.54	463	889	0.38	166.54	170.46
SINGAPORE	442	541	0.35	325	455	0.20	36.16	18.95
OTHERS*	684	1,430	0.91	3,029	4,270	1.84	(77.43)	(66.51)
TOTAL	84,999	156,298	100	135,498	231,415	100	(37.27)	(32.46)

***Other Destinations:**

- INDIA
- UNITED STATES
- PAKISTAN
- SEYCHELLES
- AUSTRALIA
- MALDIVES
- BEUNEI DARUSSALAM
- HONG KONG
- MALAYSIA (Peninsular or Sabah-freezon)
- MAURITIUS
- VIETNAM

Export Value (%) Of Sawn-Timber To Major Destinations
: 2021 / 2020

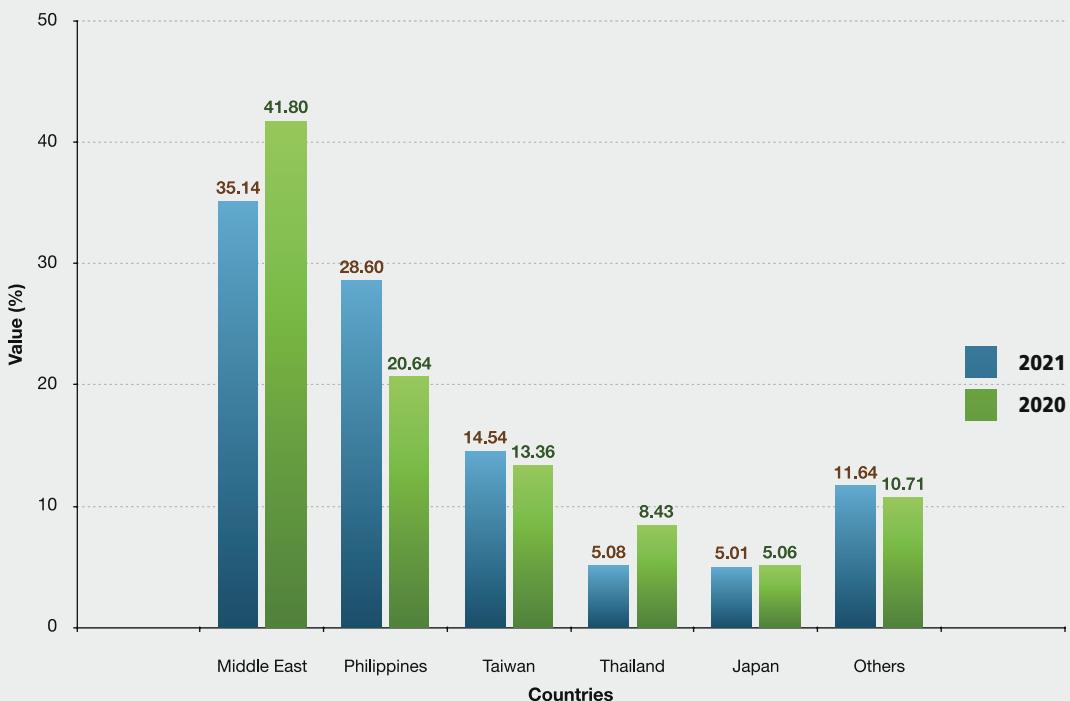


Table 5
Export Of Fibreboard By Country Of Destinations

Destinations	2021 ^b January - June			2020 ^a January - June			% Change 2021 / 2020	
	Volume (M ³)	FOB Value (RM'000)	Value %	Volume (M ³)	FOB Value (RM'000)	Value %	Volume	Value
JAPAN	51,806	100,296	68.04	70,325	118,417	80.25	(26.33)	(15.30)
PHILIPPINES	13,545	22,809	15.47	8,444	14,735	9.99	60.40	54.79
VIETNAM	5,375	8,907	6.04	2,930	5,185	3.51	83.42	71.77
INDONESIA	5,633	7,576	5.14	2,613	3,862	2.62	115.61	96.17
TAIWAN	1,596	2,593	1.76	1,530	2,846	1.93	4.33	(8.89)
KOREA	1,610	2,451	1.66	1,183	2,196	1.49	36.13	11.62
OTHERS*	2,081	2,767	1.88	368	312	0.21	466.30	785.70
TOTAL	81,647	147,398	100	87,393	147,553	100	(6.57)	(0.11)

