



*Coconut Palm Wood -
a gold mine waiting to
boost the parallel coastal
economy of coconut
growing countries*



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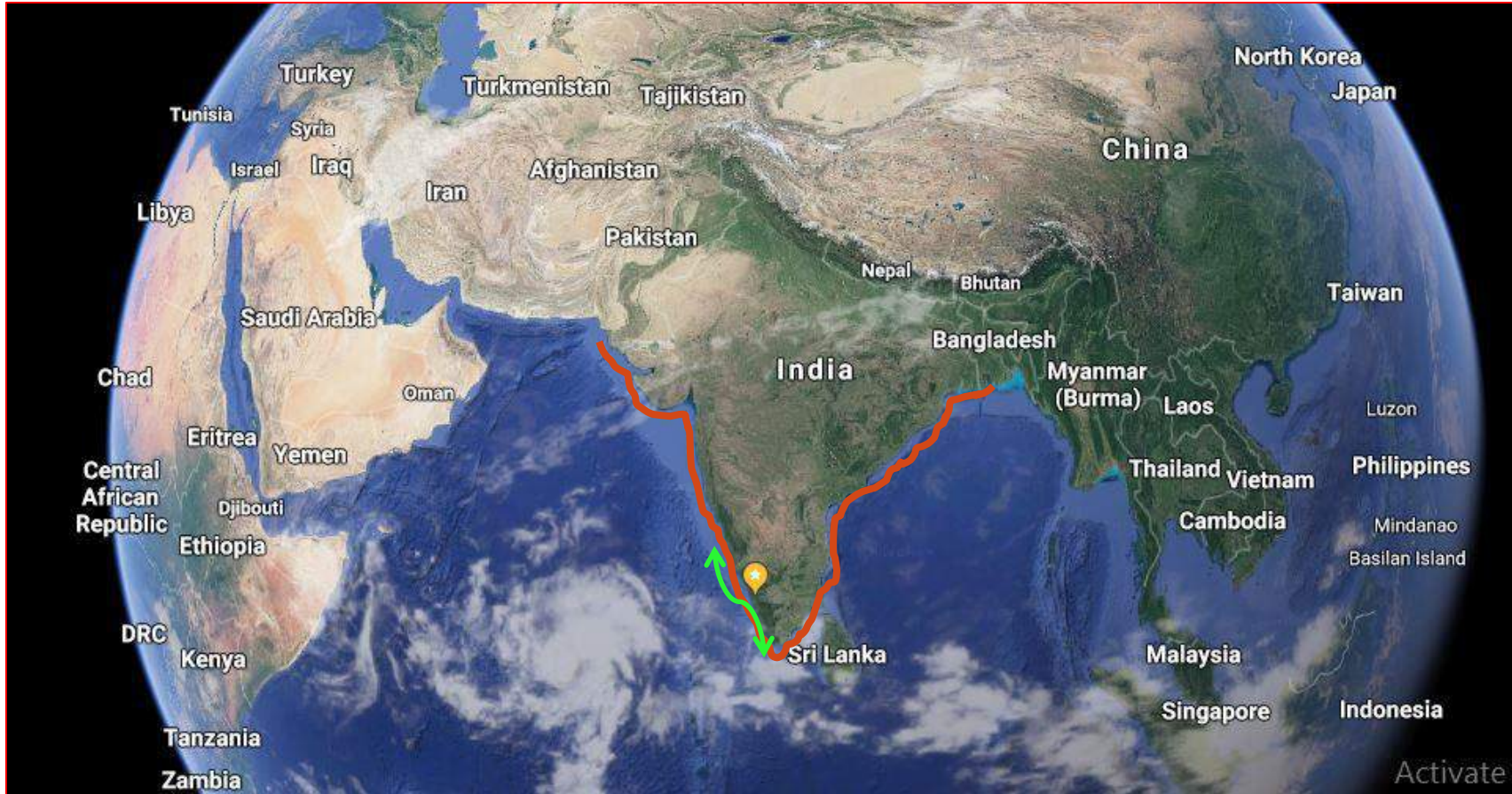


