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Planted teak: global production and markets, with reference to Solomon Islands

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Planted teak: global production and markets, with reference to Solomon Islands

*Stephen Midgley, R.T. Somaiya, P.R. Stevens, Alan Brown,
Nguyen Duc Kien and Richard Laity*



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Cover: Large logs such as these from a 70-year-old plantation in Java attract very high prices. Photo: Stephen Midgley

Foreword

Teak is probably the most widely planted high-value timber in the world, with plantings in Africa, the Pacific, South America and throughout Asia. The global area of planted teak is approaching 7 million hectares. While some of these plantations belong to governments and large companies, a significant proportion belongs to smallholder growers.

Since 1992, the Australian Centre for International Agricultural Research (ACIAR) has been supporting research in South-East Asia and the Pacific on the growing, management and processing of teak, because of its potential for fast growth and production of high-value wood. Many smallholder farmers have planted teak on the understanding that there is a strong global demand for teak timber and it commands a high price. Yet, in many countries, such as Solomon Islands, the markets for teak and other high-value planted timbers are quite immature. This means that many smallholders find it difficult to get appropriate returns from the trees they have planted.

The research to prepare this report has been done as part of the Pacific Agribusiness Research for Development Initiative (PARDI). Funded by ACIAR and managed through the University of Queensland, PARDI seeks to create sustainable livelihood development outcomes for the South Pacific forestry, fisheries and crop-based sectors through research related to improving value chains. The study of teak markets was conducted under the PARDI project entitled 'Development of a market mechanism for teak and other high-value timber in the Western Province of Solomon Islands'.

This report provides a comprehensive analysis of the markets for teak in India, China, Vietnam and Thailand, which collectively dominate the global market for teak timber. Understanding the nature of these markets and the specific characteristics of each country, including the way timber is measured and traded, is important in terms of assisting teak sellers to access these markets. The report also presents a good understanding of the planted teak resource in Solomon Islands, as well as the costs of getting logs from a farm to the port, and the opportunities for improvements in the teak value chain.

The information from this research is likely to have broad interest for people involved in growing and marketing teak resources, particularly in Solomon Islands.



Nick Austin
Chief Executive Officer, ACIAR

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The impetus for this body of work came from the Global Food Studies team at the University of Adelaide in collaboration with the Environmental Futures Centre at Griffith University.

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Abbreviations

€	European Euro	EPPL	Eagon Pacific Plantation Ltd
ACIAR	Australian Centre for International Agricultural Research	EU	European Union
AusAID	Australian Agency for International Development	FAO	Food and Agriculture Organization of the United Nations
BAF	Bunker adjustment factor	FD	Forestry Division, Ministry of Forestry, Solomon Islands
CBSI	Central Bank of Solomon Islands	FEU	Forty-foot equivalent units (40' intermodal shipping container)
CIF	Cost Insurance Freight (at port of unloading)	FIO	Forest Industries Organization (Thailand)
CIFOR	Center for International Forestry Research.	FLEGT	Forest Law Enforcement Governance and Trade (EU)
CSIL	Centre for Industrial Studies (Italy)	FOB	Free on board (price at port of loading)
m ³	Cubic metre	FSC	Forest Stewardship Council
dbh	diameter at breast height	GDP	Gross domestic product
DGCIS	Directorate General of Commercial Intelligence and Statistics, Government of India	GFTN	Global Forest Trade Network
DIMEX	Department of Import and Export (Lao People's Democratic Republic)	GTA	Global Trade Atlas

GTI	Global Trade Information Services, Inc.	PDR	People's Democratic Republic (Lao PDR)
ICD	Inland container depot	RAMSI	Regional Assistance Mission to Solomon Islands
ICS	International carrier surcharge	RFD	Royal Forest Department, Thailand
INR	Indian rupee	RMB	Chinese renminbi (yuan)
ITC	International Trade Centre	RWE	Round wood equivalent
ITTO	International Tropical Timber Organization	SBD	Solomon Islands dollar
JAS	Japanese Agriculture and Forestry Standards	SFA	Solomon Islands Forestry Association
JICA	Japan International Cooperation Agency	SI	Solomon Islands
KD	Kiln dried	SIFMP	Solomon Islands Forest Management Project
KFPL	Kolombangara Forest Products Limited, Solomon Islands	SIG	Solomon Islands Government
MAF	Ministry of Agriculture and Forestry	SME	Small and Medium Enterprise
MDF	Medium-density fibre board	SPC	Secretariat of the Pacific Community
MIS	Market Information Service (of ITTO)	TDC	Terminal Destination Charge
MoF	Ministry of Forestry	TEU	Twenty-foot Equivalent Units (20' intermodal shipping container)
MSA	Maritime Safety Authority	THB	Thai baht
NFPDP	National Forestry Plantation Development Program	TFT	The Forest Trust
NGO	Non-government organisation	UA	The University of Adelaide
NTFP	Non-timber forest product	US\$	United States dollar
OCF	Ocean freight	VND	Vietnamese dong
PEFC	Program for the Endorsement of Forest Certification Schemes	VPA	Voluntary Partnership Agreement
		WB	The World Bank
		WCS	Wildlife Conservation Society

Currency

At the time of this study (July 2013):

US\$1.00 = SBD 7.25

US\$1.00 = Chinese Yuan Renminbi 6.14

US\$1.00 = INR 60.00

US\$1.00 = VND 21,204

US\$1.00 = THB 30.00 (2011)

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Summary

Teak is a highly durable, water- and pest-resistant tropical hardwood, which makes it one of the world's most highly valued timbers and among the most popular plantation species. It is used in boat building, residential and commercial architecture and construction, furniture making (solid and veneer), carving and the manufacture of other decorative and symbolic wood products. Demand for plantation-sourced teak is growing at a high rate. Data firmly suggest that global trade in planted teak rose 47% by volume and 58% by value during 2010–12. Factors contributing to growing demand for planted teak include the inability of native teak supplies to meet demand; rising incomes and domestic demand in major client countries such as India; and increasing teak-based exports in other major teak-importing countries, such as China.

Worldwide, areas of planted teak now stand at an estimated 6.8 Mha, representing a theoretical capacity to produce up to 30 Mm³ of wood annually. At present 1.5–2.5 Mm³ is harvested, a small fraction of the potential plantation capacity. A significant proportion of the annual harvest is traded globally. Within this global trade, there are many 'buying' countries (e.g. India, China) and other countries that are simply 'trading' countries (e.g. Singapore, Hong Kong). About 1.3 Mm³ of the annual harvest of planted teak is traded as teak logs and sawn timber, at an estimated value of US\$723 million. The amounts of both harvested and traded teak are expected to increase as plantations mature and logs reach a commercial size. While the markets for mature teak from both native forests and older plantations are well established, markets for small, fast-grown teak logs are still emerging. They may come to greater prominence since a new legal regime in Burma (Myanmar), the world's chief supplier of natural teak, came into effect in April 2014. Burma plans to stop the export of logs in favour of sawn timber and processed products. The 'non-traditional' market may also include small logs from thinnings and early clearings, as growers seek prompt economic returns.

Successful investment in planted teak requires an understanding of the magnitude, location and requirements of global markets for plantation-grown logs, as well as the potential impacts of external factors influencing the global trade. Such knowledge should be useful to government policymakers, growers (commercial and smallholders) and traders as they consider options for project funding, resource management and market development. Basic questions include: *How much teak is traded and where? What are the characteristics of these markets? What prices can be expected for small and large logs? What makes some sources of teak commercially attractive while others struggle?* This technical report offers answers to some of these questions, both from a global perspective and from the particular viewpoint of Solomon Islands, an agriculturally based developing country with teak plantings in the Asia–Pacific region that is of particular interest to Australia. The report examines prices and, where possible, market dynamics in the four leading teak-trading nations: India, China, Vietnam and Thailand.

'Burmese teak' sets international standards for quality, and Burma is the world's largest supplier of teak logs and sawnwood, a supply largely maintained through harvesting of native forests. Between 2010–12 teak wood exports from Burma grew by 50%, a trade valued at US\$409 million in 2012. However, from April 2014 Burma implemented log export bans and forest trade reforms that will dramatically reduce availability of mature teak to global markets. Any future analysis of teak availability must take this into account. India and Thailand have protected resources of native teak, and both are growers of plantation teak and exporters of teak products. The remainder of global teak wood production, all plantation-grown resources, is accounted for by growers in other Asian countries (notably Indonesia), Africa, and Central and South America.

On the demand side, **India** accounts for some 75% of global teak imports, followed by Thailand, China and Vietnam. Burma is the largest supplier to

all these markets. India's imports have increased by 54% since 2010, the result of a boom in construction of residential housing. Teak is the preferred building timber in India, particularly for doors and windows, which account for some 40% of the teak wood processed. The increase in Indian demand has been met largely by plantation teak from Central and South America. The volume of wooden furniture manufactured in India for domestic consumption and export also is growing steadily, with exports reaching \$592 million in 2012. This sector, too, is a significant user of teak. An Indian policy response to the log export ban from Burma may be to allow greater access to government-managed teak plantations in India. Although this will impact upon Indian domestic supply, it is not expected to have a large impact upon trade from countries other than Burma. India's import preference is for round or squared logs, rather than sawnwood, which takes advantage of India's modern infrastructure of ports, low costs of processing and attractively low tariffs for round logs and squared logs.

China is the world's largest importer of wood. The total value of China's forest trade exceeded US\$118 billion in 2012, with exports accounting for US\$58 billion and imports US\$60 billion. Chinese exports of wooden furniture were worth an estimated US\$17.5 billion in 2012. Although imports of teak logs to China are only 10% of those imported by India, China has a strong demand for sawn teak timber, worth some US\$41million in 2012. Chinese imports of both teak logs and sawn timber are increasing. In contrast to India, where teak is used mainly for building, China uses teak predominantly for manufacturing wooden furniture for export. Chinese manufacturers of furniture for export are becoming increasingly sensitive to the need to demonstrate use of legally sourced wood.

Thailand has a large and diverse trade in forest products, with imports amounting to almost US\$3.3 billion and exports over US\$5.5 billion in 2011. Thailand is both a producer of native and plantation teak, and an importer of teak logs and sawnwood, the latter being worth an estimated US\$31 million in 2012. Thailand is also an exporter of finished and semi-finished teak products. The country has mature, sophisticated wood-processing industries that are heavily reliant upon Burma, particularly for supplies of high-quality teak from native forests. As in China and India, the recent log export ban and policy reforms in Burma are likely to have a

considerable impact upon wood supply and industry output in Thailand. This may result in an increase in illegally sourced, high-quality timber from neighbouring countries such as Lao People's Democratic Republic (PDR) or a shift to use of plantation-grown timbers from both domestic and imported sources.

Vietnam has a vibrant, modern, export-oriented wood furniture industry worth over US\$4.6 billion annually, which is highly dependent upon imported logs and timber. Despite the size of the industry, there has been a recent reduction in imports of teak logs and sawn timber. A possible explanation commonly expressed by processors has been the challenges experienced in obtaining legal or certified supplies of teak to service industry demand. In contrast, supplies of competing plantation-grown acacia and rubber have been readily available and are cheaper.

Constraints on efficient market linkages

Various constraints on efficient market linkages are identified in this report. For example, the global trade in teak is frustrated by a lack of standards and consistency in measuring and establishing prices for teak logs. Lack of information, and misinformation, result in widespread uncertainty and confusion around teak investments, particularly in relation to prices. Another source of misunderstanding in the teak trade is the confusion between different methods of calculating log volume. Some producer countries use one method for calculating log volumes and dimensions (e.g. Brereton) and a purchasing country such as India may use another method (e.g. Hoppus) as their standard. Stakeholders must be equipped to move between the two systems if they are to avoid misunderstanding and strengthen market links.

One increasingly important consideration influencing efficient trade in plantation teak involves certification and the legality of logs. Teak is widely prized and sought after for furniture manufacturing, an industry in which some companies are unconcerned with issues of legality and certification while others are highly sensitive to these issues. Meeting consumer expectations and legal requirements significantly influences growers and processors, especially those dependent upon tertiary markets in North America and Europe, where these concerns are greatest. Other factors influencing efficiency in the teak trade involve the supply chain (for example, differential tariffs applied to the import of round logs and sawnwood) and the need to trade in containers or break-bulk consignments.

Issues for Solomon Islands

Commercial and smallholder growers in Solomon Islands have established resources of planted teak estimated to total about 6,000 ha. This resource is maturing and becoming of commercial interest to wood industries in Australia, New Zealand and the more distant markets of China, Vietnam, Thailand and India. To make best use of their resource, Solomon Islands stakeholders must be familiar with broader international markets as part of decision-making processes. Without knowledge of market drivers, prices and trends, policymakers, managers and smallholder growers are severely disadvantaged. This report identifies eight important issues in marketing plantation teak from Solomon Islands (SI) to

the burgeoning furniture industries of India, Thailand, China and Vietnam. These issues relate to creating an inventory of SI plantation resources, smaller log sizes, gaining certification, differentiating the SI product, assembling commercial consignments, improving export facilities, understanding market forces and the importance of traders to the supply chain.

Finally, using a combination of data from reliable sources, pricing and patterns of trade, potential links between Solomon Islands and the four major importing countries have been identified and are quantified in this report. Individual summaries are presented of the most important aspects of production, use and trade in plantation teak in each of these countries.

Global production and use of planted teak



Photo 1. A teak plantation in Sulawesi. Photo: Stephen Midgley

Among timbers, teak holds a place which diamonds maintain among precious stones and gold among metals.

Dietrich Brandis, Inspector General of Forests, India (c. 1855)

Background

Teak (*Tectona grandis*) is a tall deciduous tropical hardwood that occurs naturally in a discontinuous distribution in peninsular India, Burma (Myanmar), Laos and Thailand (Figure 1). It is believed to have been introduced to Java 400–600 years ago (Phengklai et al. 1994), and has now become naturalised. The global area of natural teak is about 27.9 Mha (Gyi and Tint 1998), generally occurring on fertile, well-drained soils up to 1,000 m altitude. It grows best on sites with a marked dry season, annual rainfall of 1,250–3,750 mm, minimum temperatures of 13–17°C and maximum temperatures of 30–43°C

(Pandey and Brown 2000). Teak does not tolerate flooding or infertile lateritic soils (Phengklai et al. 1994). A high-value, highly versatile timber, teak has been widely established in plantations throughout the seasonally dry tropics.

The physical and aesthetic qualities of teak have given it a worldwide reputation as the ‘king of woods’. These properties, particularly for heartwood, include strength with lightness; dimensional stability; decay resistance; ease of working and seasoning; termite, fungus, chemical, water and weather resistance; and attractiveness (Keogh 2009). Exceedingly durable thanks to a high oil content, teak is sought after for boat building, the manufacture of indoor

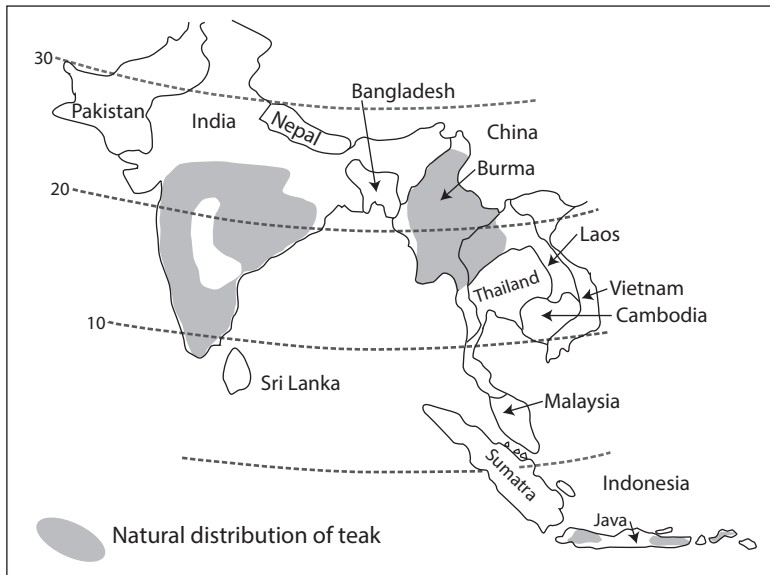


Figure 1. Natural distribution of teak. Source: Gyi and Tint (1998)

and outdoor furniture, and in building construction, including architectural finishes such as windows, doors, decking and veneer. At roughly 2.5 Mm³ annually, the current total global production of teak is small relative to the total volume of world timber production, yet it continues to enjoy special status in global timber markets, and demand for this highly versatile hardwood remains strong.

Demand for teak has been difficult to meet for centuries, thus teak has been planted and cultivated for hundreds of years. Teak was first planted in Java in the 14th century, and has since naturalised to the point that some scientists now regard Indonesia as part of teak's 'natural' distribution (Figure 1). Teak planting appears to have begun in India in the 19th century (Centeno 1997), in tropical Africa in the first decade of the 20th century, in Malaysia in 1915 (Zakaria and Lokmal 1998), and later in Latin America and the Caribbean (Centeno 1997).

Demand for teak accelerated markedly after the Second World War. By the late 1960s and early 1970s, deforestation in the natural teak belt of South-East Asia, which is home to a wide variety of economically valuable tree species, was acknowledged worldwide as a problem requiring prompt action. With the economic boom years of the 1980s–90s the problem became an urgent crisis that is still

unfolding. Teak planting expanded worldwide as the crisis developed and deepened, and leading exporters of natural teak started passing forest reforms and logging restrictions.

Native versus planted teak

Within global teak markets a fundamental distinction is made between teak grown in natural forests (native teak) and planted (plantation) teak. Logs of native teak can be considerably larger than those grown on plantations, with a higher proportion of heartwood, a major factor in pricing. Burma, India and Indonesia are currently the principal sources of native teak to international markets, but only Burma offers commercial quantities. Burma's ability to deliver native teak to the market could be severely curtailed now that the government has introduced log bans and forest reforms; a move designed to comply with proliferating regulatory regimes in Europe, North America, Australia, New Zealand and elsewhere to protect old-growth hardwood forests in the tropics. Not surprisingly, a considerable price premium is applied to teak from natural forests. The export prices of native teak are many times higher than domestic prices for plantation-grown logs (Kollert 2013). (See Table 1.)