***Other Destinations:**

- CHINA
- CANADA
- BRUNEI DARUSSALAM
- AUSTRALIA
- THAILAND
- INDIA

Export Value (%) Of Fibreboard To Major Destinations
: 2021 / 2020

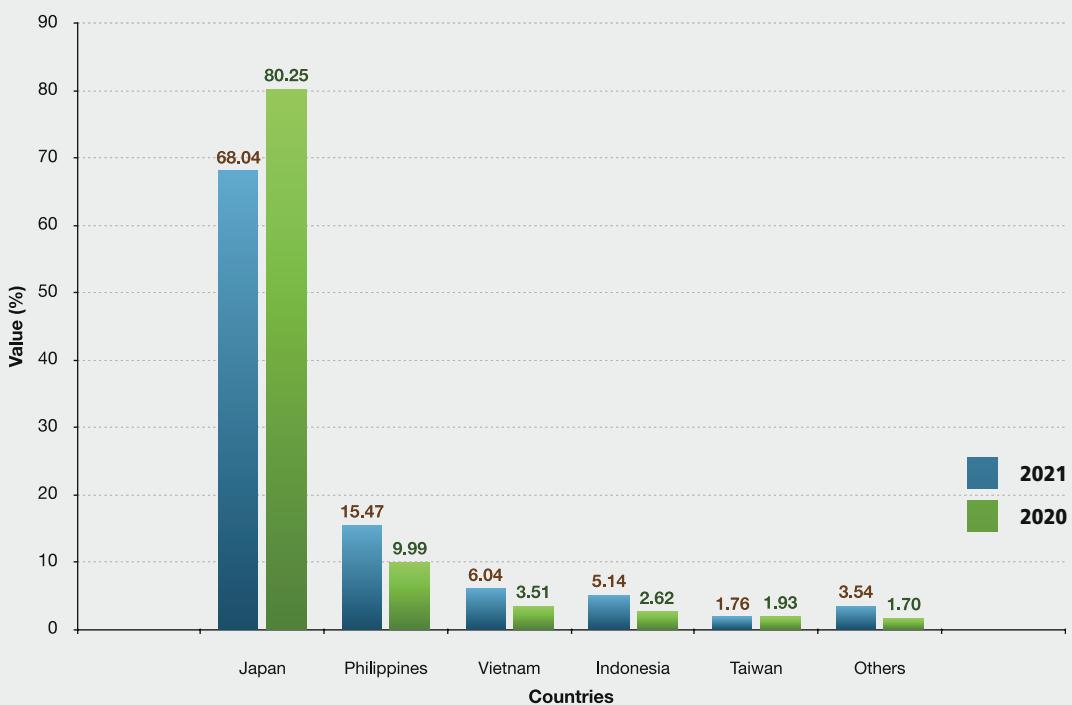


Table 6
Export Of Veneer By Country Of Destinations

Destinations	2021 ^a January - June			2020 ^a January - June			% Change 2021 / 2020	
	Volume (M ³)	FOB Value (RM'000)	Value %	Volume (M ³)	FOB Value (RM'000)	Value %	Volume	Value
TAIWAN	6,701	7,815	33.80	7,162	9,351	35.66	(6.44)	(16.43)
KOREA	3,094	5,013	21.68	6,166	8,660	33.02	(49.83)	(42.11)
JAPAN	2,412	4,942	21.37	1,899	3,868	14.75	27.02	27.78
CHINA	2,155	2,524	10.92	1,723	2,141	8.16	25.09	17.90
PHILIPPINES	2,149	2,081	9.00	1,868	1,813	6.91	15.05	14.81
AUSTRALIA	338	672	2.91	167	395	1.50	101.99	70.27
OTHERS*	30	75	0.32	-	-	-	100.00	100.00
TOTAL	16,878	23,122	100	18,985	26,227	100	(11.09)	(11.84)