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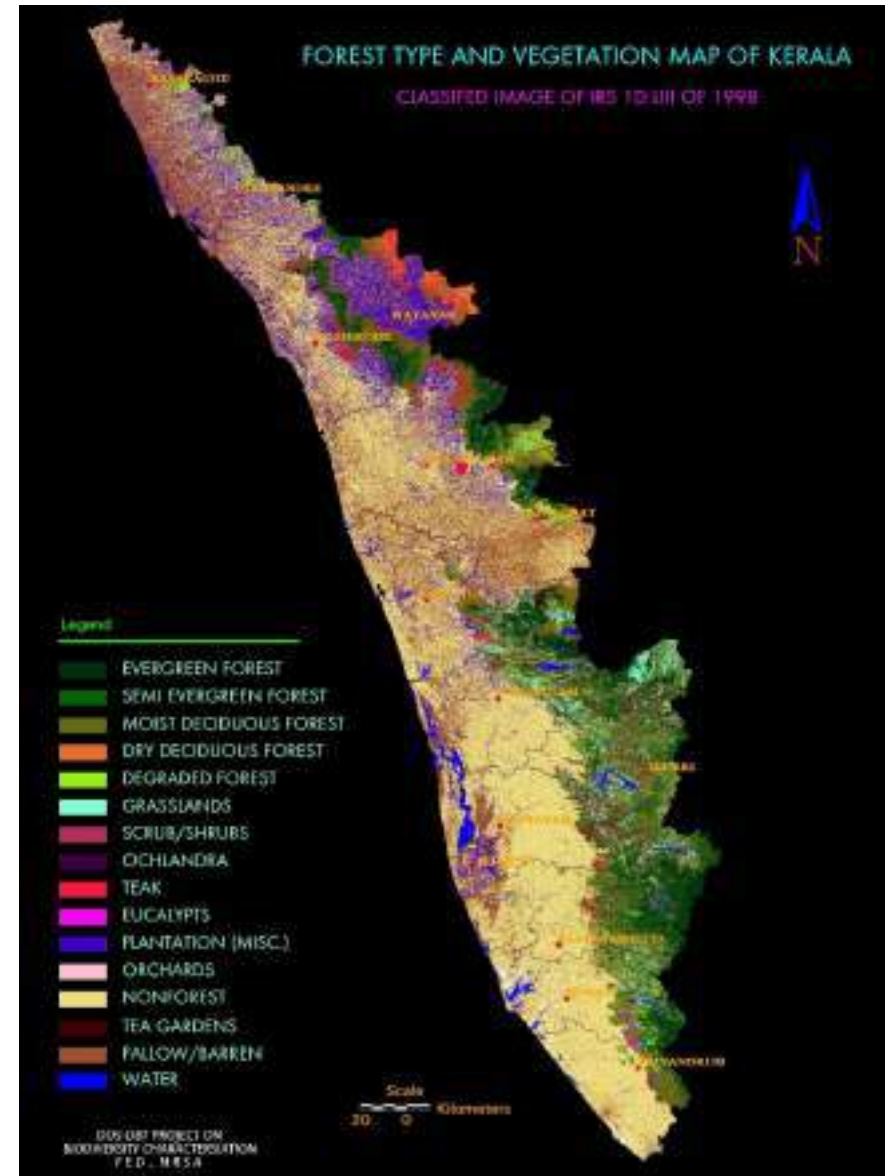


CONCLUSION

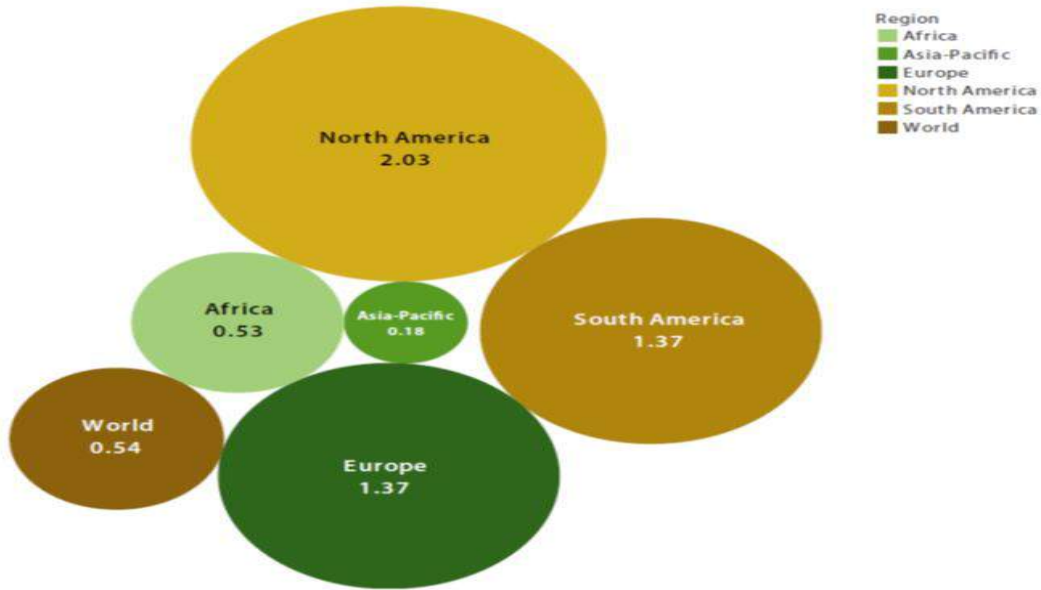
INDIA IS BLESSED WITH A VAST COASTLINE OF 7,517 KM