Table 1. Prices for natural teak and planted teak

Natural teak	Export market price (US\$/m ³ , FOB)		
	Low grade	Sawing grade	Veneer grade
Burma	1,022	1,864	4,111
Planted teak	Domestic market price at the log yard (US\$/m ³)		
	Small	Medium	Large
Africa ^a	124	203	271
Latin America	129	199	267
Asia	149	282	448

^a In Africa export prices are reported to be 1.8 times the domestic market prices

Source: Kollert (2013)

Beyond the size advantage, strong market perceptions persist that native teak is superior to planted teak with respect to several properties, although research shows that these assumptions can be questioned when fitness for specific purposes is taken into account. Bhat and Ma (2004) report that wood from planted teak differs from native forest wood in terms of colour, grain and texture. Native teak tends to produce darker, denser and a greater proportion of heartwood. Darker wood is traditionally more highly prized, and is thought to be stronger. In Lao PDR, village artisans believe that teak grown on rich alluvial soils has inferior strength properties compared with slower-growing teak from upland sites (Sookmixay, Ban Xieng Lom, Luang Prabang, Lao PDR pers. comm. 2013). Thus Bhat and Ma conclude that plantation teak is unlikely to attract the high prices of premium teak from native forests.

The differences between native and planted teak are highlighted in small, fast-grown logs from thinning operations (utility timbers with no special distinguishing features that rely upon teak's traditional reputation to gain access to international markets). However, several studies have shown that wood from standard planted teak compares well with natural teak on many dimensions. The colour of teak wood appears to be influenced by the properties of the location in which it grows. Thai sources report that the colour of teak wood from natural forests on wetter sites along riverbanks or in low, moist forests is usually darker than that from drier sites (Kaosa-ard 1998). However, the colour of plantation-grown teak

wood is also strongly influenced by planting site, and there is little effect of provenance on wood colour and wood density.

Hopewell et al. (2011) found that plantation-grown teak wood processed from trees as young as 6 years old had sufficient material and mechanical properties to be used in typical teak products, such as garden furniture and yacht decking. Sanyal et al. (1987) studied the strength properties of teak timber from 20-year-old trees grown in canal strips, and found properties matched well with standard teak. Other research supports the view that young trees (13–21 years of age) are not necessarily inferior in wood density and strength compared with older trees (55–65 years) (Bhat 2000). Studies of 22-year-old and 14-year-old teak in Brazil, for example, demonstrated that teak at both these ages had decay resistance comparable to that of naturally grown teak (Laming and Sierra-Alvarez 2000). Bhat and Ma (2004) cite research indicating that short-rotation teak wood is not significantly inferior in density and strength compared with teak from natural forests, although with a lower proportion of heartwood and extractive contents it is less durable and attractive. Indeed, Bhat (2000) summarises findings that plantation managers can accelerate tree growth in short rotations with fertiliser application and other resource management tools without altering timber strength or compromising the yield of heartwood.

However, even if natural teak were demonstrably superior on every dimension for which teak is prized, the fact of the matter is that natural forest teak is now a protected resource in most places where it is found. Natural forests certainly cannot meet worldwide demand for teak, especially given increasingly tough regulatory regimes in the major markets where teak wood and wood products are used and sold. Unless the market landscape changes dramatically in coming years, the future of the teak market lies with plantations and planted smallholdings.

Where is planted teak grown?

A recent global study of teak by the UN Food and Agriculture Organization (FAO) conservatively estimated the global area of planted teak forests was 4.3 Mha in 2010, of which 83% was in Asia, 11% in Africa and 6% in tropical America and the Caribbean (Kollert and Cherubini 2012). Another study, completed by Brazilian consulting group STCP on behalf of the International Tropical Timber Organization

(ITTO), estimated the size of global teak plantations at 5.9 Mha in 2005 (ITTO 2009). The two studies differed significantly on estimates for commercial teak plantations in Asia, particularly in India, Burma and Thailand—some of the largest growers. In addition, many plantations are smallholder-owned and are usually not included in formal forest inventory data. Keogh (2009) suggested a global figure closer to 7 Mha, which is close to a moderated estimate of 6.8 Mha (Table 2).

FAO used historical data to indicate where areas of planted teak have increased substantially in recent years. Planted areas are increasing fastest in countries of South and Central America and West Africa, where resources have expanded by 4–45% between 1995 and 2010 (Kollert 2013).

How much planted teak is grown and traded?

Using generalised growth data from multiple sources, the ITTO estimates that roughly 31 Mm³ of plantation teak wood is grown annually around the world (ITTO 2009). The production of mature teak is currently restricted to the traditional producers of Burma, India and Indonesia, the latter two of which also produce some large logs from planted forests. FAO reported on log removals from teak forests from 26 countries, and estimated total teak harvests accounted for 2–2.5 Mm³ in 2010 (Kollert 2013). Asia reported the highest removals of planted teak at 523,000 m³, some 500,000 m³ from natural teak forests in Burma and the remainder (presumably) from planted resources elsewhere. Africa, South America and Central America have about the same share of 15% or roughly 140,000 m³ per year. Several teak-growing countries did not participate in the report. Their unaccounted harvesting volumes and volumes from thinnings tally to up to 1 Mm³ annually.

Among the countries reporting significant log removals in the FAO study (Kollert and Cherubini 2012) are:

- **Asia:** Indonesia, 453,613 m³; Thailand, 53,472 m³. India did not report on log removals.
- **Africa:** Benin, 64,460 m³; Tanzania, 60,000 m³
- **Central America:** Costa Rica, 74,153 m³; El Salvador, 54,259 m³.
- **South America:** Ecuador, 73,630 m³; Brazil, 67,282 m³.

Table 2. Moderated estimates of areas of teak plantations^a

Source location	Area (ha '000)		
	FAO (2010)	ITTO (2009)	Moderated estimate
Asia			
India	1,667	2,561	2,561
Indonesia	1,269	1,470	1,470
Burma	390	0	390
Thailand	128	836	836
Laos		0	15
Bangladesh	73		73
Others		726	726
Asia total	3,527	5,593	6,071
Africa			
Ghana	214	40	214
Nigeria	146	74	146
Côte d'Ivoire	52	66	66
Benin	26	0	26
Sudan		25	25
Tanzania			10
Others		51	51
Africa total	470	256	538
Latin America			
Brazil	65	50	65
Panama	55	0	55
Ecuador	45	0	45
Costa Rica	32	30	32
Guatemala	28	0	28
El Salvador			
Others		53	53
Latin America (total)	225	133	278
Global total	4,346	5,982	6,887

^a The FAO study (Kollert and Cherubini 2012) upon which the data in this table in part rely did not receive responses from 22 teak-growing countries, thus offering conservative data. The ITTO report also admitted to some challenges, including the absence of plantations recorded for Burma. The 'moderated estimate' aims to be a credible moderation between these two sources.

Sources: FAO (2010); ITTO (2009); other sources

Raiyani (2013) illustrates the changing nature of global teak trade (see Figure 2). While Asia remains the largest global supplier of teak, based on Burma's dominant position, Africa has remained a consistently large supplier over the past 6 years. Supplies from maturing resources in Latin America expanded at over 20% annually during the same period. Carrillo (2013) suggests that Burma will reduce supplies of

teak from natural forests, although it is unclear from Burma's export data what proportion of the exports are derived currently from the country's 390,000 ha resource of planted teak. ITTO (2013a) reports that the Myanmar Timber Enterprise (MTE), the sole agency responsible for harvesting, extraction and distribution of logs in Burma, is drastically cutting its annual harvesting from native forests and foreshadows impacts on global trade in teak.

Measurement of log volumes and standards

There is no single internationally accepted method for measuring logs, and log volumes can be calculated in several ways, each offering a legitimate—but

different—result (see Box 1). Units used in measuring log volume include cubic feet, cubic metres and board feet, average diameters, centre log diameter, small-end diameter and circumference. What the grower produces in real cubic metres thus may not be the same volume that is traded. This can be a source of considerable misunderstanding and confusion. A grower wants to be paid for wood grown, and the trader wants to pay only for wood that can be processed.

Moreover, some producer countries may use one method for calculating log volumes and dimensions (e.g. Brereton) and a purchasing country may use another (e.g. Hoppus) as their standard. For example, in Solomon Islands, the Brereton scale is used for calculating volume whereas in India (the world's

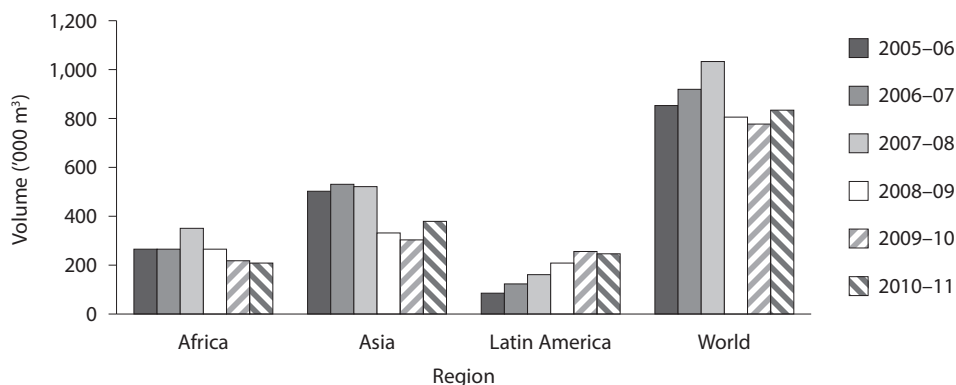


Figure 2. Global exports of teak (by region), 2005–11 ('000 m³). Source: Raiyani (2013)

Box 1. Common methods for calculating log volume

Hoppus: A measurement system developed in Britain and widely used in the hardwood trade of India and China. The measurement was devised to estimate the proportion of a round log that would be usable timber after processing, in effect attempting to 'square' the log and allowing for waste. The Hoppus system is used almost exclusively in India to measure teak logs, and is used by Indian traders to quantify loaded volumes of logs in containers.

Brereton: This rule was originally devised for use in North America with Douglas fir and redwood, and is now used extensively in the export and import trade (USDA 1974). It is a

cubic volume rule that uses the average of both of the log's end-diameters rather than simply the diameter at the small end of the log.

Japanese Agricultural Standard: Japanese Agriculture and Forestry Standards (JAS) are used to grade and measure logs destined for Japan. The standards include factors for taper and volume calculation based upon end-diameters. JAS can understate the cubic volume of short logs and those of small diameter by as much as 40% of the actual volume, while longer, larger logs with little taper may be over-estimated by 20% (Ellis and Elliott 2001).

largest teak market) the Hoppus system is used. A 20 foot container can hold up to 15 m³ (real volume) of small logs, but this may convert to about 13 m³ if the Hoppus system is applied. Recent experience in Solomon Islands indicates that a container-load of small teak round logs of 13 m³ (based upon the Brereton scale) was measured as only 11 m³ using the Hoppus scale, causing considerable confusion.

Conversion factors have been developed to clarify this important dialogue. Conversion factors have long been used by the forest sector as a tool for analysing forests and manufacturing facilities for forest products, and they touch virtually every aspect of forecasting and analysis (FAO 2010). Silvicultural growth models, biomass calculations, carbon sequestered in forests and timber sale appraisals all depend on conversion factors. FAO (FAO 2010, p. 2) offers the following example of the importance of adopting agreed conversion factors:

A practical example would be a timber sale appraisal that a sawmill is conducting to determine a bid price. The stand volume may be reported in cubic metres over bark but the purchaser may need to convert these volumes into inside bark volumes, weight or board feet to match their units of measure. To determine the value of the timber, the purchaser will need to know the cost of getting the timber from the stump to the mill site, thus weight-to-volume ratios are likely to be an important parameter for determining weight-based transport costs. Primary product recovery will need to be estimated using conversion factors from round wood to the primary product, e.g., 2 m³ round wood will produce 1 m³ sawnwood. A material balance will be used to determine the quantity and thus value of the residual products made, and finally, ratios may be used to estimate the quantity of unmeasured products from the timber sale such as bark and logging residue (top-wood, limbs, foliage) that may be profitable to utilize for energy or other purposes.

Log scaling is the process of estimating the weight or volume of a log while allowing for features that reduce product recovery. Scaling in terms of volume has been the predominant method, but weight scaling is common in some industries such as the fibreboard and the pulp and paper sectors. Many log rules for estimating volume were devised when sawn timber was the principal product. Rather than measuring the total volume of the log, they apply sawmilling assumptions to estimate the quantity of sawn timber a given log will yield. Most log measurements are made under bark.

Ideally, producers and buyers should agree on a common form of log measurement, standardise allowances or agree on standard conversion factors to convert assessed volume to true cubic volume. Solomon Islands Forestry Department has approved the Brereton measurement of logs, and this has been commonly adopted. It is based upon the formula:

$$V = (0.7854 \times D \times D \times L) / 1,000,000$$

where V = volume in cubic metres, D = diameter in centimetres based upon two measurements of diameter at each end of the log; all four diameter measurements are added and a mean diameter (D) of the log calculated; L = length in centimetres.

The lack of standards and consistency in establishing prices for teak logs has long been a common theme of discussions in international teak markets. Several experts have reflected upon this issue. Keogh (2007) observed ‘...due to lack of standards, lack of information and misinformation there is widespread uncertainty and confusion around teak investments, particularly in relation to prices’. Keogh suggests the establishment of an international pricing mechanism for teak that is designed to provide standard, transparent, widely published and up-to-date information on plantation teak prices. Moya and Pérez (2008) agree that ‘...it is difficult to get accurate and regular wholesale and export prices for teak wood’. Ladrach (2009) concurred with these observations:

The creation of uniform international log grades for plantation teak, along with standardized lumber and product grades would be of great help to improving the marketability of teak wood products. Standardized descriptions are needed so that buyers know the exact quality of the products being offered for sale.

Kollert (2013) noted the particular difficulty of carrying out a survey of teak prices for the FAO in 2010:

Firstly, there are no common international log grading rules established, and the perception by the countries of a small size and big size logs proved to be rather different.

The major challenge for plantation growers in Solomon Islands is to produce quality teak wood that is acceptable in international markets. The adoption of an agreed set of log grading rules in collaboration with global buyers would be a good start to improving the marketability of teak wood products.

Factors influencing prices

Size and quality affects pricing in plantation teak, just as it does with natural teak (Figure 3), with higher prices being paid for large, long rotation (>50 years), slow-grown teak, usually produced in Java, West Africa and elsewhere. Small logs from fast-grown plantations (20-year rotations), or plantation thinnings, occupy a cheaper market niche. Price structures can differ markedly for seemingly similar types of logs, with differences in colour and appearance having the largest influence on price. For example, the market price for a 30 cm top log (the top log on the trunk of the tree) from a tree grown on a 70-year rotation will be different to that for a 15-year-old 30 cm log from a thinning program (Midgley and Laity 2009).

Differences in markets and prices for squared as against round logs complicate the picture further. This applies mostly to small logs, often sold as ‘squared logs’ with most of the sapwood removed as four outer flitches. This offers value to the buyer and facilitates easy loading and efficient transport by container.

Because there are no commonly accepted, systematic or consistent international grading rules with corresponding price values, teak wood prices are generally determined based on subjective visual assessment of logs, usually by experienced estimators (Box 2). In recognition of the myriad factors considered in calculating prices for teak logs, a draft set

of log grading rules, based upon the Brereton log scaling system, has been established for Solomon Islands, which will allow small plantation-grown logs to be classified as either Grade A or Grade B (Laity and Ahsan 2012). (See also Appendix 1.)

The furniture sector as a major source of demand

The world’s top producers of furniture are China, the USA, Italy, Germany, India, Japan, France and Poland, while the world’s top exporters are China, Germany, Italy, Poland, the USA and Vietnam. China is both the world’s largest producer and exporter of furniture (CSIL 2013). Wood furniture is a subset of the broader international trade in furniture, and production/export patterns generally follow the broader furniture pattern. The use of teak in furniture production is a subset of that subset, and is subject to the pressures and growth promoters within the wood furniture sector generally.

The global furniture industry more or less tracks the expansion, contraction and recovery of the global economy, and particularly the housing market. Housing starts have long been a leading indicator of economic recovery and strength, as the decision to purchase a house is discretionary. Such expenditure is sensitive to interest rates, and lower interest rates tend to stimulate demand for new houses. When people buy new houses, they also tend to buy new furniture and other household objects. Thus, the world

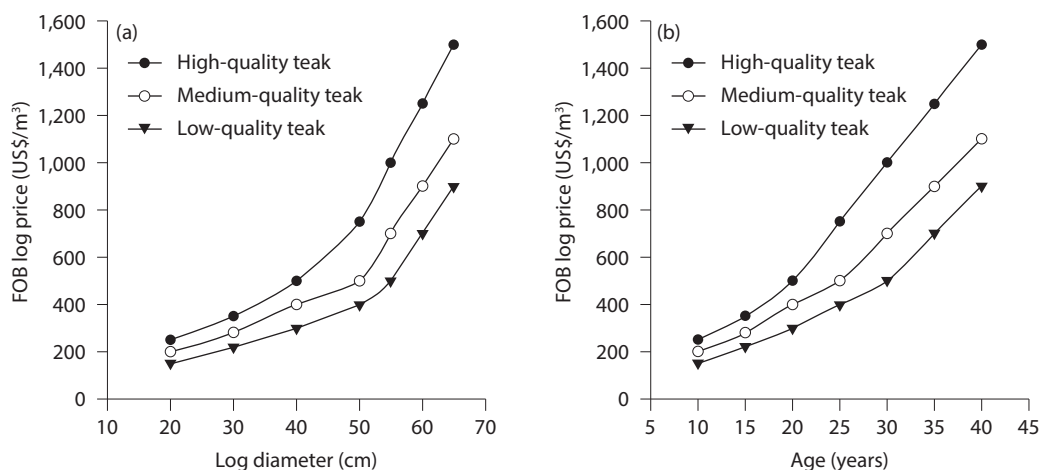


Figure 3. Estimated average prices for plantation teak wood in relation to (a) log diameter and (b) age. Source: Moya and Pérez (2008)

furniture market experienced a downturn following the global financial crisis (GFC) in 2008 (Figure 4), but was recovering—at least in the major importing markets of North America and Europe—by 2011. Global furniture production for 2011 was valued at US\$370 billion, while global international trade in furniture was valued at \$109 billion. In 2012 the recovery trend continued, and recent projections estimate global furniture production to reach US\$436.5 billion by 2015 (UN 2012).