***Other Destinations:**

- India

Export Value (%) Of Veneer To Major Destinations
: 2021 / 2020

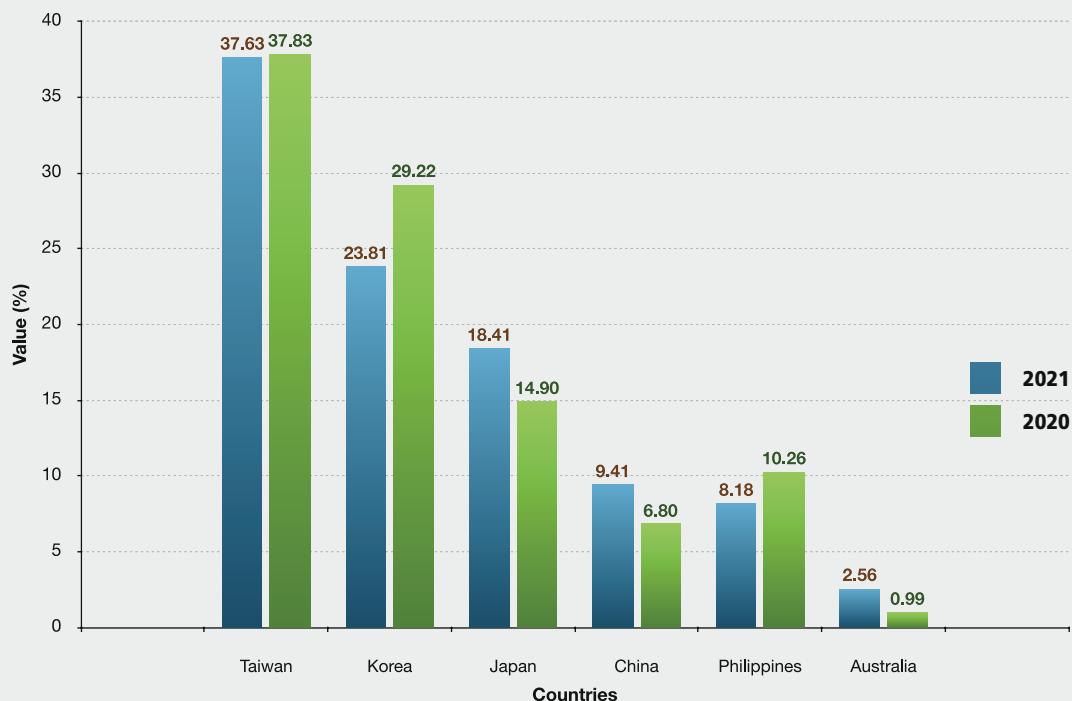


Table 7
Export Of Doorskin By Country Of Destinations

Destinations	2021 ^b January - June			2020 ^a January - June			% Change 2021 / 2020	
	Volume (M ³)	FOB Value (RM'000)	Value %	Volume (M ³)	FOB Value (RM'000)	Value %	Volume	Value
PAKISTAN	11,407	24,565	56.43	8,638	18,992	68.10	32.07	29.34
INDIA	3,903	8,789	20.19	2,127	4,860	17.43	83.54	80.86
SOUTH AFRICA	1,342	3,676	8.44	204	523	1.88	557.23	602.59
PHILIPPINES	1,116	2,818	6.47	265	715	2.56	321.22	294.37
GUATEMALA	583	1,447	3.32	-	-	-	100.00	100.00
TAIWAN	589	1,346	3.09	740	1,719	6.17	(20.42)	(21.70)
INDONESIA	156	386	0.89	220	447	1.60	(29.04)	(13.62)
THAILAND	95	281	0.64	176	510	1.83	(45.64)	(44.95)
OTHERS*	91	228	0.52	49	121	0.43	86.88	87.64
TOTAL	19,284	43,535	100	12,418	27,888	100	55.29	56.11