Kerala's coast runs some 580 km in **length**, while the state itself varies between 35–120 km in width.



DEMOGRAPHY AND FOREST COVER



❑ **Asia-Pacific region has the lowest per capita forest cover. Just one-third of the world per capita forest cover.**

❑ **Considering the continued growth in population, per capita forest cover is declining in most countries, including India.**

❑ **Countries / areas with relatively high forest cover will be under intense pressure from forest-deficit countries / areas.**

❑ **This will depend on the larger economic situation.**

Per capita forest area (in ha)



CHINA AND INDIA: DOMINANT IMPORTERS OF TROPICAL HARDWOOD LOGS

- ❑ The global trade in tropical primary wood products is concentrated within the Asia-Pacific region.
- ❑ Tropical saw and veneer log exports from Asia-Pacific producers account for about three-quarters of global exports (Malaysia, PNG, Solomon Islands and Myanmar).
- ❑ China and India account for more than 86% of total tropical round wood imports by ITTO members (2011) compared with 22 percent in 1995.
- ❑ In 2012 China's tropical hardwood log imports constitute about 1/3 of total log imports.
- ❑ India's imports are predominantly tropical hardwood (54 percent), with a strong preference for teak.





**Opportunities – India's Coastline
Goldmine in waiting**

TABLE 1. AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT IN MAJOR COCONUT GROWING COUNTRIES

Sl No.	Countries	AREA ('000 Hectares)	Production (Million nuts)	Productivity (Nuts/ha)
1	F.S Micronesia	18.00	60.00	3,333
2	Fiji	64.00	159.00	2,484
3	India	2,088.00	22,167.00	10,616
4	Indonesia	3,441.00	13,934.00	4,049
5	Jamaica	16.00	100.00	6,250
6	Kenya	77.00	254.00	3,299
7	Kiribati	23.00	198.00	8,609
8	Malaysia	85.00	505.00	5,941
9	Marshall Islands	8.00	38.00	4,750
10	Papua New Guinea	221.00	1,483.00	6,710
11	Philippines	3,565.00	13,825.00	3,878
12	Samoa	99.00	267.00	2,697
13	Solomon Islands	38.00	100.00	2,632
14	Srilanka	440.00	3,011.00	6,843
15	Thailand	184.00	686.00	3,728
16	Tonga	26.00	56.00	2,154
17	Vanuatu	92.00	699.00	7,598
18	Vietnam	165.00	1,471.00	8,915
19	Other Countries	1,256.00	8,115.00	6,461
	Total	11,906.00	67,128.00	5,638

Source: Asian and Pacific Coconut Community (APCC) Statistical Year Book 2015

Availability of coconut wood

World : 12.29 M ha

Cultivated area India : 2.14 M ha (19.20%)

Kerala : 0.79 M ha (37.24%)