The markets of Europe and North America are the world’s largest importers of wood furniture

(Figure 4), with the USA being the largest. In 2011 total US furniture imports were valued at US\$12.4 billion (UN 2012). Over the past quarter century, the markets of Europe and North America have become increasingly sensitive to the sources of wood used in furniture manufacturing, particularly tropical hardwoods such as teak and mahogany. From these sensitivities have grown new and proliferating regulatory regimes to protect forest resources from unsustainable exploitation, and to develop alternatives in the form of hardwood plantations.

Box 2. Factors in estimating prices for teak logs

Log dimensions. For teak logs, dimensions matter: the FAO study (Kollert 2013) demonstrated that in Asia, Latin America and Africa prices for large plantation logs were 2–4 times higher than prices for small logs. Moya and Pérez (2008) identified the importance of both diameter and age as influences in free onboard prices (FOB) at time of loading in Costa Rica (see Figure 3).

Log form and defects. Physical factors such as straightness, taper, fluting and eccentricity around the pith have an impact on sawn-wood recoveries and thus on prices offered. Defects such as knots, branch stubs or splits from harvesting are also taken into account.

Heartwood. Teak’s darker heartwood is the market favourite. In some cases the lighter sapwood can be used as a feature but most markets prefer a greater proportion of heartwood. In some countries, logs are downgraded if there is excess sapwood. For example, if logs are less than 60% heartwood (by volume) in Laos or 50% in Solomon Islands, they are classified B-grade logs.

Insects and fungi. Logs and log shipments should be free from insects and fungi. Apart from possible damage to wood quality, insects and fungi can present phytosanitary problems requiring expensive quarantine procedures.

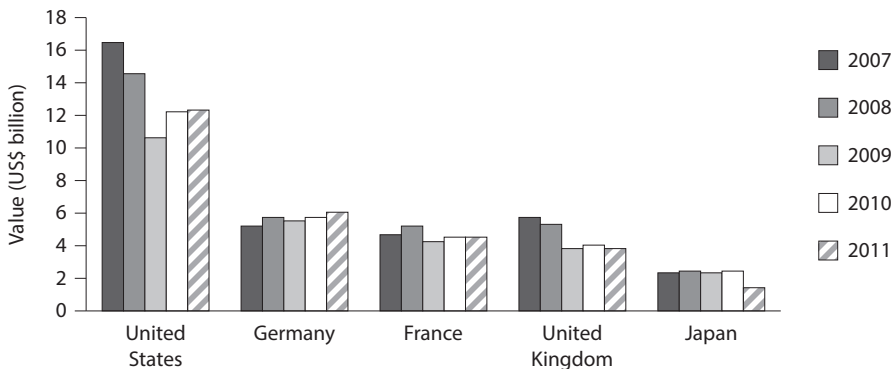


Figure 4. Value of wood furniture imported by the five dominant importing countries, 2007–11. Source: UN (2012)

International regulations and certification

Global wood markets have become increasingly sensitive to timber sourced illegally or unsustainably. The large markets of North America and Europe have responded legislatively through the Lacey Act (USA) and the European Union Timber Regulations (EUTR). Governments, buyers and retailers have embraced the principles of certification, seeking reassurances of sustainability and environmentally responsible production. Consumers probably prefer certified wood, but the question remains whether they are willing to pay enough to cover the extra costs of certification.

The Lacey Act (USA)

The US conservation law known as the Lacey Act was extended in 2008 to include timber, and provided the USA with an effective means of encouraging the timber industry to exercise 'due care' in preventing imports of illegal timber. All wood imports to the USA now require documentation showing that the wood has been legally sourced.

European Union Timber Regulation

The EUTR became effective on 3 March 2013. This law provides a general 'prohibition' against the 'placing on the EU market of illegally harvested timber or timber products derived from such timber'. The process leading to this law, Forest Law Enforcement Governance and Trade (FLEGT), has been part of the EU's policy response to combat illegal logging and associated trade. This is an overarching effort to prohibit placing of illegal timber and timber products on the internal European market, both for conservation reasons and to protect European timber producers from 'unfair' competition. Appendix 5 lists the timber and timber products listed in the Annex to the EUTR (Manoharan 2013).

Countries that supply the EU are either preparing for or entering into negotiations for Voluntary Partnership Agreements (VPA) as part of the FLEGT action plan. A VPA aims to ensure that wood exported to the EU is from legal sources, and supports partner countries to improve their governance of the forestry sector, thereby assisting with EUTR compliance. Signing a VPA should lead to a country being able to issue FLEGT legality licences that will fulfill the requirements of the EUTR and improve the marketing of a country's produce (Heuch et al. 2012).

For India alone, products listed under the EUTR have an annual export value of around US\$1.3 billion. In 2012, six EU member states accounted for more than 12% of this total value. Furthermore, India's exports to the EU of value-added timber and timber products from both domestically sourced and imported timber are growing (Manoharan 2013). Similarly, over one half of Vietnam's exports of wood furniture (valued at more than US\$2 billion) are directed towards Europe and North America, as are nearly 50% of China's wood furniture exports, worth over US\$5 billion.

Australia's Illegal Logging Prohibition Act

The *Illegal Logging Prohibition Act 2012* came into effect in August of that year. The law aims to reduce harmful environmental, social and economic impacts of illegal logging by restricting the importation and sale of illegally logged timber products in Australia. The law demonstrates an Australian commitment to prevent the trade of illegal timber products both nationally and internationally. It prohibits the importation of timber products containing illegally logged timber, and the processing of domestically grown logs that have been illegally logged. It also requires importers and processors of regulated timber products to fulfill due diligence requirements, and establishes monitoring and investigation powers to enforce legislative requirements.

The law establishes a range of offences that impose substantial criminal penalties on importers or domestic processors of raw logs in relation to:

- importing illegally logged timber (clause 8)
- processing illegally logged raw logs (clause 15)
- importing illegally logged timber in regulated timber products (clause 9)
- importing regulated timber products without complying with due diligence requirements (clause 12)
- processing raw logs without complying with due diligence requirements (clause 17)
- importing regulated timber products without making a Customs declaration (clause 13).

In addition, the governments of Australia and New Zealand have signed an Arrangement on Combating Illegal Logging and Promoting Sustainable Forest Management that outlines their shared commitment to work together to deal with illegal logging and promote sustainable forest management.

Certification

Along with legislative means to encourage trade in legally sourced timber, global markets are seeking to encourage sustainable management of forests and limit irresponsible or illegal management, by the adoption of one of two major international certification systems. These two systems are operated by the Programme for the Endorsement of Forest Certification (PEFC), a Swiss-based non-governmental organisation (NGO) and the world's largest forest certification system, and the Forest Stewardship Council (FSC), a multi-stakeholder, not-for-profit NGO based in Germany.

Demands for certification in the tropical hardwood sector are currently being driven by 'corporate social responsibility' policies of larger retailers and manufacturers, and are expected to receive a major boost with introduction and implementation of the EUTR. Of particular importance are chain-of-custody (CoC) processes encouraged by the certification schemes. Large house-builders, and retail, public sector and merchant customers, now require evidence of a clear CoC (see certification images below).



Certificate Number:
BMT-PEFC-0753

Logo License Number:
PEFC/16-33-844



Competition

Teak's physical and aesthetic qualities have given it a worldwide reputation as a premium timber with a strong cultural reputation in markets such as India

and China and a reputation for quality in the dominant markets of Europe and North America. This reputation was built originally upon high-quality timber from natural forests, which is now in short supply, with Burma being the only remaining exporter of sawlogs from natural teak forests. Wood from mature teak plantations (>50 years of age) in India, Thailand and Indonesia commands high prices approaching those of native teak. It is likely that competition for these mature resources will increase and prices will rise. An expected market response will be a shift to younger teak of smaller sizes.

Other species

Mature teak is highly prized and competition with other species has not been an issue. However, smaller size, plantation grown teak produces utility timbers, with no special distinguishing features, which rely upon teak's traditional reputation to gain access to international markets. Small size, fast-grown teak now constitutes a significant proportion of the international teak trade (Appendix 2) and its ready availability and competitive price have seen an increase in its use as a timber for utility furniture. As such, it is now competing with other utility hardwoods such as rubberwood and tropical acacias, both of which are competitively produced commercially in South-East Asia and that provide the basis for competitive furniture industries.

Rubberwood. The recovery of merchantable rubberwood logs once economic latex yield declines at age 30–35 years provides an important and valuable source of wood highly regarded as sawn timber, plywood, in furniture markets and as a fibre source for MDF. Its light colour and easy woodworking, machining and staining properties allow it to be used as a substitute for many other species in the furniture industry.

There are an estimated 10 Mha of rubber plantations in South-East Asia (IRSG 2009). Yields of rubberwood at harvest depend on the site, clone, management, age and quality and can vary from 52–163 m³/ha¹ suggesting an estimated standing stock of rubberwood in South-East Asia exceeding 600 Mm³. The region's annual economically viable rubberwood harvest is estimated to exceed 6.5 Mm³.

¹ In Thailand at clearing, Chantuma (2009) estimates an average production of stem and branch rubberwood at above 15 cm diameter of 137 m³/ha.

In Malaysia, rubberwood represented 35% of total exported wood products in 2007, worth US\$2.1 billion (Shigematsu et al. 2011). Furniture comprised most of these exports. From a planted resource of 2.9Mha in Thailand, an estimated annual rubberwood production of 5–6 Mm³ contributed to around 60% of total exported wood products in 2007, worth US\$629 million. Thai exports of sawnwood were dominated by exports of sawn rubberwood to China (Huech et al. 2012). Prices for rubberwood are attractive and vary with commodity demand for rubber latex (Eastin 2011). Thai log yard prices were of the order of US\$529/m³ in 2013 (USDA 2013).

Acacia. There are over 2 million ha of tropical acacias (*Acacia mangium*, *A. auriculiformis*, *A. crassicarpa* and *A. mangium* × *auriculiformis* hybrid) planted in South-East Asia, with Indonesia, Malaysia and Vietnam being the major growers (Griffin et al. 2011). These plantings are used extensively as a source of wood fibre for pulp. However, some of these plantations are making a far larger impact as a resource for solid wood products, although the volume of this trade is smaller than pulpwod use. In South-East Asia, substantial

quantities of *A. mangium* wood are now traded for solid wood products (Midgley and Beadle 2007). This new industry is being driven by demand for plantation-grown wood that can meet the certification requirements of furniture industries in Europe and North America, reduced availability of logs from native forests, and increasing awareness that these acacias are very suitable for plywood, furniture, flooring and light construction. The wood of the *A. mangium* × *auriculiformis* hybrid is similar to *A. mangium* but has slightly higher density and is suitable for products where strength is important. *Acacia auriculiformis* is denser and has a rich heartwood colour, though it is slower growing than the other taxa. The main acacia wood product manufactured for export from South-East Asia is furniture sold into Europe and the USA. It has similar characteristics to teak but is much cheaper. The total value is difficult to estimate, but figures from Vietnam suggest that it comprises some 10% of the predicted total turnover of exported wood and wood products for 2013 of US\$5.5 billion (VBN 2013).

The next four chapters examine four leading client countries for teak: India, China, Vietnam and Thailand.

India

In terms of teak-trading nations, India is the world's largest importer of teak logs (Figure 5). It comprises about 75% of the total global trade (Raiyani 2013), although it also produces teak from an estate of over 3.37 Mha, with a standing volume of 371 Mm³. Of the estimated global harvest of 2–2.5 Mm³, India harvests some 300,000 m³ domestically. In 2012 India imported almost 1 Mm³ of round and squared logs (DGCIS 2013), suggesting a total annual consumption of 1.3 Mm³. Raiyani (2013) anticipates Indian teak use will increase to 2.05 Mm³ annually by 2020. Should the policies and the regulatory framework for Indian forests change, there is a possibility that domestic production from India's teak planting might increase (Raiyani 2013).

Imports of teak logs

The volume and value of Indian imports of rough teak, both round and squared logs (HS Commodity code 44034910, 'Teak Wood In Rough') increased steadily over the past few years, from US\$320 million in 2010 to more than US\$528 million in 2012 (DGCIS 2013) (Table 3). Both volume and value of Indian teak imports are expected to continue to

grow at approximately 5% until 2020 (Raiyani 2013: Table 5).

India imports teak from a range of countries, dominated by Burma (Figure 6). It is difficult to establish what proportion of Burma teak comes from natural forests and what proportion from plantations. West Africa has been a consistent source of teak logs, and imports from Central America are increasing as wood becomes available. Raiyani (2013) anticipates that Indian imports from Burma will decrease in response to Burma's changing harvesting codes and export regulations, but predicts that Latin and South American imports will grow as resources in those exporting countries mature. Given the competitive prices offered by Latin American suppliers (Table 4), such increases appear likely.

India's imports of sawn teak timber

Following the trend for logs, Indian imports of sawn timber have also increased in both volume and value between 2010–12 (Table 5). The relatively low volume of sawn timber imported is strongly influenced by the Indian preference to sawlogs domestically, and

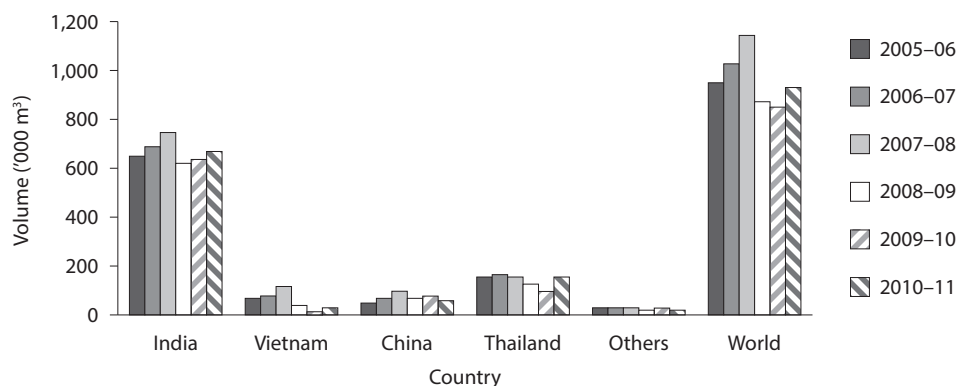


Figure 5. Global imports (m³) of teak, 2005–11. Adapted from Raiyani (2013)

a willingness of major exporters (primarily Burma) to sell round logs. West Africa has been a significant source of round logs. However, sovereign risk due to political and civil unrest presents serious challenges to the West African teak timber trade, and

it is uncertain if plantations harvested have been replanted. The West African markets have been forced to shift from high-quality, >20-year-old plantations material to younger commercial teak offering lower yields and higher costs (Raiyani 2013).



Photo 2. Indian imports of small round and squared teak logs from Central and South America at Mumbai. Photo: Stephen Midgley

Table 3. India's value and volume of teak imports—2010, 2011, 2012

2010		2011		2012	
Value (US\$)	Quantity (m ³)	Value (US\$)	Quantity (m ³)	Value (US\$)	Quantity (m ³)
319,316,669	647,746	470,629,047	934,268	528,525,501	996,943

Source: DGCIS 2013

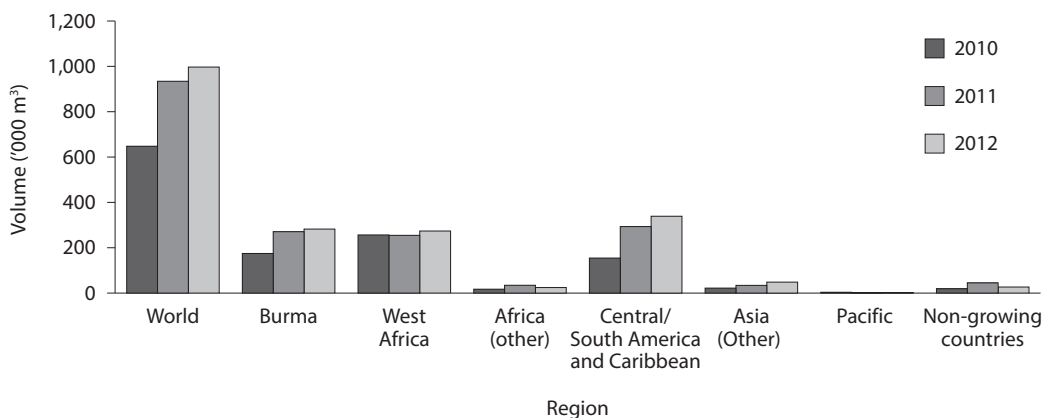


Figure 6. India's imports (m³) of teak (by region), 2010–12. Source: DGCIS (2013)

Table 4. Value (US\$), volume and unit value of Indian imports of round and squared teak logs (Commodity: 44034910), 2010–12 (year ending December)

Partner country	2010		2011		2012				
	US\$	Quantity (m ³)	Av. value/m ³	US\$	Quantity (m ³)	Av. value/m ³	US\$	Quantity (m ³)	Av. value/m ³
World	319,316,669	647,746	493	470,629,047	934,268	504	528,525,501	996,943	530
Burma	144,490,938	174,748	827	216,657,010	270,829	800	248,588,128	282,382	880
West Africa	100,652,997	256,524	392	100,485,246	254,757	394	109,076,069	273,775	398
Africa Other	7,449,184	17,159	434	15,422,529	34,489	447	11,628,484	24,427	476
Central/South America and Caribbean	52,129,959	154,585	337	107,306,801	293,433	366	131,572,610	338,957	388
Asia other	5,894,565	22,025	268	12,606,050	34,059	370	15,529,768	48,386	321
Pacific	1,497,474	3,645	411	1,476,884	1,660	890	979,470	2,136	459
Non-grower countries	7,196,136	19,045	378	16,645,045	44,952	370	11,114,562	26,778	415

Source: DGCIS (2013)

Table 5. Value (US\$), volume and unit value of Indian imports of sawn timber (Commodity: 44072910) 2010–12 (year ending December)

Partner country	2010		2011		2012				
	US\$	Quantity (m ³)	Av. value/m ³	US\$	Quantity (m ³)	Av. value/m ³	US\$	Quantity (m ³)	Av. value/m ³
World	13,376,615	36,721	364	28,137,963	94,104	299	21,315,749	55,983	381
Burma	531,723	269	1,977	607,752	159	3,822	233,853	181	1,292
West Africa	1,209,029	2,976	406	1,625,847	3,707	439	2,162,969	5,137	421
Africa Other	6,877,187	17,058	403	6,417,127	14,456	444	5,414,464	11,877	456
Central/South America and Caribbean	1,397,067	3,551	393	3,960,265	8,096	489	7,000,553	14,504	483
Asia other	425,891	795	536	269,062	625	430	267,358	588	455
Pacific	65,791	141	467	45,783	107	428	163,833	348	471
Non-grower countries	2,869,927	11,931	241	15,212,127	66,954	227	6,072,719	23,348	260

Source: DGCIS (2013)

Indian use and manufacture of teak products

Indians have a strong historical and cultural affinity for teak wood, due to its beauty, strength, durability and pest resistance. Replications of traditional furniture and fancy plywoods use either large, mature-age plantation teak (>60 years of age) or teak imported from Burma's natural forests. Imported teak is typically used for door and window frames, furniture, handicrafts and household goods and carpentry.