***Other Destinations:**

- NEPAL
- MIDDLE EAST
- VIETNAM
- MONGOLIA

Export Value (%) Of Doorskin To Major Destinations
: 2021 / 2020

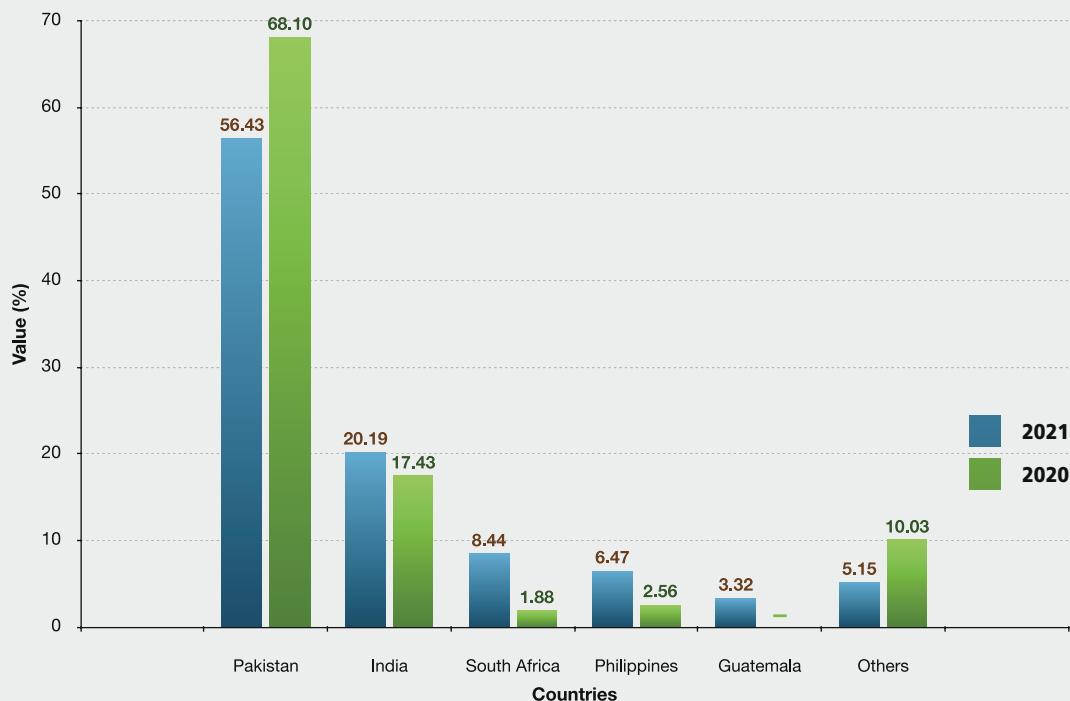


Table 8

Export Of Laminated Board/Flooring By Country Of Destinations

Destinations	2021 ^b January - June			2020 ^a January - June			% Change 2021 / 2020	
	Volume (M ³)	FOB Value (RM'000)	Value %	Volume (M ³)	FOB Value (RM'000)	Value %	Volume	Value
UNITED STATES	2,844	12,307	70.64	1,264	5,775	51.31	124.92	113.10
VIETNAM	699	2,644	15.18	625	2,340	20.79	11.80	13.03
TAIWAN	678	1,441	8.27	728	1,702	15.12	(6.86)	(15.35)
MACAU	44	425	2.44	44	442	3.92	0.00	(3.82)
EU	102	334	1.92	-	-	-	100.00	100.00
KOREA	52	97	0.56	189	484	4.30	(72.49)	(79.98)
SINGAPORE	86	93	0.53	129	145	1.29	(33.33)	(36.19)
INDONESIA	23	81	0.47	52	184	1.63	(55.62)	(55.81)
BANGLADESH	-	-	-	23	36	0.32	100.00	100.00
BRUNEI DARUSSALAM	-	-	-	14	54	0.48	(100.00)	(100.00)
MALAYSIA (Peninsular or Sabah-free zone)	-	-	-	22	95	0.84	(100.00)	(100.00)
TOTAL	4,529	17,421	100	3,091	11,255	100	46.49	54.78