Percentage of senile palms in India : 20%

Approx. number of senile palms available : 16700 no./year/district

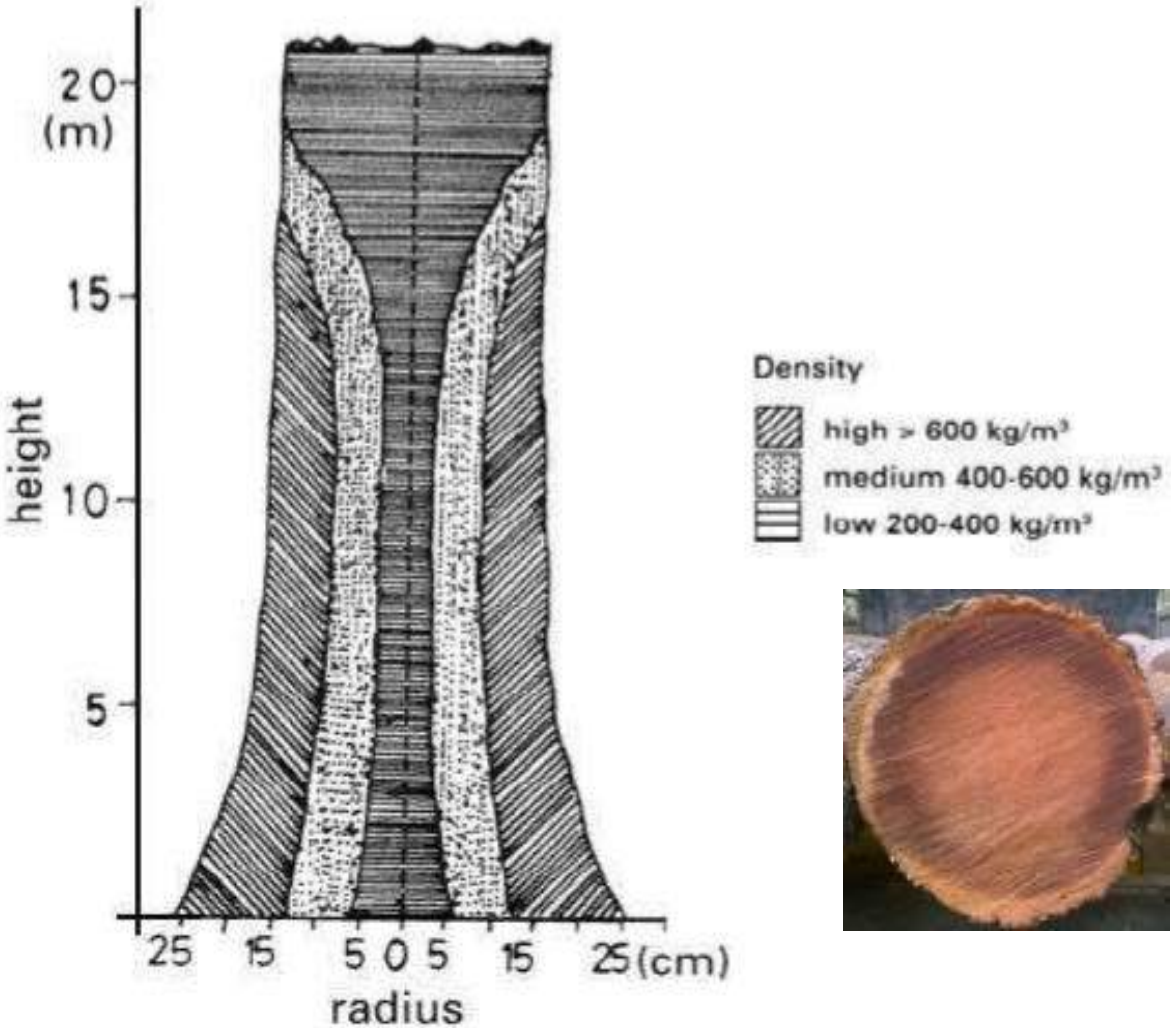
(GOK, 2015; CDB, 2014; NABARD, 2013; Arancon, 2009)

“Waste to Wealth”



(Source: FAO, 2014)

FIG. 1: WOOD DENSITY DISTRIBUTION IN MATURE COCONUT PALM



(Killmann and Fink, 1996)

Table 2. Strength properties of Coconut wood in comparison to other conventional timbers

Species	Static bending		Compression parallel to grain
	MOR (N/mm ²)	MOE (N/mm ²)	MCS (N/mm ²)
<i>Albizia odoratissima</i> (Safed Seres Kunnivaka)	144	14500	79
<i>Artocarpus heterophyllus</i> (Jackwood)	81	10100	50
<i>Artocarpus hirsutus</i> (Ayani/Anjili)	97	12200	62
<i>Tectona grandis</i> (Teak)	96	12000	53
<i>Terminalia paniculata</i> (Laurel/Maruthu)	112	14300	64
<i>Xylia xylocarpa</i> (Pyinkado/Irul)	110	14200	71
<i>Cocos nucifera</i> (Coconut)	93	15900	57