Indian demand for teak has been strong as a result of increasing urbanisation and an expanding housing sector. New houses require door and window frames, new furniture such as beds, wardrobes, cabinets, side tables, coffee tables, kitchens and dining tables, and chairs for homes, gardens and swimming pools (Appendix 2). Teak is preferred for furnishings for

hotels, resorts and schools. Rapid urbanisation, with concomitant construction, has also fuelled demand for building teak. India's urban population is expected to increase from 377 million in 2011 to about 600 million in 2031, with the 53 largest cities accounting for 43% of the country's urban population. An urban housing shortage already exists equivalent to an estimated 18.8 million dwelling units (GOI 2013).

Estimates of future consumption of teak wood in India to 2020 are provided in Table 6, taking into account the importance of the doors-and-windows market segment as the largest component within the building industry (Raiyani 2013). However, the recent downturn in the Indian economy, the strong depreciation of the Indian rupee against the US dollar and a crumbling real estate market (Bradsher and Thirani 2013) may lower these figures.

Table 6. India's future consumption (m³) of teak

Consuming sector	2010	2015	2020
Construction (industrial)	460,000	530,000	610,000
Construction (household)	200,000	270,000	380,000
Doors and windows	520,000	660,000	850,000
Furniture	130,000	170,000	210,000
Total consumption	1,310,000	1,100,000	2,050,000

Source: Raiyani (2013)



Photo 3. Large logs from a 70-year-old plantation in Java. Logs such as these attract very high prices. Photo: Stephen Midgley

Indian exports of teak

India's exports of wood products increased by 27% in 2012–13 (Table 7), and wooden furniture was the largest component (ITTO 2013b). The total Indian furniture market is substantial, estimated in 2011 to exceed about US\$5.8 billion (INR350 billion). Of this, 85% falls into the small-size sector. A World Bank study predicts the organised furniture sector will grow by 20% a year worldwide, and India, Brazil and Russia are expecting a boom (Business Vibes 2013).

Industry sources consulted in the course of this technical report suggest that teak constitutes a significant proportion of wood furniture exports from India. These exports were valued at US\$592 million in 2012 (DGCIS 2013) and were directed mainly towards the markets of North America and the European Union (Figure 7), both of which are sensitive to the need for legality and certification. This will have an inevitable impact upon the sourcing policies of industries involved in wood furniture manufacture.

Indian products listed under the EUTR have an annual export value of around US\$1.3 billion. In 2012 five EU member states (Germany, France, the Netherlands, Poland and Italy) accounted for

more than 12% of this total value. India's exports of value-added timber and timber products to the EU and other markets are increasing, with these products manufactured from both domestically sourced and imported timber. Although illegal logging for commercial production is not considered a serious problem in India, a country with a long history of forest management policies and laws, the large volumes of imports could ultimately harm export markets unless sourced legally (Manoharan 2013).

Table 7. Trends in Indian exports of wood products, 2011–13

Item	2011–12	2012–13
Cork and products	2.3	2.1
Hardboard	10.0	11.4
Sawnwood	16.8	28.4
Other articles of wood	114.2	162.0
Sandalwood chips	1.8	1.0
Tea chest panels	0.1	0.1
Veneer	11.6	14.4
Wooden furniture	274.8	333.4
Plywood products	16.1	14.8

Source: ITTO (2013b)

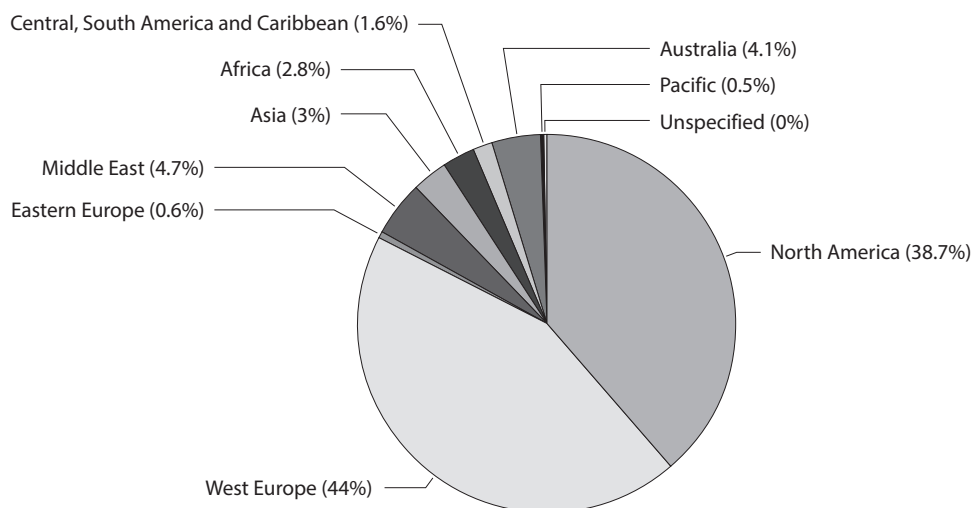


Figure 7. India's exports of wooden furniture, 2012 (total value US\$592m). Source: DGCIS (2013)

Indian ports, import logistics and facilities

India has many ports that are important to the trade in teak, both logs and sawn timber. The locations of some of the larger ports that can handle both break-bulk and containerised shipments are provided in Figure 8. Ports used for the import of large volumes of logs are also used to import large volumes of sawn timber. Almost 45% of round and squared log imports come through the two modern ports of Kandla and Mundra in the western state of Gujarat (Figure 9). Over 62% of sawnwood imports come through these same ports (Figure 10).

The ports of Kandla and Mundra have been able to provide efficient port services, together with adjacent manufacturing hubs and industry parks to process imported timber. As these ports have increased

efficiency and the adjacent processing hubs have expanded, they have taken market share from some of the older, longer established ports (Figure 11). While Kandla remains an attractive port, the adjacent processing hub at Mundra has been able to take business away from Kandla.

Paradip in Orissa State is a major port serving the eastern and central parts of India. It is not used currently to import logs and sawn lumber. However, the port has an ambitious expansion program to double its capacity to meet increasing demand for imports. Associated with this expansion is a plan to set up a port-based cluster of wood-based industries based upon the successful Kandla model. The hub will manufacture wooden products with imported timber and market them within and outside the country. Details of the import processes involved at Indian ports are discussed in detail in Appendix 2.



Figure 8. Locations of India's major ports for importing teak logs. Source: DGCIS (2013)

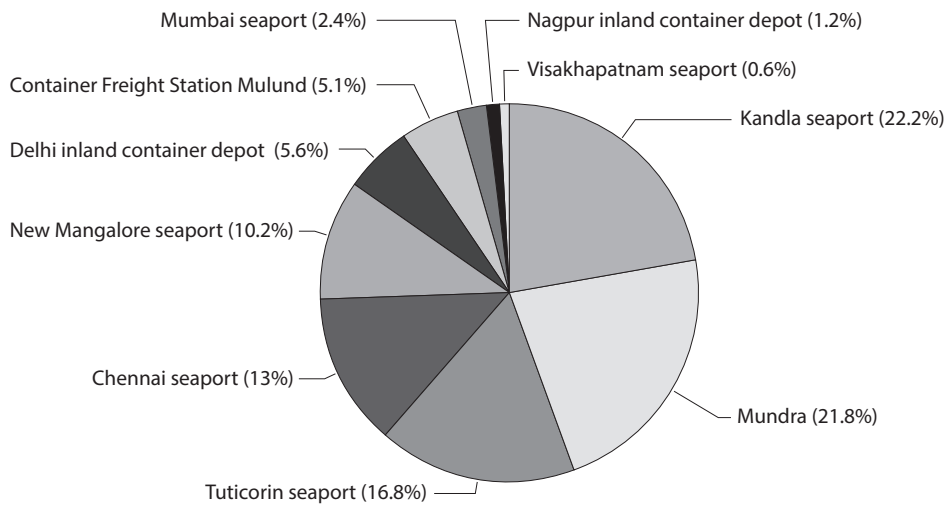


Figure 9. Volume (m³) of imports of round and square teak logs through major Indian ports, 2012. Source: DGCIS (2013)

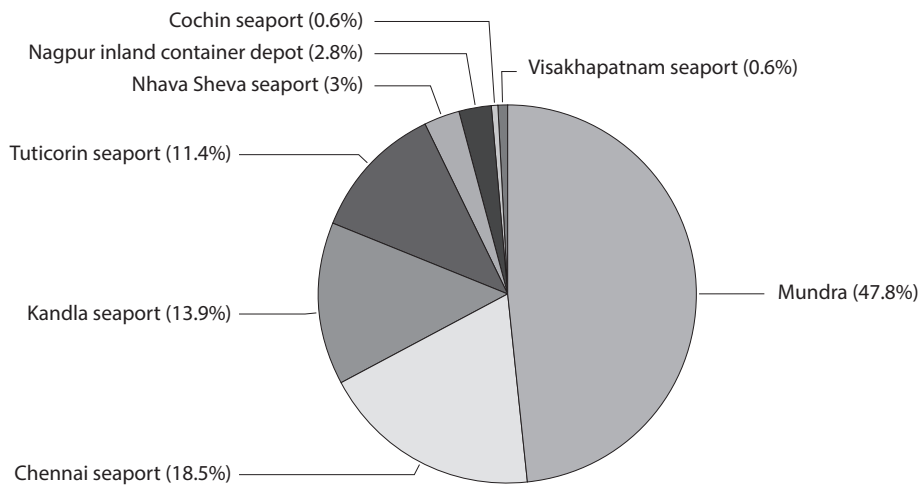


Figure 10. Volume (m³) of imports of teak sawnwood through major Indian ports, 2012. Source: DGCIS (2013)

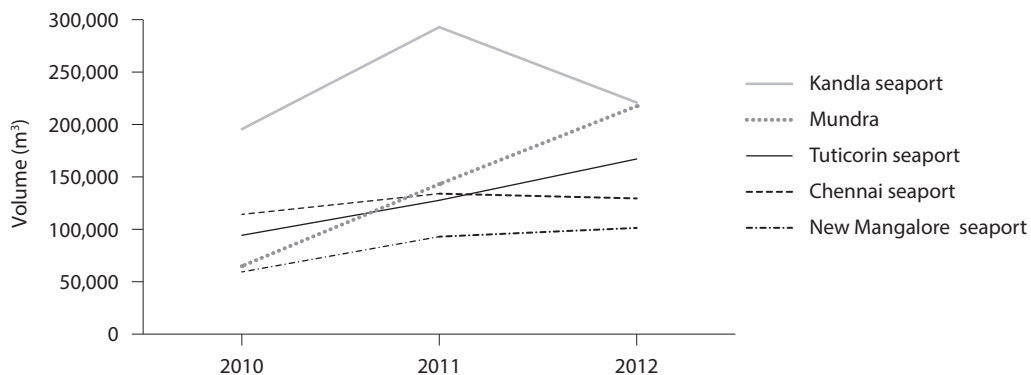


Figure 11. Changing preferences for ports, Indian teak imports (m³) by major ports, 2010–12. Source: DGCIS (2013)

Observations on the Indian wood products sector

- **India has a culture that appreciates the use of wood, especially teak.** Wood is featured in public and private buildings and as furniture, and is appreciated for its aesthetic qualities.
- **Imports of wood will continue to grow.** Demands for wood are strong and domestic sources are limited in both quantity and quality. Imports will continue to grow.
- **India is a price-conscious market—cheaper is better!** India’s wood and log imports are largely controlled by many traders who operate on small and competitive margins. Indian markets are prepared to accept inexpensive logs classed as pulp logs or rejects in Australia and New Zealand and use their comparative advantage of cheap labour to use these to produce sawn wood and veneers.
- **The Indian wood market is seasonal.** Between April and July demand dips in response to the monsoon and lower building/construction activity. The months of April–May are extremely hot and sawmills work below capacity. Prices are at their best during September–January.
- **Regional species preferences.** Teak is the benchmark against which all other timbers are assessed in India.
- **Changing building and construction practices.** The housing market is substantial and growing. There are no standard sizes used in Indian house construction. There are guidelines but each house is unique, although this is changing where standard fittings offer savings. Emerging changes in building practices will see use of standard doors and window fittings, offering opportunities to outside manufacturers of these products.
- **Pessimism regarding India’s capacity to increase domestic wood production.** While senior bureaucrats were positive about the likelihood of India increasing domestic wood production, importers, traders and others in the wood industries did not share this optimism. Government interference is regarded as a hindrance to investment in plantations.
- **There is little sharing of information and cooperation in the Indian market.** The Indian wood markets are generally small, highly fragmented and competitive. Information is not shared easily, and relationships in business are extremely important.
- **Future sources of imported logs and timber.** There has been surprisingly little strategic thought given to the longer term sustainability of Indian log imports. The import market considers that logs will always be available in international trade, and it only requires locating sources and negotiating prices.

China

China has a vast trade in forest products, and is the world's largest wood products exporter (Woodmarkets 2013). Furniture, paper products, plywood, fibreboard and selected wood products play the most important roles in China's forest products exports. The value of China's trade in forest products was US\$118.8 billion in 2012. Of the total trade, exports accounted for \$57.6 billion, an increase of 5% over 2011. Imports accounted for \$61.3 billion, a decrease of 6% over 2011 (Woodmarkets 2013). Wood furniture and wooden doors, both sectors that use teak imports, were valued at over US\$12.5 billion, and have been growing at over 5% annually (Table 8).

Despite the magnitude of this trade and the size of the domestic markets, challenges for the sector are expected in 2013, given the rising costs of labour and raw materials, as well as weaker export markets for Chinese furniture and wood products

due to competition from lower cost processors (Woodmarkets 2013). China's lucrative export trade in forest products is dependent upon imports of raw materials. Volumes of log imports from major suppliers are shown in Table 9.

Use and manufacture of teak products

China has become the world's biggest producer and exporter of furniture products. The China National Light Industry Information Centre reports that the total value of Chinese furniture manufacturing reached US\$154 billion in 2011, an increase of US\$39 billion or 25% year-on-year. Exports from the Chinese furniture sector represent 35.3% of global furniture trade (Business Vibes 2013). The wooden furniture export component of these exports

Table 8. China's wood products exports, volume and value (2011–12)

Products sector	Volume ('000 m ³)		Value (US\$m)	
	2011	2012	2011	2012
Wood furniture (million pieces)	202	200	11,321	11,911
Wood doors (tonnes)	307,586	321,273	579	619
Plywood	9,372	10,033	4,340	4,796
Fibreboard	3,458	2,532	1,548	1,670
Particleboard	191	208	50	63

Source: Woodmarkets (2013)

Table 9. China log imports ('000 m³, all species) by country, 2011–12

Country	2011	2012
Russia	14,072	11,185
New Zealand	8,244	8,624
USA	4,885	3,640
Papua New Guinea	2,799	2,581
Australia	1,576	1,222
Canada	2,462	1,576
Solomon Islands	1,774	1,916
Congo	621	614
Malaysia	551	437
Others	5,342	5,237

Source: Woodmarkets (2013)

(HS code: 940161,940169, 940330, 940340, 940350, and 940360) reached \$17.5 billion in 2012, a slight increase from the \$17.1 billion in 2011 (USDA 2012). (Figure 12.) A substantial proportion of the raw materials for the wooden furniture export markets are imported.

China exported 200 million pieces of wood furniture in 2012. The USA, Japan, UK, Germany and Australia were the five leading export markets (Table 10). In addition, China exported wooden door products valued at US\$619 million in 2012, an increase in value of 26% over 2011 (Woodmarkets 2013). The main markets for wooden doors were the USA, Japan, Hong Kong, Romania and Canada. It is likely that plantation teak would be attractive for the door market sector.

Table 10. Volume and value of China’s exports of wooden furniture by destination country

Country	Volume (million pieces)		Value (US\$m)	
	2011	2012	2011	2012
USA	63.8	64.8	3,367	3,771
Japan	19.6	18.9	701	764
UK	10.0	11.0	479	584
Germany	9.3	9.6	332	373
Australia	9.0	9.5	417	449
France	6.4	7.2	268	297
Canada	6.9	0.1	345	384
Netherlands	4.2	5.1	114	122
Others	73.0	74.0	5,296	5,166
Total	202.2	200.2	11,319	11,910

Source: Woodmarkets (2013)

Manufacturers within China’s wood furniture industry are concerned that, after years of rapid increase, China’s wood furniture exports will stagnate over the next few years as prices and environmental sensitivity rises, causing their products to be less competitive (USDA 2012). China has recently been losing furniture trade to countries with lower labour costs, such as Indonesia and Vietnam, as well as to some newer emerging countries, including Bangladesh and Cambodia. To remain competitive, manufacturers are focusing on lowering manufacturing costs. The supply of wood fibre for raw materials remains tight in China and in other Asian manufacturing countries, leading manufacturers to continue to seek alternative sources of supply (UN 2012).