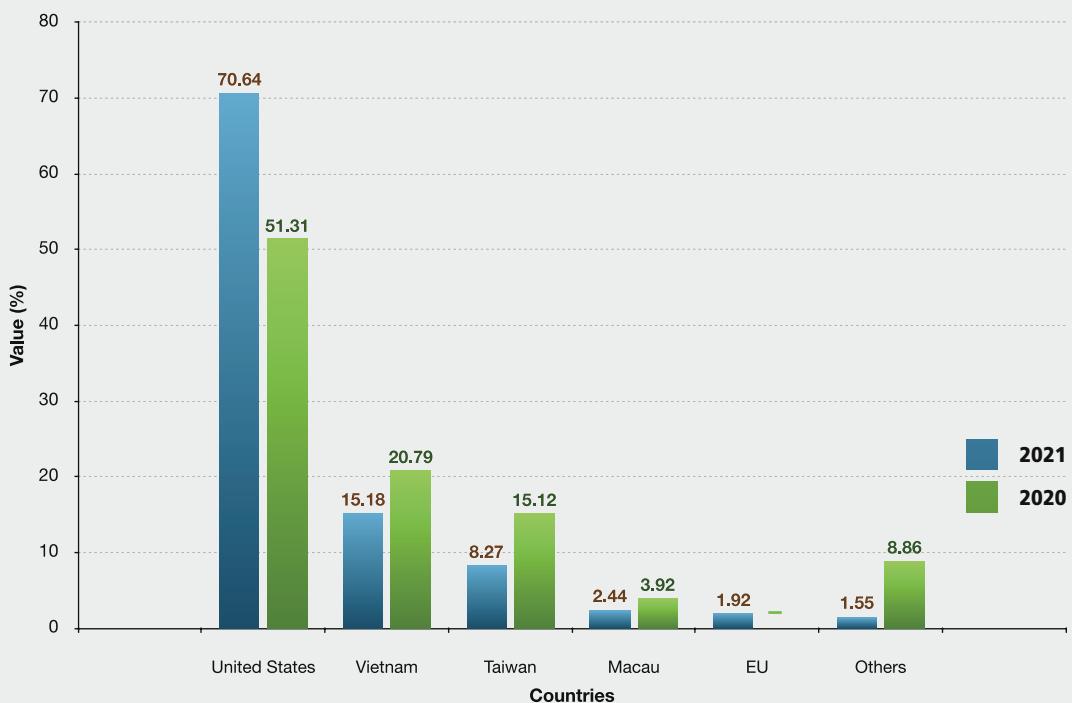
Export Value Of Laminated Board / Flooring To Major Destinations
: 2021 / 2020

Table 9
Export Of Particle Board By Country Of Destinations

Destinations	2021 ^b January - June			2020 ^a January - June			% Change 2021 / 2020	
	Volume (M ³)	FOB Value (RM'000)	Value %	Volume (M ³)	FOB Value (RM'000)	Value %	Volume	Value
INDONESIA	1,850	1,448	44.27	6,189	4,109	41.70	(70.11)	(64.77)
JAPAN	674	562	17.19	1,457	1,071	10.87	(53.76)	(47.48)
KOREA	601	520	15.89	1,796	1,136	11.53	(66.55)	(54.27)
PHILIPPINES	529	435	13.31	2,140	1,490	15.12	(75.27)	(70.78)
VIETNAM	527	288	8.82	3,174	2,017	20.48	(83.40)	(85.70)
CHINA	21	17	0.52	-	-	-	100.00	100.00
KENYA	-	-	-	44	29	0.30	(100.00)	(100.00)
TOTAL	4,202	3,270	100	14,800	9,852	100	(71.61)	(66.81)