(Gnanaharan and Dhamodaran, 1989)

Table 2. Comparison of wood properties of Teak and Coconut wood

PROPERTY	TEAK	COCONUT
Basic density (Kg/m ³)	750	820
Janka hardness (N)	4740	8430
MOR (MPa)	97.1	89.4
MOE (GPa)	12.28	11.41
Crushing strength (MPa)	54.8	66.2
Shrinkage (%)		
Radial (R)	2.6	5.5
Tangential (T)	5.2	5.5
Volumetric	7.2	11
T/R	2.0	1.0

Constraints & Remedies

Very high density at its periphery, saw gets out of the saw line; Fine substances similar to sand will rapidly blunt the blade



Tungsten carbide or stellite tipped machineries & tools

Difficult to nail and splits are common



Pre-drilling

Sawn lumber - trunk once formed does not increase in diameter with age - 25 mm and 50 mm thick sizes only



Glued lamination of the wood

Untreated freshly-cut lumber can be easily attacked by moulds and staining fungi



Grading, Seasoning (kiln / air drying & Preservative treatment

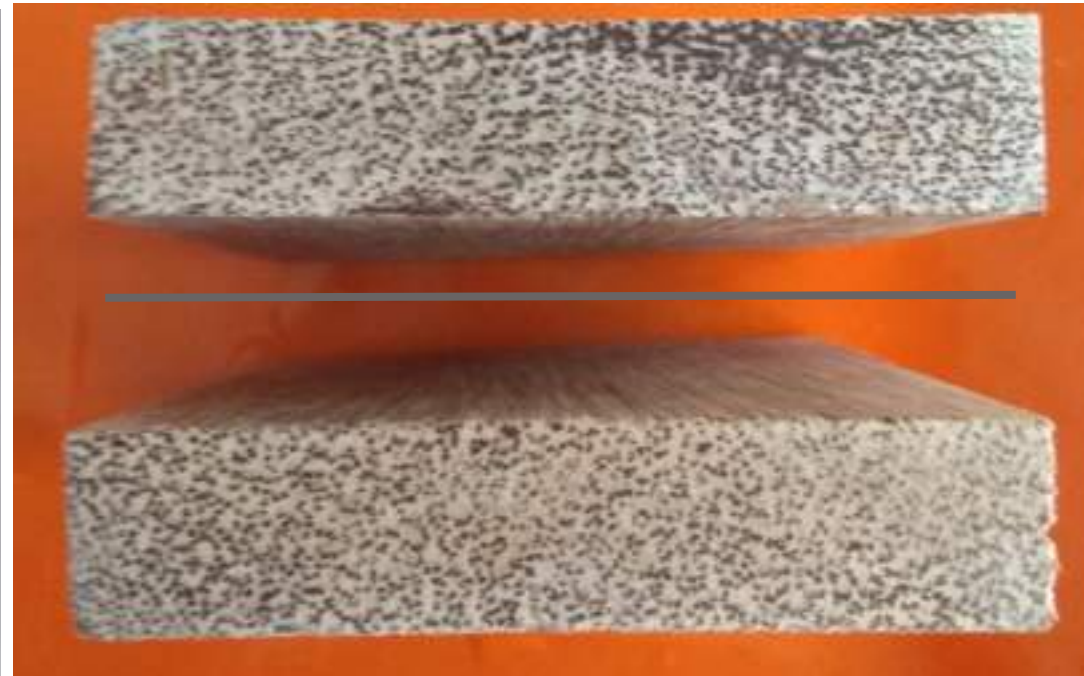
**WOOD
DRYING
DEFECTS**



Twisting



Cupping, checks & splits



Internal collapse

Table 3. KERAWUD (Density graded, dried, preservative treated, high & medium density, palm wood)

Denisty Grading	Seasoning (Drying - kiln/air)	Preservative treatment (Dipping/Vacuum pressure)
Using NDT (Pilodyne) 	Standardised for both processes	Standardised for both processes (using Organic eg. CNSL, Neem oil and Inorganic preservatives, BBA/CCB)