Photo 4. Doors and window frames represent a major Chinese use of teak. Photo: Stephen Midgley

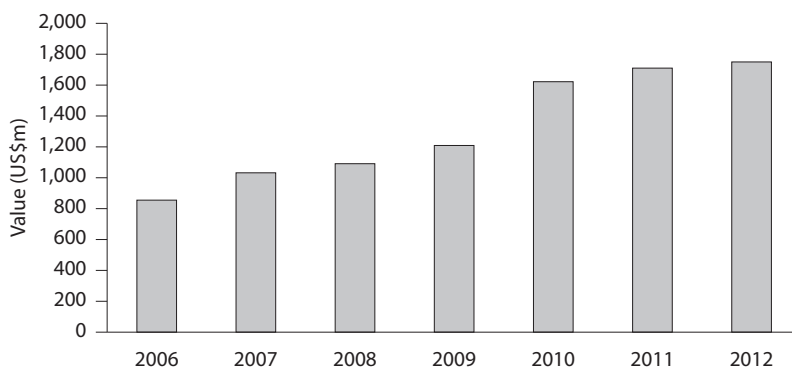


Figure 12. China wood furniture export value, 2006–12. Source: USDA (2012)

Imports of teak logs

In 2012 China's imports of round and squared teak logs exceeded 114,000 m³, and were worth more than US\$92 million. Burma remains the primary source for China's imports of teak logs (Figure 13),

providing 78% of total imports. From 2010–12, Chinese imports of teak logs steadily increased in both volume and value. Burma met the bulk of China's rising demand (Figure 14, Table 11). Supplies from other countries did not change significantly.

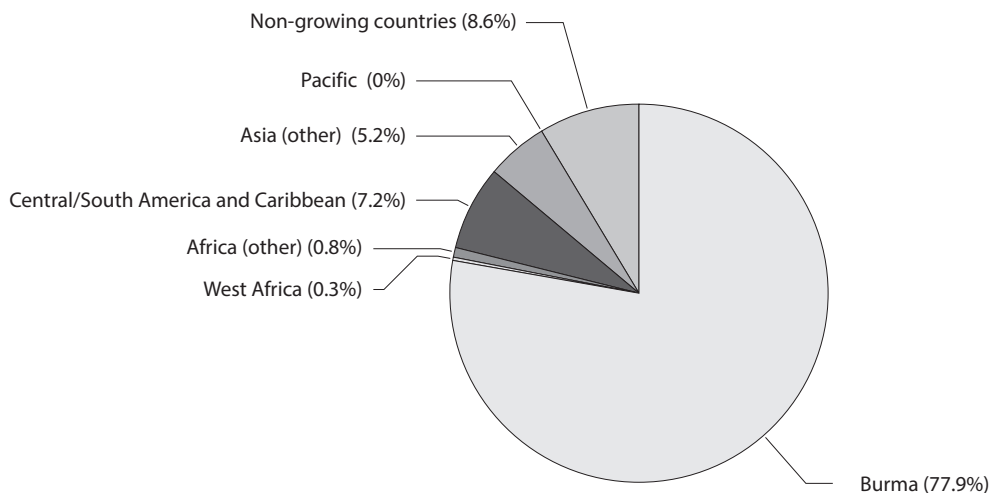


Figure 13. China's imports (m³) of teak round logs and squared logs by region, 2012. Source: Appendix 3

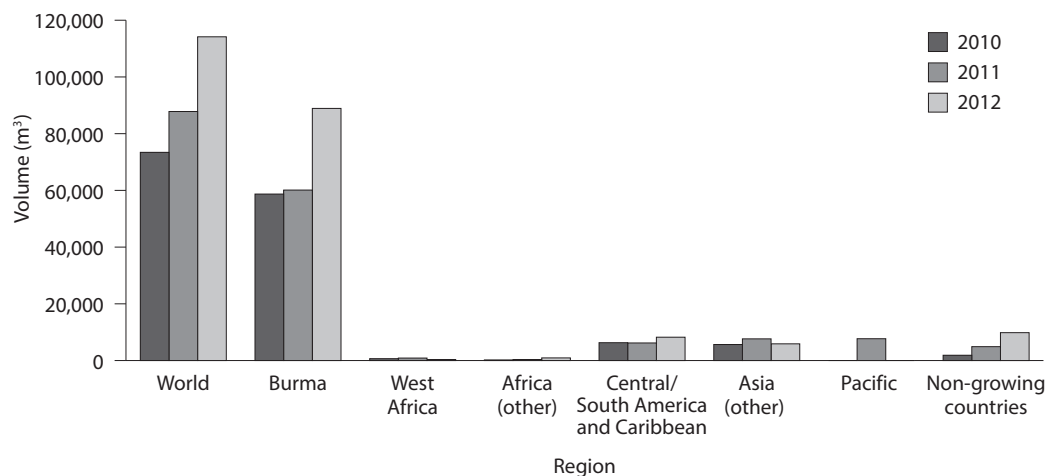


Figure 14. Chinese import trends for round and squared logs by region, 2010–12. Source: Appendix 3

Table 11. Sources of supply for teak round and squared logs 2010–12 (years ending December)^a

Partner region	2010			2011			2012		
	Quantity (m ³)	Value (US\$)	Average value (/m ³)	Quantity (m ³)	Value (US\$)	Average value (/m ³)	Quantity (m ³)	Value (US\$)	Average value (/m ³)
World	73,416	50,334,401	686	87,813	60,775,244	692	114,159	92,515,320	810
Burma	58,705	42,175,758	718	60,114	48,510,304	807	88,905	76,670,824	862
West Africa	671	381,830	569	875	548,045	626	362	261,176	721
Africa (other)	220	86,565	393	368	126,932	345	932	528,170	567
Central/South America and Caribbean	6,300	3,306,913	525	6,202	3,107,039	501	8,232	4,340,718	527
Asia (other)	5,651	3,005,923	532	7,652	3,686,861	482	5,894	3,450,497	585
Pacific	0	0	0	7,701	1,390,323	181	0	0	0
Non-growing countries	1,869	1,377,412	737	4,901	3,405,740	695	9,834	7,263,935	739

^a Commodity 44034910, Teak wood in the rough. Log import volume and value by country of origin
Source: Appendix 3

China's imports of sawn teak timber

Import patterns for sawn timber mirror those of teak logs, with Burma providing 78% of imports (Figure 15). According to a Woodmarkets report commissioned for this study (Appendix 3), in 2010–2012 Chinese imports of teak sawn timber steadily increased in both volume and value, with the bulk of the demand

being met by a relatively static supply from Burma but with increasing amounts from West Africa (Figure 16). In 2012, China's imports of teak sawn timber exceeded 49,718 m³, worth more than US\$41 million. Over the 3-year period, the rate of increase in imports of round logs and squared logs (73,416–114,1569 m³) was substantially greater than the increase for sawn timber (49,718–55,846 m³), which may reflect an increased processing capacity in China.

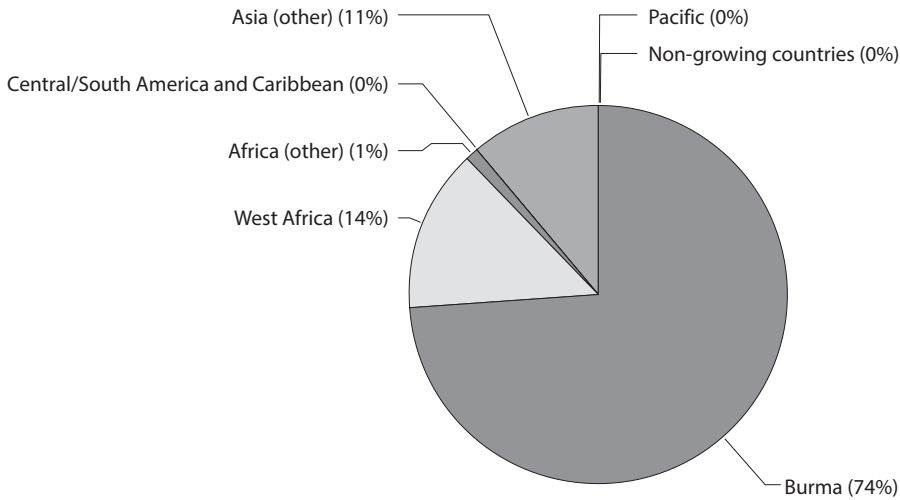


Figure 15. China's imports of teak sawn timber (m³) by region, 2012. Source: Woodmarkets (2013)

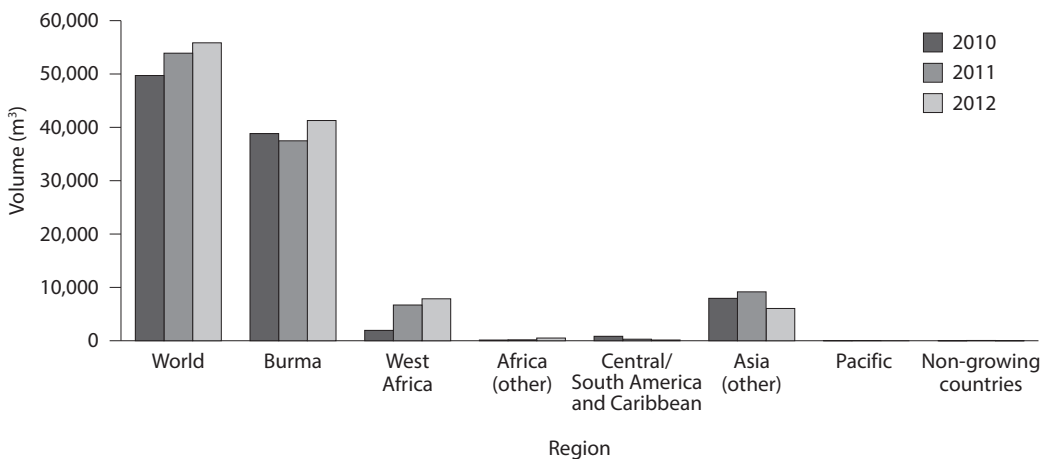


Figure 16. Chinese import trends for teak sawn timber (m³) by region, 2010–12. Source: Woodmarkets (2013)

Average prices paid for teak logs and sawn timber

The recorded cost of insurance freight at port of unloading (CIF) values for round logs, squared logs and sawn timber varies greatly between shipments and with quality. However, an attempt has been made in Figure 17 to compare average prices for round logs and squared logs from different regions. Prices from Burma are consistently high (and increasing), reflecting the substantial proportion of large native logs imported. Unit values of log imports from the

Pacific were low, reflecting the small size of logs imported and the small consignments. The data suggest that there is an upward trend in average values over the past 3 years. This may be due to a number of factors including the influence of shipping costs upon CIF values.

Figure 18 attempts to make a similar comparison for sawn timber. The obvious conclusion to be made is that sawn timber is more highly valued than logs. Sawn timber values from the Pacific (Papua New Guinea in this case) are comparable with higher values for shipments from other regions.

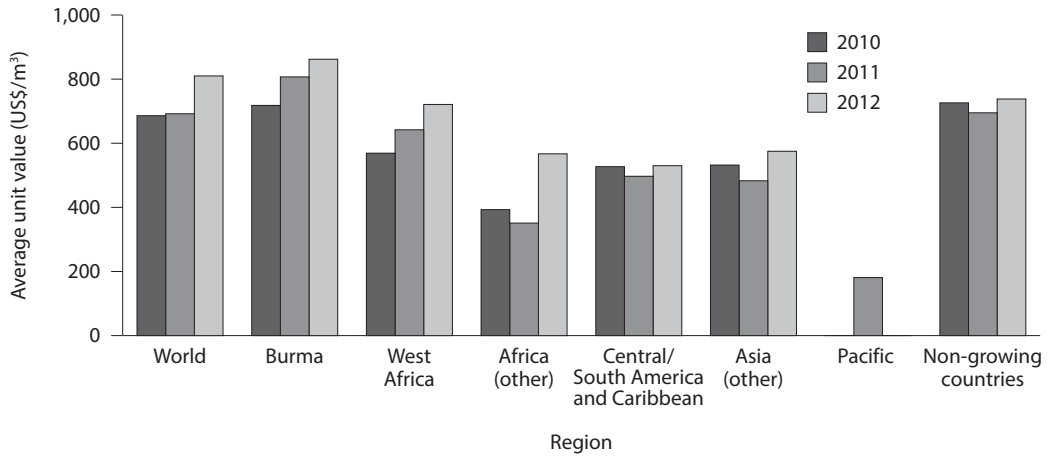


Figure 17. China: average unit values for teak log imports by region, 2010–12. Source: Woodmarkets (2013)

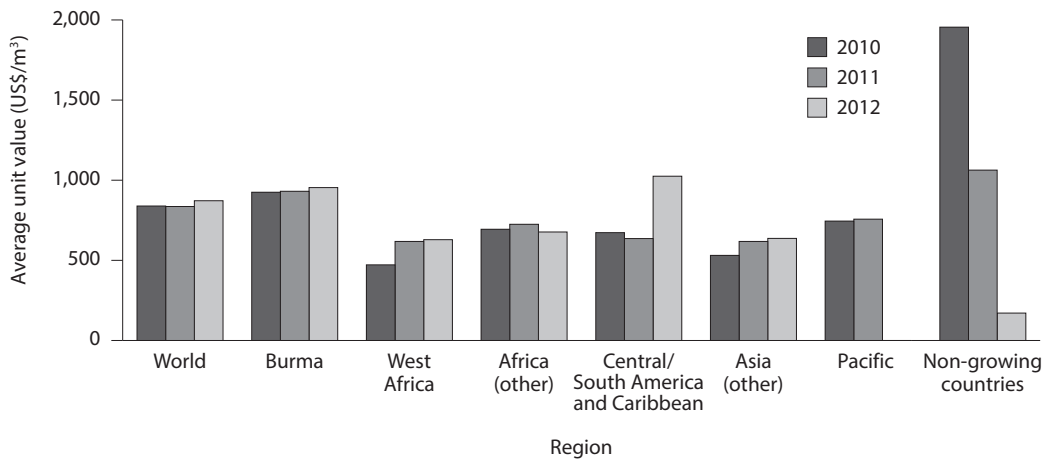


Figure 18. China: average unit value of teak sawnwood imports by region, 2010–12. Source: Woodmarkets (2013)

Chinese ports, import logistics and facilities

The largest ports for Chinese imports of teak are the land ports adjacent to Burma. The customs post of Kunming, which is responsible for the border posts with Burma, recorded imports exceeding 40,000 m³ of round logs and 41,000 m³ of sawn timber in 2012 (Tables 12 and 13). The other primary ports are located on China's eastern seaboard between Shanghai and Guangzhou, servicing the wood products industries in that region.

India versus China

Comparisons between China and India are warranted as India represents some 75% of global trade in teak, and China, as the world's largest manufacturer of wood furniture, is also a major user of this versatile tropical hardwood. India imports almost nine times as much teak wood in the rough as China (Figure 19) while the imports of teak sawnwood to both

countries are similar. Figure 20 shows the dominant position India holds relative to China in the global markets for teak logs (HS Commodity 44034910: Teak wood in the rough). 'Burmese' teak enjoys a special status in both countries, which have strong traditional links with Burma, and acquire the largest proportion of their teak imports from that source. The trends for teak log imports for both countries have been steadily increasing over the past 3 years (Figure 20), with some of the most obvious increases coming from the countries of Central and South America and the Caribbean.

China challenges India's dominance as the world's leading teak importer in the area of sawnwood (Figure 21). India's import tariff structure favours the importation of round logs and squared logs (tariff = 5.15%) over imports of sawn timber (tariff = 14.712%). Teak from Burma is highly sought-after in the Chinese furniture market, and this is likely to continue, reflected by the steady Chinese demand for teak sawnwood (Figure 22). Recent changes to Burma's regulation of the teak trade are expected to have a smaller influence

Table 12. China teak log import volume and value by customs post, 2010–12

Customs post	Province	Port type	2010		2011		2012	
			m ³	US\$	m ³	US\$	m ³	US\$
Kunming	Yunnan	Land port	30,435	19,641,957	15,463	10,416,728	40,002	27,969,042
Shanghai	Shanghai	Seaport	9,634	5,895,783	19,897	14,656,982	25,156	20,704,761
Huangpu	Guangdong	Seaport	12,420	8,815,160	23,213	14,553,290	16,110	12,303,403
Nanjing	Jiangsu	Seaport	13,292	10,918,971	7,397	7,072,306	13,463	14,299,602
Shenzhen	Guangdong	Seaport	1,091	497,957	3,725	2,500,175	8,480	6,370,352
Guangzhou	Guangdong	Seaport	3,166	2,266,038	11,021	9,095,861	6,915	7,853,643
Shantou	Guangdong	Seaport	1,793	1,344,955	1,456	1,091,703	1,354	1,015,359
Xiamen	Fujian	Seaport	41	72,853	935	509,313	1,186	1,008,557

Source: Woodmarkets (2013)

Table 13. China teak sawn timber import volume and value by customs post 2010–12

Customs post	Province	Port type	2010		2011		2012	
			m ³	US\$	m ³	US\$	m ³	US\$
Kunming	Yunnan	Land port	38,922	35,920,835	37,511	34,773,081	41,972	39,657,983
Shenzhen	Guangdong	Seaport	7,133	3,157,870	10,645	6,408,605	7,096	3,594,075
Shanghai	Shanghai	Seaport	1,155	743,515	1,956	1,328,821	3,405	2,604,813
Huangpu	Guangdong	Seaport	441	233,458	1,948	921,899	2,030	1,376,974
Guangzhou	Guangdong	Seaport	679	453,869	865	690,218	463	459,969
Shantou	Guangdong	Seaport	146	236,698	40	68,931	265	346,279
Xiamen	Fujian	Seaport	90	107,014	85	125,356	143	184,142

Source: Woodmarkets (2013)

on the sawnwood trade in teak than it will for the log trade because, while banning log exports, Burma is shifting its wood exports to sawnwood and processed products.