**Export Value Of Particle Board To Major Destinations
(RM'000) : 2021 / 2020**

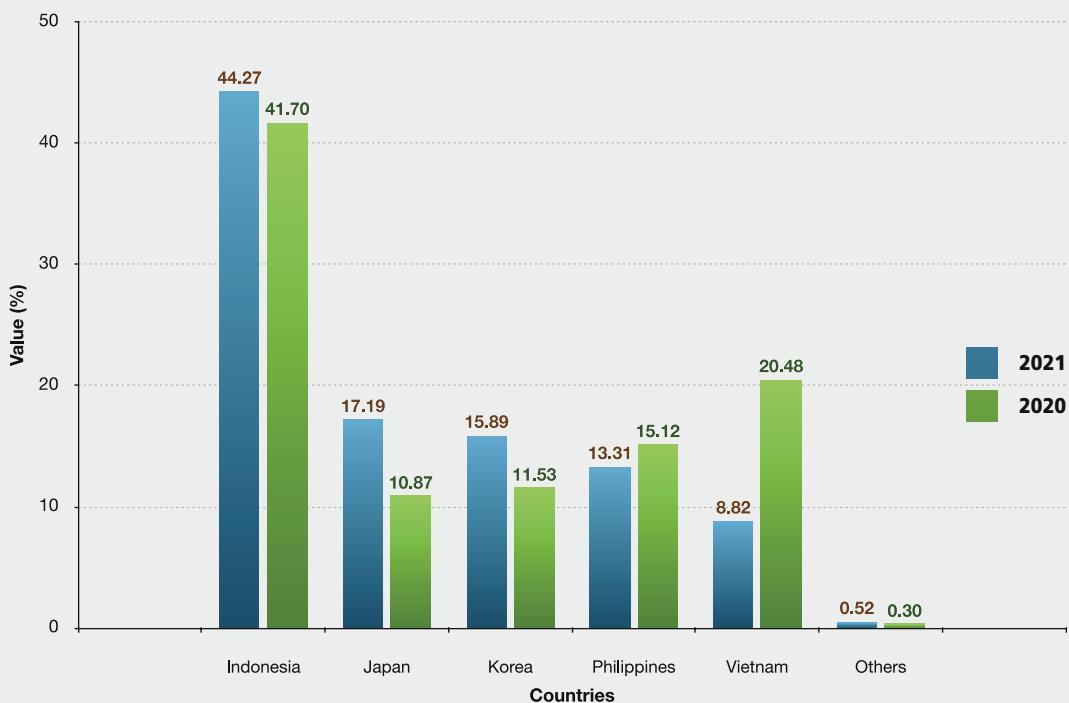


Table 10
Export Of Door Panel & Frame By Country Of Destinations

Destinations	2021 ^a January - June			2020 ^a January - June			% Change 2021 / 2020	
	Volume (M ³)	FOB Value (RM'000)	Value %	Volume (M ³)	FOB Value (RM'000)	Value %	Volume	Value
JAPAN	4,709	7,489	97.45	6,044	9,765	98.37	(22.09)	(23.30)
THAILAND	26	157	2.04	26	152	1.53	2.28	3.13
BRUNEI DARUSSALAM	33	39	0.51	6	8	0.08	427.87	391.49
MALDIVES	-	-	-	7	1	0.01	(100.00)	(100.00)
TOTAL	4,769	7,686	100	6,083	9,926	100	(21.61)	(22.57)