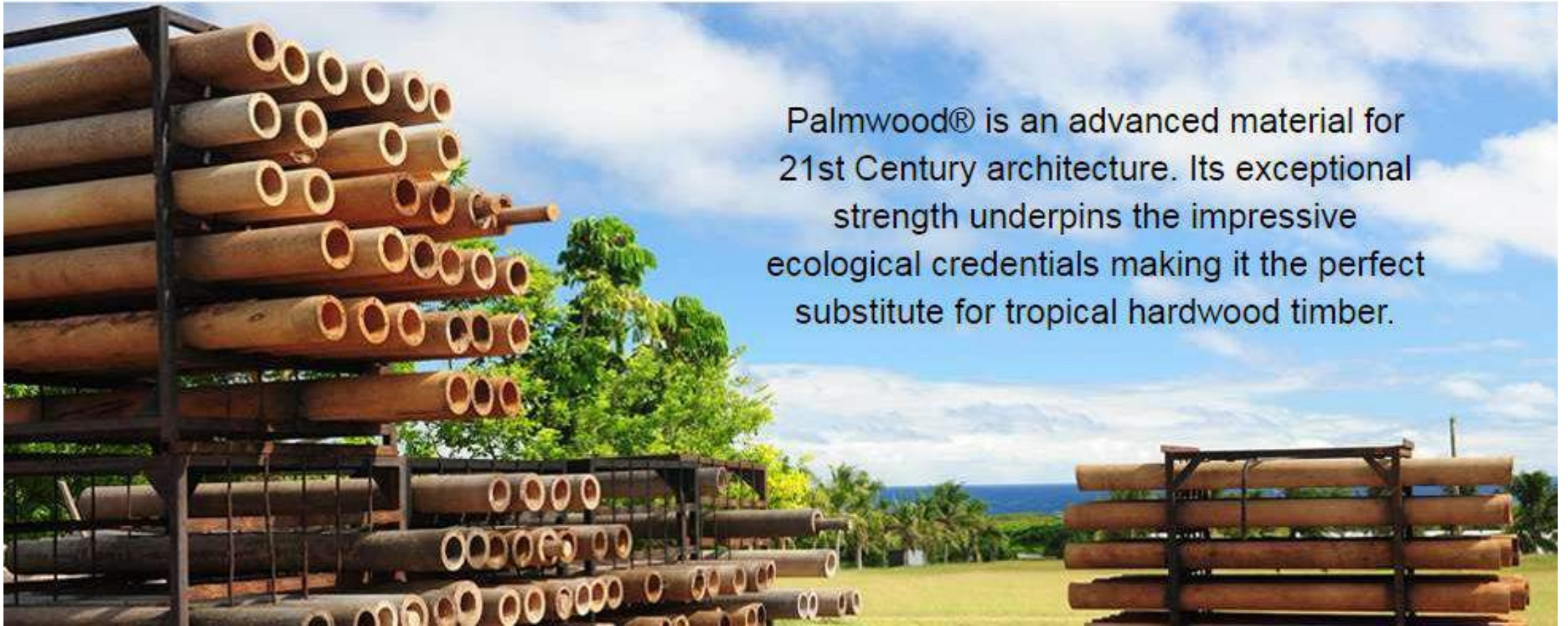


Air Seasoning

Vacuum Pressure Seasoning Plant

Diffusion / Steeping

PALMWOOD® ?