The importance of the international trading community to the trade in teak is demonstrated in Figure 22, where non-growing countries play a dominant role in India's teak wood supply. Non-growing countries were a dominant part of India's teak sawnwood imports in 2010, including Germany (16,573 m³), the USA (16,295 m³) and Canada (12,748 m³). It is an artifact of international trade data that the country of supply on the paperwork may not be the same as the country of origin².

Average values for teak imports

Many factors influence the CIF price of teak: log grades, wood quality, age and shipping, handling and wharf costs. However, it is instructive to examine broad trends and make comparisons between leading global players for the import of round and squared teak logs (Table 14) and sawn timber (Table 15). Generally, India pays less for its imports of teak logs from all regions, with the exception of Burma and parts of Africa.

² In the course of this study supplying countries that are non-growing countries were found to include Austria, Belgium, Bosnia-Herzegovina, Canada, China (PR), Croatia, Czech Republic, Estonia, France, Georgia, Germany, Iraq, Italy, Kazakhstan, (Republic of) Korea, Latvia, Lithuania, New Zealand, Netherlands, Oman, Qatar, Romania, Russia, Singapore, Spain, South Africa, Sweden, Switzerland, Turkey, United Arab Emirates, UK, USA, and Ukraine.

Observations on the Chinese wood products sector

- China is the **world's largest trader trade in wood products**. In 2012 the Chinese wood products trade was valued at US\$118 billion, with exports accounting for US\$57 billion and imports for US\$61 billion.
- China's export trade is **heavily dependent upon imports** of logs and sawn timber, including teak, and this will continue.
- The **wood furniture and wooden doors sectors**, both users of imported teak, were valued at over US\$12.5 billion in 2012.
- The Chinese **wood furniture processing industry is world class** and very sophisticated.
- Domestic and international **demand is strong** for Chinese wood products.
- **Europe and North America** are China's main furniture export markets. Both are sensitive to increasing demands for legally sourced wood and for certification.
- While Chinese imports of teak logs are only 10% of the volume imported by India, Chinese imports of **teak sawnwood** greatly exceed those of India.
- **Burma** provides 78% of Chinese teak imports. The proportion of China's wood products trade that involves teak thus is likely to be affected significantly by the changes to Burma's log export rules and forest reforms.

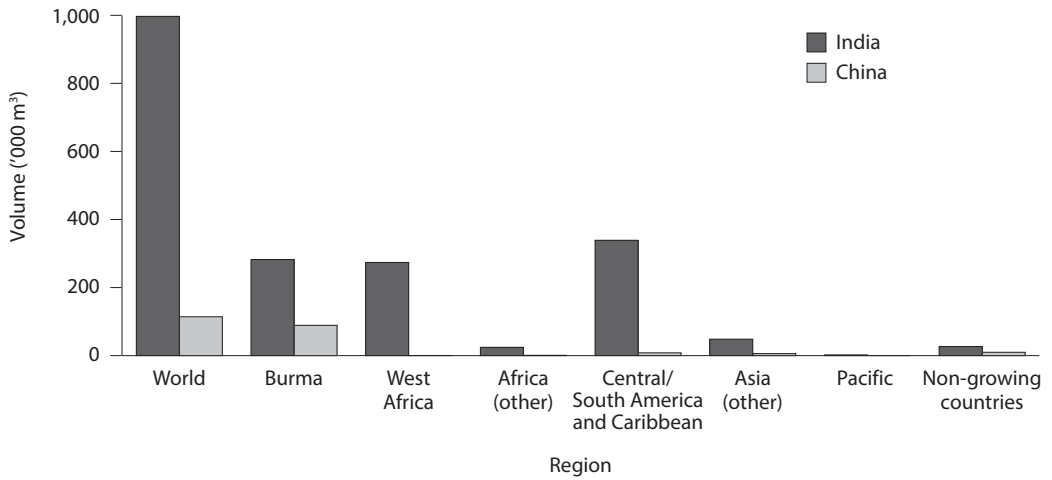


Figure 19. India and China imports of round and squared logs (HS Commodity 44034910), 2012. Source: DGCIS (2013), Appendix 3

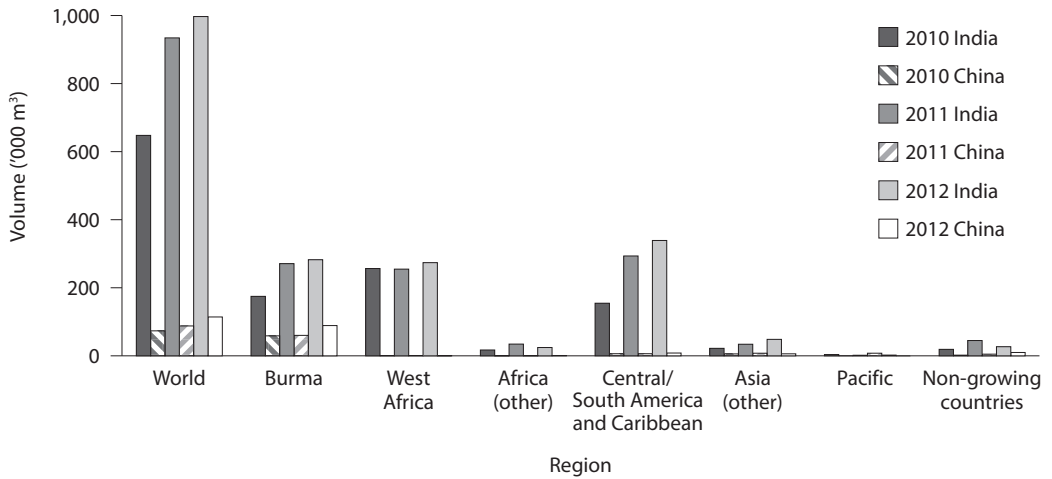


Figure 20. Sources of India and China imports of round and squared logs (Commodity 44034910), 2010–12. Source: DGCIS (2013), Appendix 3

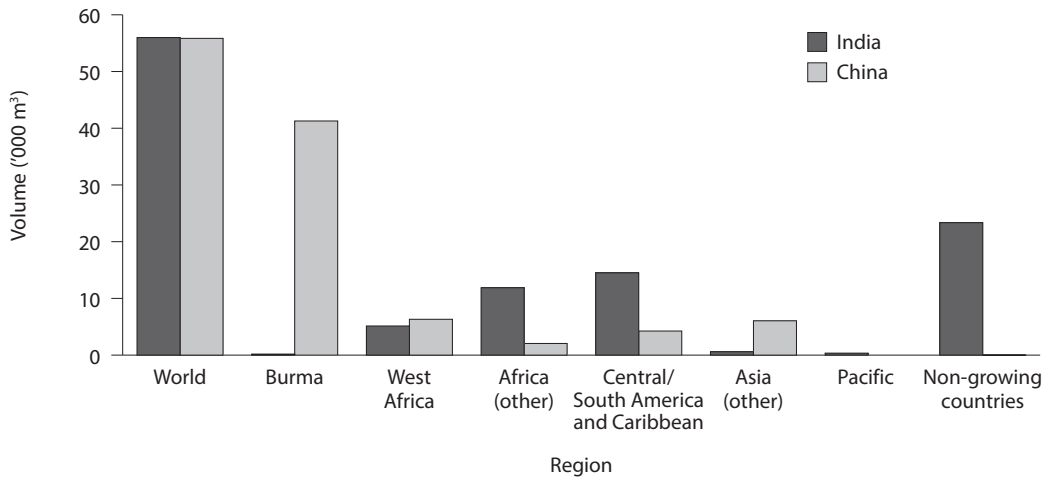


Figure 21. China and India imports of teak sawnwood (Commodity 44072910), 2012. Source: DGCIS/China Customs

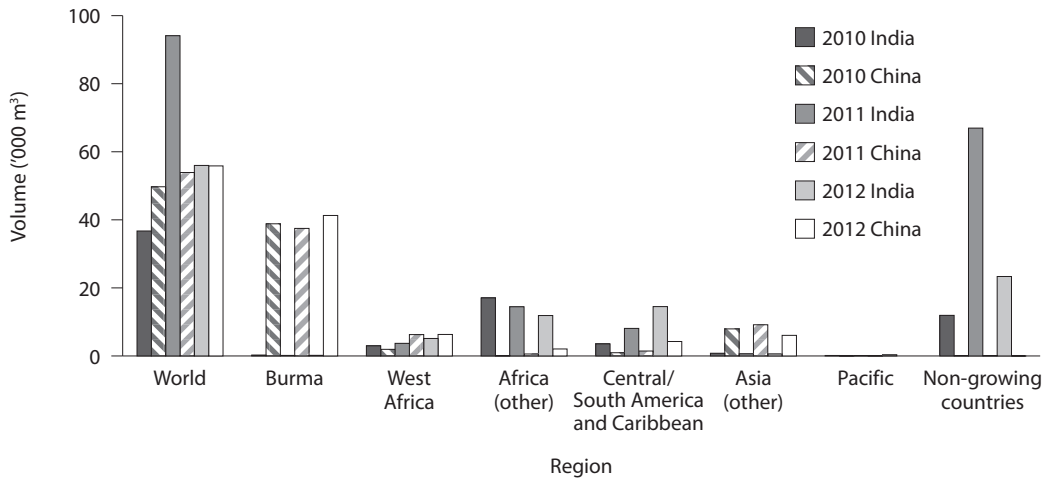


Figure 22. India and China imports, Commodity 44072910, teak sawnwood, 2010–12. Source: DGCIS/China Customs

Table 14. India and China: average unit values (US\$/m³) for imports, by region, of teak logs (HS Commodity 44034910), 2010–12

Partner region	2010		2011		2012	
	India	China	India	China	India	China
World	493	686	504	692	530	810
Burma	827	718	800	807	880	862
West Africa	392	569	394	642	398	721
Africa (other)	434	393	447	351	476	567
Central/South America and Caribbean	337	527	366	497	388	530
Asia (other)	268	532	370	483	321	575
Pacific	411	–	890	181	459	–
Non-growing countries	378	726	370	695	415	738

Table 15. India and China: average values (CIT US\$/m³), by regions of supply, for teak sawnwood (Commodity: 44072910), 2010–12

Partner Region	2010		2011		2010	
	India	China	India	China	India	China
World	364	839	299	836	381	872
Burma	1,977	925	3,822	931	1,292	954
West Africa	406	3,297	439	859	421	4,029
Africa (other)	403	983	444	624	456	4,642
Central/South America and Caribbean	393	5,895	489	626	483	12,817
Asia (Other)	536	6,783	430	618	455	6,683
Pacific	467	745	428	757	471	–
Non-growing countries	241	598	227	955	260	48

Vietnam

Demand driver: the furniture sector

Vietnam is now a major exporter of wood furniture, ranking sixth in the world and second in South-East Asia, with US\$4.67 billion of exports in 2012 (Binh 2013). Furniture making plays an important role in the local economies of Vietnam, particularly in the southeast of the country, and the sector employs over 300,000 people. Domestic consumption accounts for 10% of production, while the remaining 90% is exported. The export industry for wood furniture has increased steadily over the past 17 years (Figure 23).

A substantial proportion of Vietnamese furniture exports depends upon imported logs, lumber and wood panels, the value of which reached US\$1.5 billion in 2012 (Binh 2013) (Figure 24). Vietnam also uses logs and lumber from domestic acacia plantations (900,000 ha) to supply the furniture industries.

Neighbouring Lao People's Democratic Republic (PDR) was the principal source of logs imported into Vietnam in 2012, worth an estimated US\$285 million

(Figure 25). China also accounted for a significant proportion (US\$200 million) of the total US\$1.5 billion worth of logs, sawn timber and panels Vietnam imported to meet the needs of the furniture industry (Binh 2013). However, teak comprised a very small fraction (US\$12 million) of these imports.



Photo 5. A factory in Vietnam making furniture. Photo: Stephen Midgley

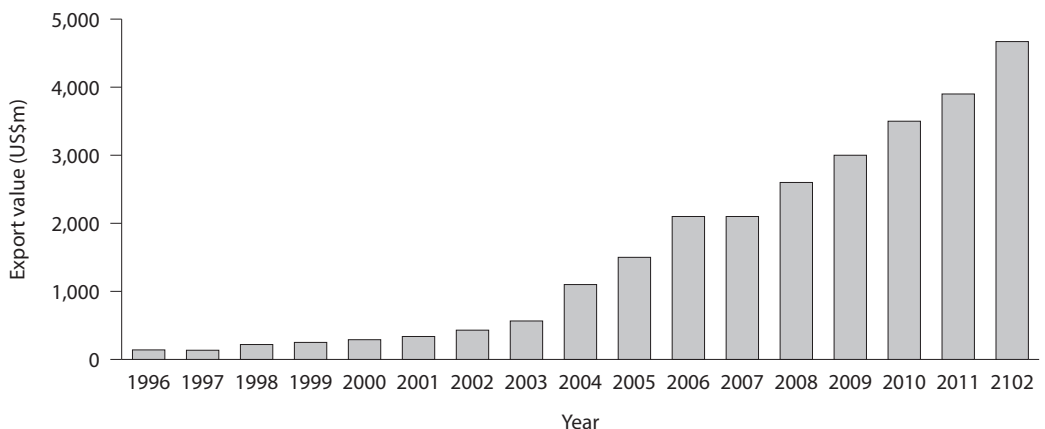


Figure 23. Value of Vietnamese exports of wood furniture, 1996–2012. Source: Salwood Asia Pacific

Because more than 67% of Vietnam’s furniture exports go to the USA, EU and Japan (Figure 26), all markets sensitive to the legality of sourced wood, the Vietnamese industry is now placing great importance on complying with the US Lacey Act, EUTR and legal requirements in other environmentally conscious societies (Binh 2013), including Australia. Discussions with the Vietnamese members of the World Wildlife Fund’s Global Forest Trade Network (GFTN) indicate that Vietnamese importers offer

prices roughly 20% higher for FSC-certified logs, and 10% more for controlled wood.

Approximately 15% of Vietnamese furniture exports go to China, where they are sold on Chinese domestic markets or re-exported. Several large Chinese furniture producers have relocated to Vietnam to take advantage of Vietnam’s favourable trade access to US markets, and to avoid increasing labour and other costs at Chinese manufacturing hubs.

Vietnamese imports of teak logs and sawn timber

In contrast to Vietnam’s wood imports that are generally growing, imports of teak logs and sawn timber are declining in both volume and value (Figures 27–29). Pressure for legal timber and a preference for certified timber on the part of Vietnam’s export industries may explain the significant reduction in imports from Burma and other sources. Many of the teak plantations in Central and South America have gained FSC status, which may explain their significant place in the Vietnamese market, but even imports from this quarter have declined markedly (Figure 30). Industry informants suggest that Vietnam’s client countries are driving the shift to certified wood, and the amount of certified teak worldwide is low.

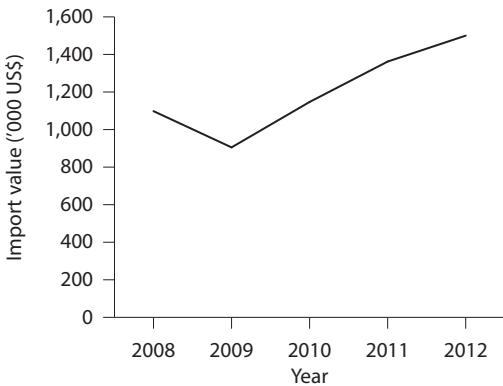


Figure 24. Vietnam’s imports of wood products, (US\$) 2008–12. Source: Binh (2013)

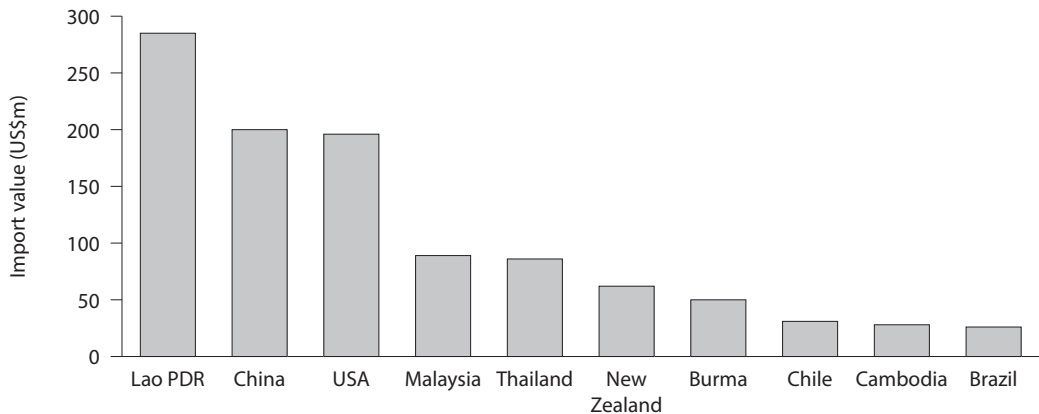


Figure 25. Sources and value of Vietnam’s wood imports. Source: Binh (2013)

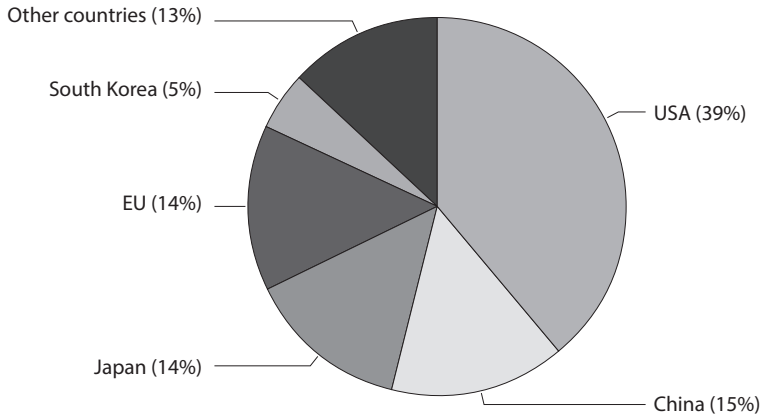


Figure 26. Vietnam's export markets (by value in US\$) for timber products and furniture, 2012. Source: Binh (2013)