**Export Value (%) Of Door Panel & Frame To Major Destinations
: 2021 / 2020**

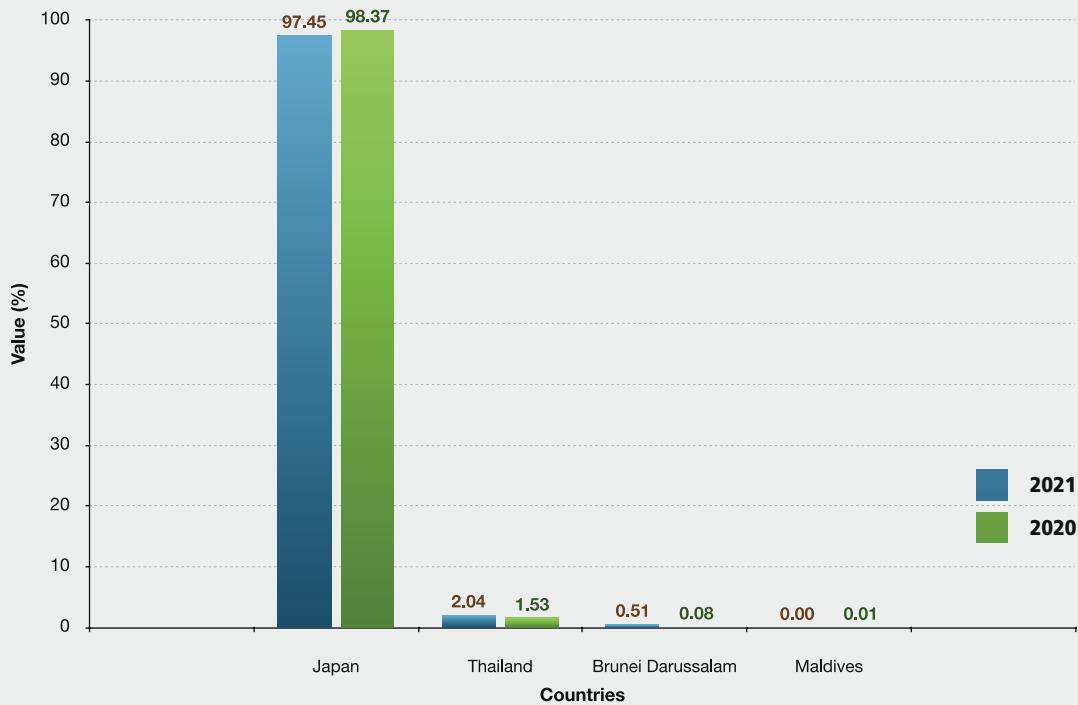


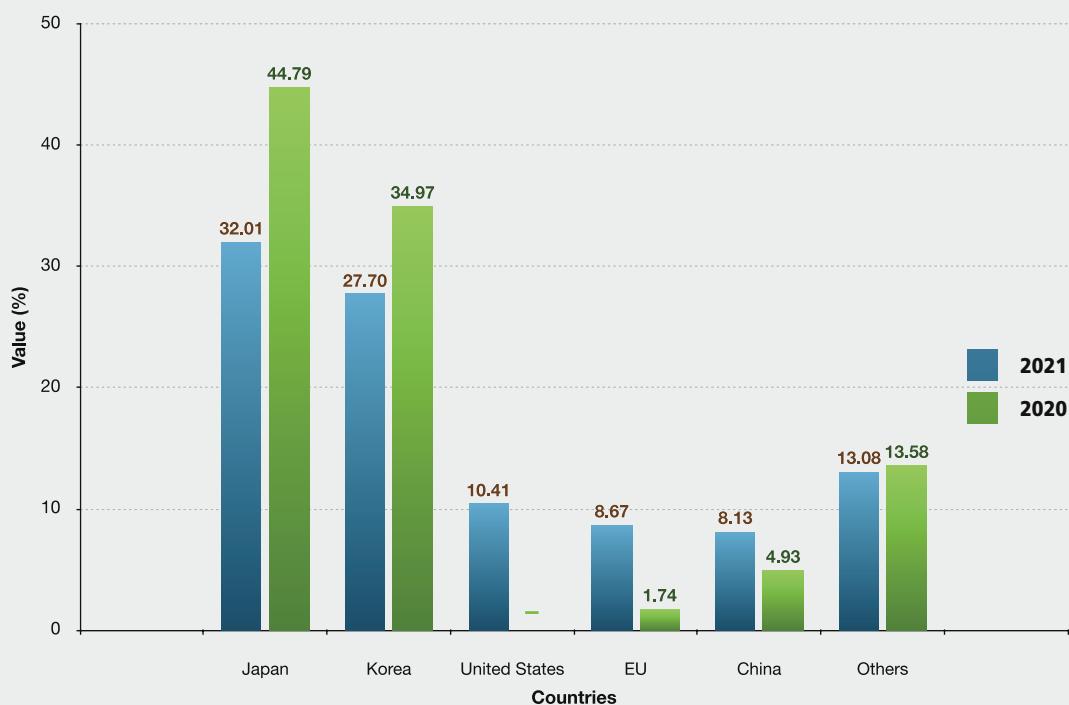
Table 11
Export Of Moulding By Country Of Destinations