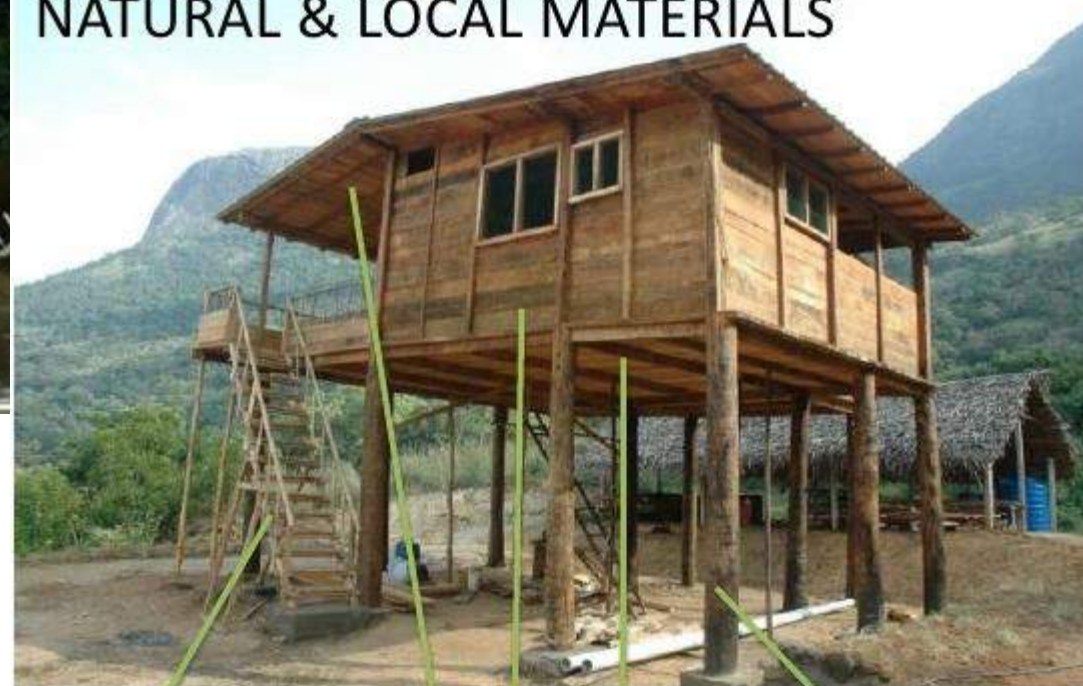
Palmwood® is an advanced material for 21st Century architecture. Its exceptional strength underpins the impressive ecological credentials making it the perfect substitute for tropical hardwood timber.

FLOODS & CLIMATE CHANGE PLAYING HAVOCS

NEED FOR A RELOOK AT OUR 'REBUILD' STRATEGY



NATURAL & LOCAL MATERIALS



Bamboo Staircase

Coconut wood planks

Palm tree pole



***TRAININGS & CONFERENCES –
VALUE ADDED PRODUCTS FROM
'KERAWUD'***

COCONUT WOOD TECHNOLOGY DEMONSTRATION CENTRE (CWTDC), KERALA AGRICULTURAL UNIVERSITY – COCONUT DEVELOPMENT BOARD (CDB, GoI) FUNDED



TRAINING IN COCONUT WOOD ('KERAWUD') BASED PRODUCT MANUFACTURE (CDB FUNDED PROJECT)

KERAWUD furniture items on display in exhibitions and sales outlets



Manufacture of Knock-Down and traditional furniture items



Coconut Wood Technology Demonstration Centre (CWTDC)

Portable Saw Mill for on-site sawing of palms





**COCONUT FIBRE
CEMENT BOARD
(CFCB)**



**MUSHROOM
SUBSTRATE**



**MICROBIAL DECOMPOSITION OF
COCONUT WOOD WASTE**



CFCB PLANT



**CFCB
MANUFACTURE**



BIOBIN

COCONUT BIOMASS WASTE UTILIZATION (RECYCLING)

TRAINING IN VALUE ADDED PRODUCTS FOR FARMER PRODUCER ORGANISATIONS (FPO)





**MODERN (KNOCK-DOWN) &
CONVENTIONAL DESIGNS**

NOVELTIES

Lamp Shades



Household furniture



YOGA TABLE



VAIGA 2017 (KAU) & THRISSUR POORAM EXHIBITION (2018)



WORLD COCONUT DAY 2019 (SEP. 02)



INTERNATIONAL COCONUT CONFERENCE, TAJ-CALICUT NOV.7, 2019



KNOWLEDGE AND SKILL DEVELOPMENT ON COCONUT BASED SECONDARY AGRICULTURE

CAAST-KAU

NATIONAL AGRICULTURAL
HIGHER EDUCATION
PROJECT (CAAST)
GoI & World Bank funded
(3,510,000 USD)



**KERALA AGRICULTURAL
UNIVERSITY**



CONCLUSION

- Large number of senile palms are available
- Properties of coconut wood are comparable to other conventional wood and can be substituted
- Wood properties vary considerably though
- Grading, proper seasoning and preservation techniques should be applied to enhance wood properties to prolong service life
- Technology upgradation in Wood Finishing, Design innovations, Sales Promotion and marketing strategy need of the hour





THANK YOU