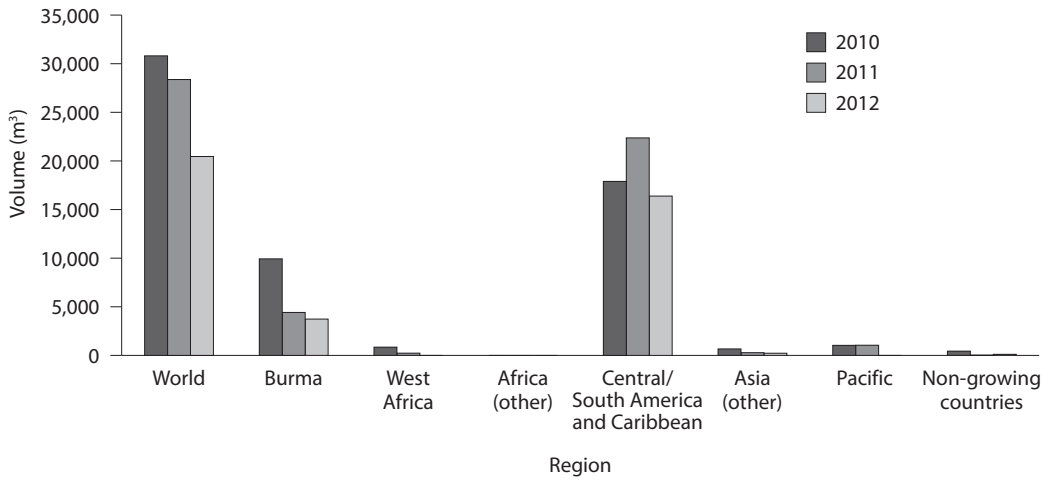


Figure 27. Vietnamese imports of round and squared logs, by region, 2010–12. Source: Appendix 4 (2013)

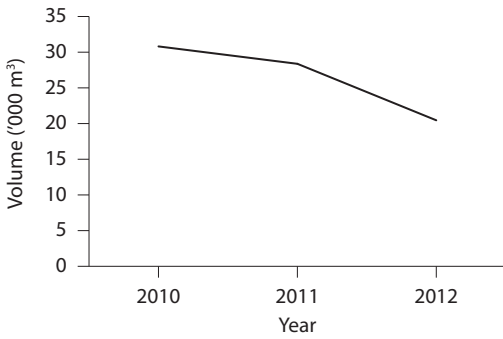


Figure 28. Volume of Vietnam's imports of teak from all sources, 2010–12. Source: Appendix 4

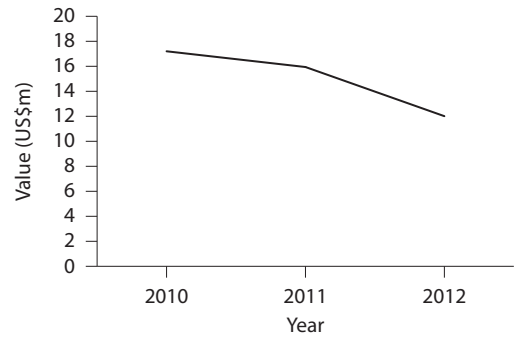


Figure 29. Value of Vietnam's imports of teak logs and sawn timber from all sources, 2010–12. Source: Appendix 3

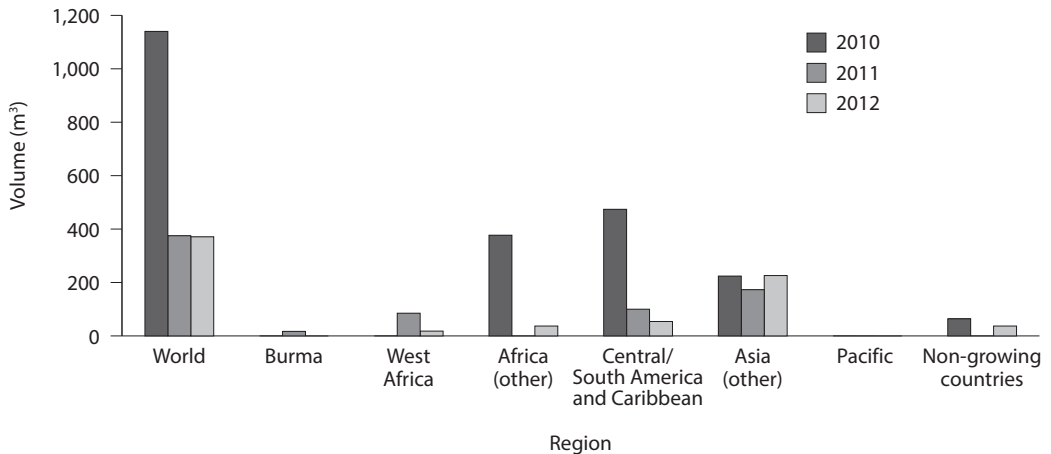


Figure 30. Trends in the volume of Vietnam's imports of sawn teak by country, 2010–12. Source: Appendix 4

Observations on the Vietnamese wood products sector

- Vietnam has developed a strong and modern wood furniture industry and **ranks sixth globally as a furniture exporter**, a trade worth over \$4.6 billion in 2012.
- The industry is **heavily dependent on log and sawn-wood imports**, which reached US\$1.5 billion in 2012.
- More than 50% of Vietnam's exports of wood furniture are directed to the markets of **Europe and North America**, which are sensitive to the legal status of sourced wood and certification.
- Vietnamese **teak imports have decreased markedly** due to the need to use legally sourced and/or certified wood. The trade in teak from Burma has almost ceased.
- Cheaper, smaller teak is in **competition with plantation-grown acacia wood** as a utility wood.
- Vietnam would be an **attractive market for legally verified** or certified teak logs and timber.

Thailand

Diverse wood products sector rooted in culture

Thailand is unusual in that it is a grower, an exporter and an importer of teak. Historically, the ‘king of woods’ has played a central role in Thai culture as a result of its favoured status as a building material for homes and palaces, as well as many of the fixtures, finishes and furnishings that make this architecture, and the way of life it traditionally housed, distinctly Thai. Elaborately carved wooden embellishments and decorative panels with Buddhist symbols and themes, as well as depictions of Thai life and historical events, have long been an artistic specialty, and remain a culturally important segment of Thai forest industries.

In addition to these cultural specialties, contemporary Thailand exports a diverse range of manufactured teak products, including joinery, solid wood furniture, flooring, veneers, boat and yacht decking, teak-faced plywood (marine ply) and other items at the high end of the price scale. Domestic timber, which has smaller dimensions, provides material for flooring. Larger products and those that must be of high quality (marine ply, boat decking, solid wood furniture) tend to be manufactured from imported timber.

Traditionally, the forest sector (not just teak) has been an important component of the Thai economy. Today forest-based industries account for a small but still culturally important part of total Thai trade. In 2010, imports of forest products amounted to almost 100 billion baht in 2010 (US\$3.3 billion), or 2% of the total value of all Thai imports. Exports of forest products increased to over 165 billion baht (US\$5.5 billion), or 2.7% of the total value of all Thai exports (Heuch et al. 2012).³ The great diversity of the Thai forest products sector is shown by the number and classification of factories licensed to process and/or

sell wood: of 17,724 factories licensed in 2010, only 828 (5%) were classified as sawmills (Heuch et al. 2012).

As in the other three major client countries for planted teak, furniture comprises an important part of Thailand’s export trade. The Centre for Industrial Studies ranks the country 27th among furniture exporters worldwide (Tracogna et al. 2012), and in 2011 the value of Thai furniture exports was an estimated 16 billion baht (US\$550 million) (Heuch et al. 2012). Wood furniture exports account for around 45% of the total sector output, but 70% of furniture exports (USDA 2013). The domestic market for Thai furniture is also extremely healthy, and in 2012 was valued at US\$2 billion 2012 (USDA 2013).

From 1945 to 1975 logging and conversion to agriculture resulted in a reduction of Thailand’s forest cover from 61% to 34% of total land area. In the ensuing decade, the proportion declined further still. This led to a ban on logging in 1989 and subsequent policy measures to reforest the country. Currently about 33% of the total land area of Thailand is forested (16.8 Mha), of which about 96% is natural forest. However, the current proportion of forest to total land area is far below the government’s target level of 40% forest cover (25% for conservation and 15% for economic forest). Several policy initiatives and incentive programs have been adopted to encourage tree planting, as detailed in the next section. Only a fraction of this planting is teak, however. The largest source of domestic hardwood in Thailand is rubberwood, of which 5–6 Mm³ are harvested annually, mainly from plantations (USDA 2013). A significant proportion of this harvest (2.8 Mm³ of sawn timber in 2010) is exported, much of it to China.

Native and planted teak in Thailand

The native ‘teak region’ or ‘teak bearing area’ of Thailand, which lies in the north and west of the country, has been estimated to be 2.3 Mha (Mahaphol

³ Discrepancies in available volumes and values make detailed analysis and reconciliation difficult.

1954). Some of this area is now protected forest. Thailand's first teak plantations were established in 1906 (Pianhanuruk 2008), and the country now has a planted teak resource of an estimated 836,000 ha (RFD 2009). This estate is controlled and managed by several different classes of stakeholder: 100,000 ha by the government-owned Forest Industry Organization (FIO) and the Thai Plywood Company; over 100,000 ha by concessionaires and private landholders; and the remainder by the Royal Forest Department. Detailed data on the land under management and the actual area of plantations vary between data sources. Many plantations are smallholder owned or informal line plantings, and are not included in formal forest inventory data. Plantations of teak, especially those managed by FIO, are primarily in the north of the country.

Following passage of the Commercial Forest Plantation Act 1992, several reforestation projects were initiated. From 1994–2002, one program provided subsidies of \$780 over a 5-year establishment period to encourage landowners and local farmers to establish plantations on their own land. Another program is the Farmer Debt Swap for Forest Plantation Project (2005–07), implemented by the Ministry of Natural Resources and Environment (MNRE) in conjunction with the Bank for Agriculture and Agricultural Cooperatives. This project has reportedly helped approximately 300,000 farmers reforest about 3,200 km² in exchange for reducing their debts by about 7.1 billion baht (about US\$236 million) (Eastin 2011). Thailand now has substantial areas of planted teak with some 2.9 Mha of rubber (USDA 2013), 826,000 ha of teak (RFD 2009), and 500,000 ha of eucalypts (GIT Forestry Consulting 2009).

Teak plantations and wood harvesting are regulated in a number of ways to segregate plantation-grown teak from the native resource. Teak plantations are required to register with the local office of the RFD or its equivalent in the Provincial Ministry office. Permits from the RFD are required to fell and transport plantation timber (Heuch et al. 2012).

Thailand very likely cannot expand teak wood production from domestic sources in the short to medium term (Pianhanuruk 2008). The existing resource of mature plantations is fully committed, and the bulk of the teak plantings are immature. Government policies designed to expand forest cover in Thailand mean that the plantation resources of teak controlled by the government are unlikely to be

harvested. Demand will have to be met via imports, if at all.

Thailand's trade in teak

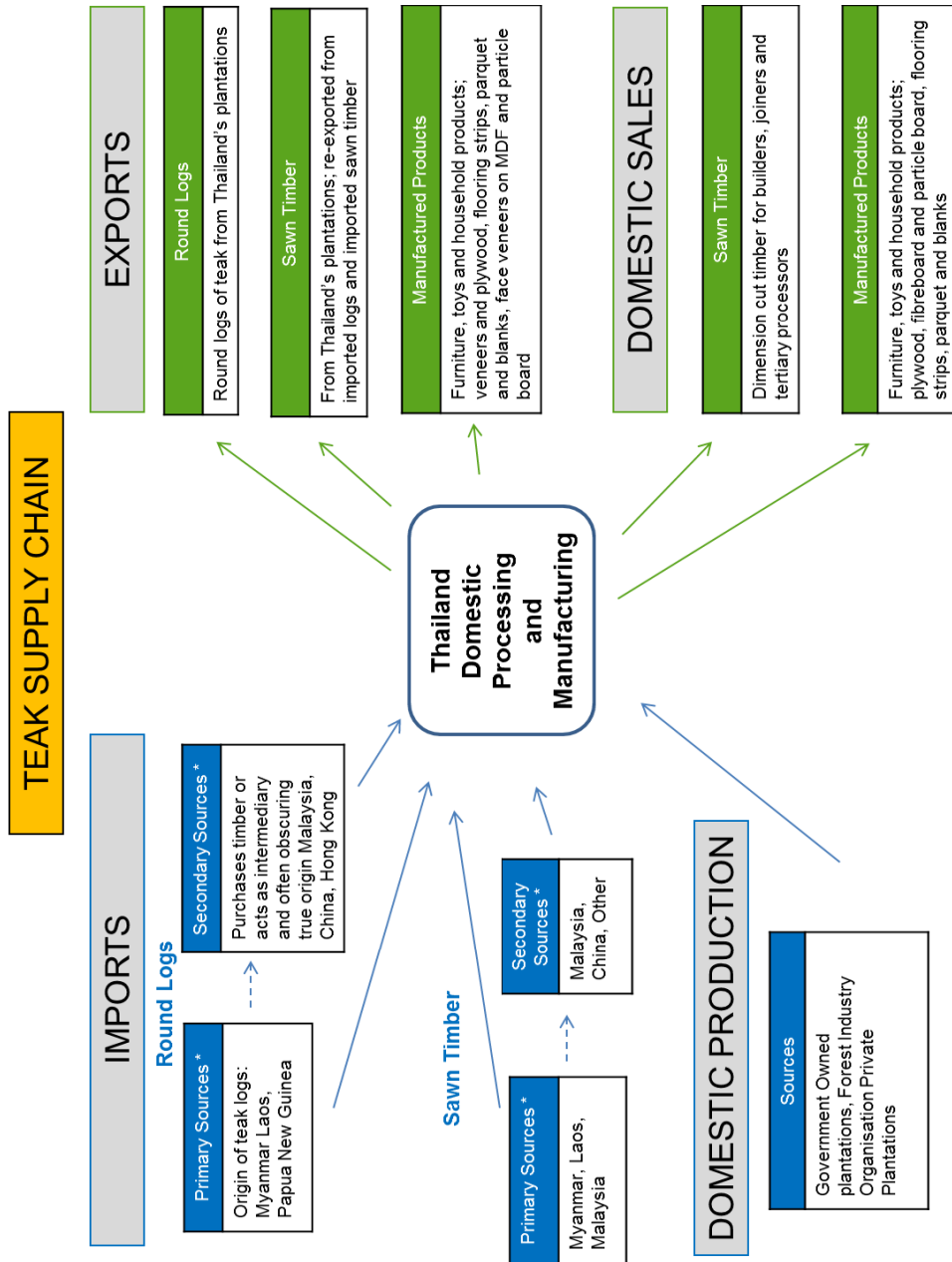
Thai imports of round and squared teak logs and teak sawnwood exceeded 67,000 m³ in 2012, and were valued at over US\$31 million (see Figure 32). In the same year exports of high-quality logs and large cants (squared logs) and sawnwood (excluding furniture) exceeded 5,000 m³ and were valued at over US\$12 million (see Figure 36). Heuch et al. (2012) developed a model supply chain to demonstrate the dynamics of teak wood supply in Thailand (Figure 31).

Generally, teak in Thailand is used for high-value products. Imported teak is usually of larger dimensions and of higher quality than domestically grown plantation teak, and so is used for high-value products and products involving solid wood construction, such as furniture, flooring strips and parquet blocks. Teak logs are also used to produce veneer, and teak veneers are used to face plywood, chipboard, particle board, MDF and block board. Imported teak may be imported as round logs, squared logs, sawn timber, semi-processed or semi-finished.

Thai imports of teak logs and sawn timber

Thailand's imports of teak round and squared logs rely principally on supply from neighbouring Burma, which supplied over 97% (27,162 m³) of Thai teak imports in 2012. (Table 16 and Figure 32.) Although Lao PDR and Malaysia also sell teak to Thailand, these amounts are relatively small (2% or 595 m³), but significant discrepancies in volumes and values can make detailed analysis and reconciliation challenging. For example, informal information from traders in Lao PDR suggests that current figures are serious underestimates.

The value of Thailand's imports of round and squared logs has varied from US\$19 million to US\$23 million over the past 3 years (Figure 33). The higher unit value from Burma reflects the large size and higher quality of logs from natural forests in that country. Analysis of Thailand's teak imports indicates a significant increase in volumes from Burma over the past 3 years (Figure 34), reaching US\$8 million in 2012 (Figure 35).



*Primary and Secondary sources extracted from RFD Forestry Statistics data 2010

Figure 31. Dynamics of the Thai teak wood supply chain, 2012. Source: Heuch et al. (2012)

Proposed changes to timber export policies in Burma will threaten this link in the supply chain of Thai teak manufacturing. Thailand's neighbours, Lao PDR and Malaysia, remain small suppliers. Data from Lao PDR is problematic as much of the trade in plantation teak logs (both round and squared) crosses the border informally.

Although sawnwood imports have increased over recent years, almost all of this has been sourced in Burma and will be similarly affected by a new forest protection regime. Industry sources in Thailand have expressed a preference for rough-sawn, kiln-dried timber. Green sawn timber can become mouldy and stained during transport, causing quality degradation. Kiln-dried lumber at 8–10% moisture content is preferred. Thai processors also have a preference for rough-sawn lumber, as this avoids the 5% import tariff on S4S (finished four sides) timber.