Destinations	2021 ^b January - June			2020 ^a January - June			% Change 2021 / 2020	
	Volume (M ³)	FOB Value (RM'000)	Value %	Volume (M ³)	FOB Value (RM'000)	Value %	Volume	Value
JAPAN	664	1,590	32.01	1,077	2,574	44.79	(38.38)	(38.22)
KOREA	651	1,376	27.70	891	2,009	34.97	(26.94)	(31.51)
UNITED STATES	75	517	10.41	-	-	-	100.00	100.00
EU	44	431	8.67	21	100	1.74	111.34	331.59
CHINA	300	404	8.13	164	283	4.93	83.67	42.49
SOUTH AFRICA	62	236	4.76	18	57	0.99	247.23	314.53
MALDIVES	52	214	4.32	15	56	0.97	254.41	284.88
TAIWAN	56	117	2.35	124	204	3.56	(55.03)	(42.89)
AUSTRALIA	20	82	1.65	93	340	5.92	(78.66)	(75.95)
OTHERS*	-	-	-	40	123	2.14	(100.00)	(100.00)
TOTAL	1,924	4,968	100	2,441	5,747	100	(21.18)	(13.55)

***Other Destinations:**

- BRUNEI DARUSSALAM
- SEYCHELLES

Export Value Of Moulding To Major Destinations
: 2021 / 2020



Publication Items For Sale

Order Form

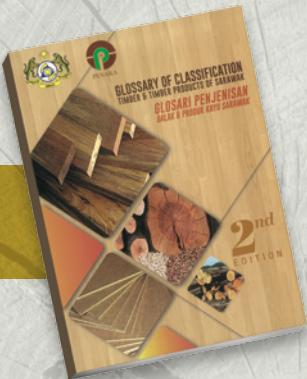
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The Malaysian Grading Rules For Sawn Hardwood Timber (English) (2009 Edition)



RM 90

Glossary Of Classification
Timber & Timber Products Of Sarawak
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to us, Nothing Should

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WASTE

Utilising technology and innovations for timber products are the hallmarks of STIDC's continuous pursuit of excellence for the timber industry and rightly, nothing should go to waste. In this aspect, STIDC has strived to make use of every part of the log for useful purposes and further enrich downstream industries for the benefit of the State and its people, now and for the future. STIDC firmly believes that forest resources should be optimally utilised for a sustainable future.

PERBADANAN KEMAJUAN PERUSAHAAN KAYU SARAWAK Sarawak Timber Industry Development Corporation (STIDC)

Wisma Sumber Alam, Jalan Stadium, Petra Jaya, 93050 Kuching,

P.O. Box 194, 93702 Kuching, Sarawak, Malaysia.

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www.sarawaktimber.gov.my