Thai exports of teak logs and sawnwood (excluding furniture)

In 1991 export of teak logs and lumber initially was prohibited, then subsequently restricted by FIO. Processed products or veneers were exempt from these restrictions (Pianhanuruk 2008). Almost all of the teak logs and sawn-wood products (excluding furniture) exported by Thailand are of the highest quality. India appears to be the dominant market for high-grade logs and wood slabs destined for sliced veneers and other premium products (Figure 36).

FIO is the only organisation authorised to make such exports, and it is a strictly controlled market.

Thai exports of sawn wood vary from small cheap boards to top-quality marine decking commanding prices of over \$8,000/m³. Europe and the USA are the principal importers of these timbers (Table 17). The global financial crisis (2007–09) had a significant impact on Thai exports of high-quality teak (Figure 37), as markets for luxury products such as marine decking for yachts collapsed in Europe and the USA. It has taken several years for business confidence to recover.

Thai wood product exports and the issue of compliance

To comply with legal requirements in client countries, Thailand relies upon a certificate of origin for the logs and sawn wood it imports. The certificate is issued by an organisation in the country from which the wood has been dispatched. Although the document certifies that the wood making up a particular shipment has come from a particular country, it does not guarantee that this reflects where the wood was originally harvested. Certificates of origin do not make reference to, much less specify, the past chain of custody, and it is widely acknowledged that timber may have been routed through a number of different locations before it physically leaves the country, at which point it acquires the certificate of origin (Heuch et al. 2012).

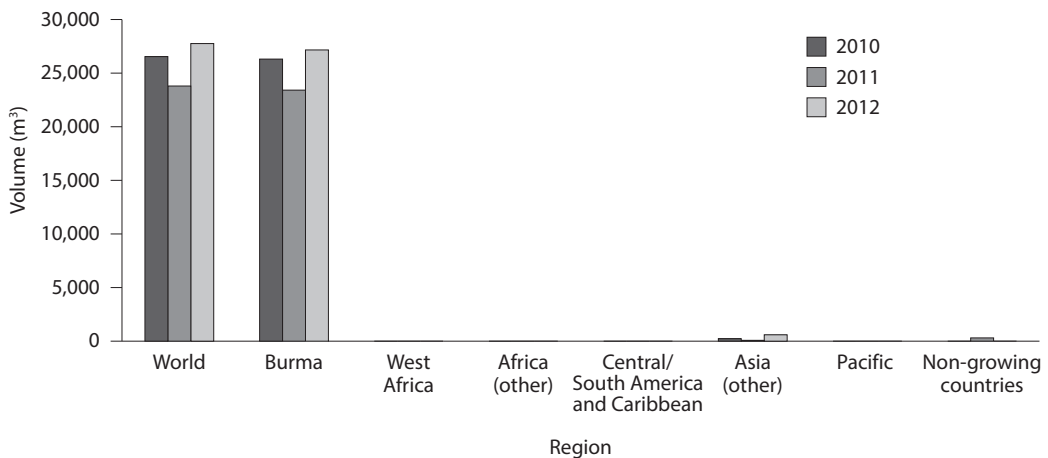


Figure 32. Volume of Thai imports of round and squared teak logs, 2010–12. Source: Appendix 4

Table 16. Sources of supply of teak round logs and squared logs, 2010–12

Supplying country	2010			2011			2012		
	Volume (m ³)	Value (US\$)	Av. value (US\$/m ³)	Volume (m ³)	Value (US\$)	Av. value (US\$/m ³)	Volume (m ³)	Value (US\$)	Av. value (US\$/m ³)
World	26,541	20,499,834	772	23,798	19,098,381	803	27,757	23,302,376	840
Burma	26,309	20,347,604	773	23,414	19,036,585	813	27,162	23,128,478	852
West Africa	0	0	0	0	0	0	0	0	0
Africa (other)	0	0	0	0	0	0	0	0	0
Central/South America and Caribbean	0	0	0	0	0	0	0	0	0
Asia (other)	232	152,230	656	78	21,207	272	595	173,898	292
Pacific	0	0	0	0	0	0	0	0	0
Non-growing countries	0	0	0	306	40,588	133	0	0	0

Source: Appendix 4

Table 17. Thai exports of teak sawnwood, scantlings, boards and decking, 2007–12

Client country/region	2007			2008			2009		
	Value (US\$)	Volume (m ³)	Unit value (US\$/m ³)	Value (US\$)	Volume (m ³)	Unit value (US\$/m ³)	Value (US\$)	Volume (m ³)	Unit value (US\$/m ³)
World	5,721,525	181,735	31	288,159	101	2,853	227,905	86	2,650
Europe	3,366,020	125,769	27	144,286	36	4,008	227,905	86	2,650
USA	2,355,505	55,966	42	0	0	0	0	0	0
India	0	0	0	0	0	0	0	0	0
Others	0	0	0	143,873	65	2,213	0	0	0
Client country/region	2010			2011			2012		
	Value (US\$)	Volume (m ³)	Unit value (US\$/m ³)	Value (US\$)	Volume (m ³)	Unit value (US\$/m ³)	Value (US\$)	Volume (m ³)	Unit value (US\$/m ³)
World	480,891	37,208	13	292,095	93	3,141	3,351,647	612	5,477
Europe	277,801	90	3,087	292,074	91	3,210	799,214	94	8,502
USA	0	0	0	0	0	0	2,537,303	489	5,189
India	203,091	37,118	5	0	0	0	0	0	0
Others	0	0	0	20	2	10	15,129	29	522

Source: Thai Customs (2013) (Caution is needed in interpreting data from Thai Customs databases, especially regarding exports. High-value logs and products can appear to have very low unit values, and data from neighbouring countries do not tally with industry reports.)

The Thai Government implemented a complex suite of regulations designed to differentiate between wood from natural forests, wood from domestic plantations and wood from imports in order to enable Thai exporters smoother access to lucrative markets in countries with legal mechanisms to protect natural forests. Pianhanuruk (2008) observed that the Thai framework had the perverse effect of making the industry not more but less competitive, primarily due to the added cost of dealing with domestic regulations, and was widely perceived as government seeking to control, rather than facilitate, the export industry.

As stated, about 70% of Thailand’s wood furniture production is exported (USDA 2013). The primary markets for these exports are the USA and Japan (Figure 38). Nine European countries also are among the top 20 markets for Thai furniture (Heuch et al. 2012). The demand for certification to ensure compliance with legal forest protection regimes is strong and growing in these markets. An estimated 300 factories are involved in the export of furniture from Thailand, and a substantial proportion are keen to ensure the legality of the wood they use to maintain access to these high-value markets.

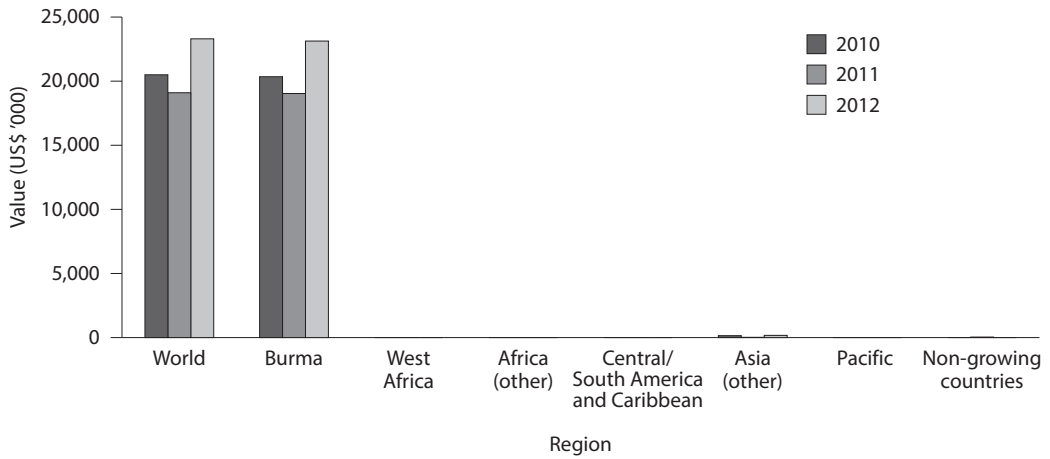


Figure 33. Value of Thai imports of round and squared logs, 2010–12. Source: Appendix 4

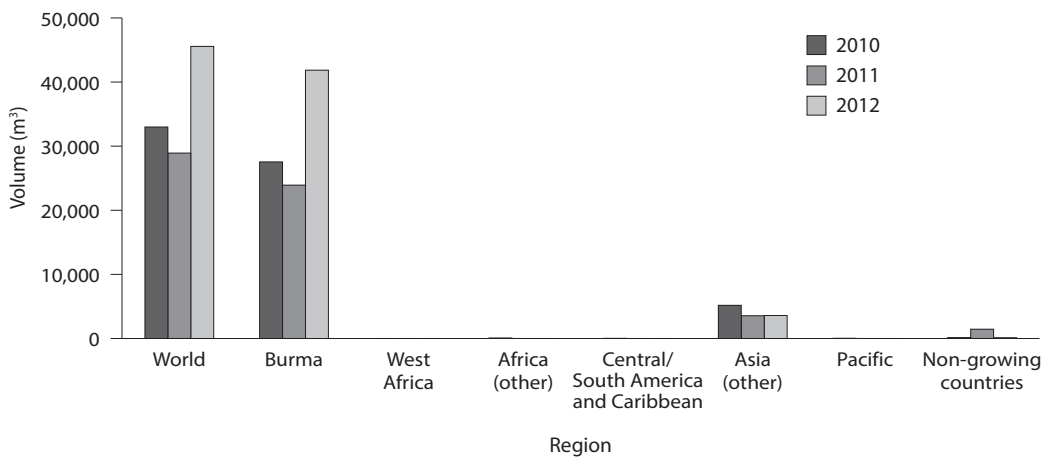


Figure 34. Volume of Thai imports of teak sawn wood, scantlings and boards, 2010–12. Source: Appendix 4

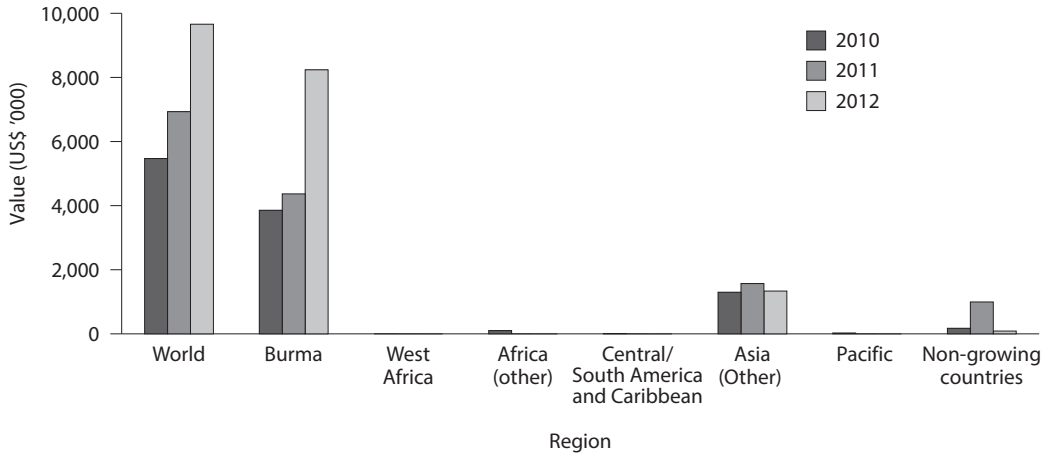


Figure 35. Value of Thai imports of sawn wood, scantlings and boards, 2010–12. Source: Appendix 4

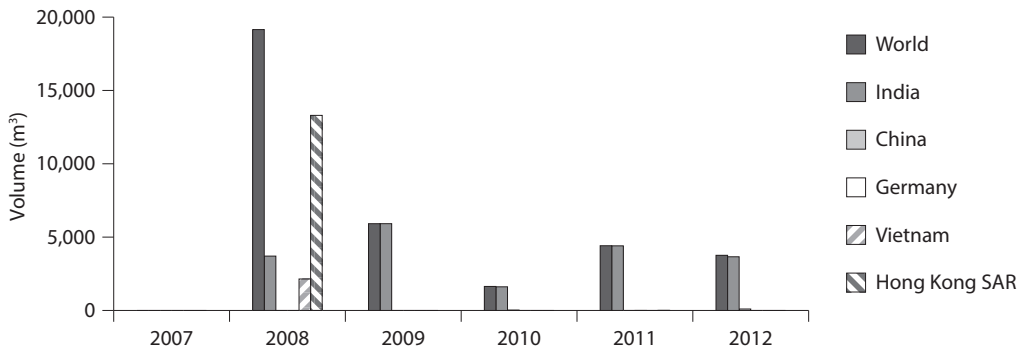


Figure 36. Volume of Thai exports of high-quality logs and large squared logs, 2007–12. Source: Appendix 4

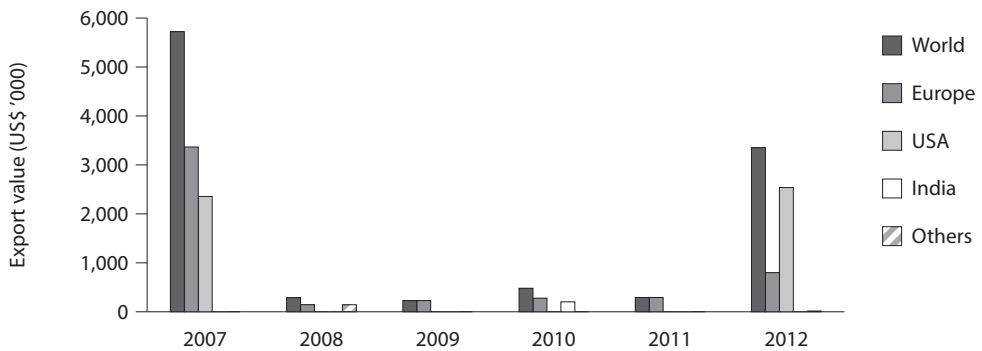


Figure 37. Value of Thai exports of teak sawnwood, scantling, boards and decking, 2007–12. Source: Appendix 4

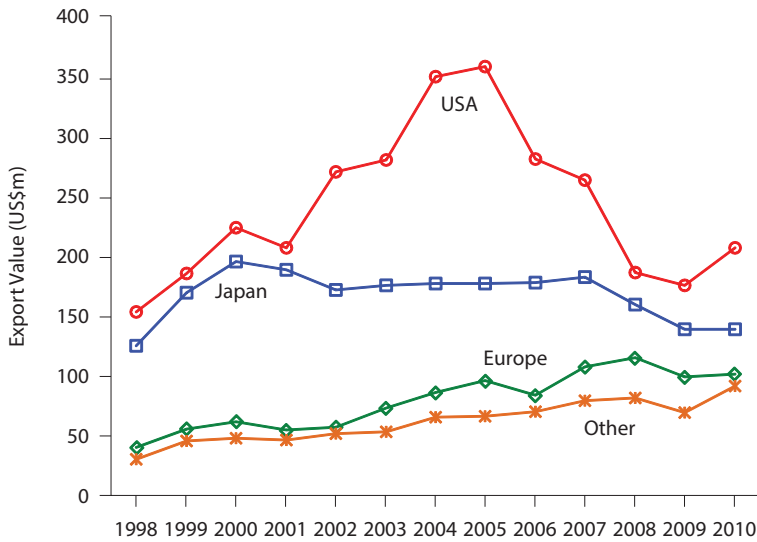
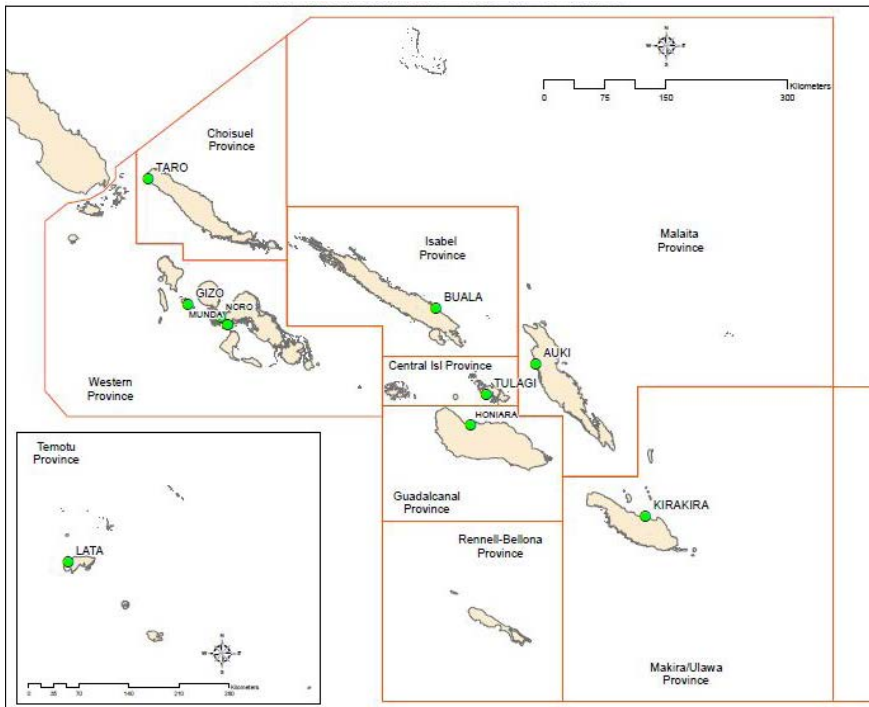


Figure 38. Value of Thai furniture exports by destination, 1998–2010. Source: Eastin 2011

Observations on the Thai wood products sector

- The Thai wood products industry has a **strong tradition** of working with teak.
- Thailand is both an **importer and exporter** of teak sawn wood.
- Thailand has both **natural and plantation** teak, but harvests from native forests occur only in exceptional circumstances.
- Cheaper, small teak, if used as utility wood, competes with plantation-grown **rubberwood**.
- The primary source of imported teak is **Burma**, so Thai imports are likely to be significantly affected by the changes to Burma’s forest reforms and new log export rules.
- Over 50% of Thailand’s exports of wood furniture are directed to the markets of **Europe, Japan and North America**, markets that increasingly demand certification of the chain of custody of teak.

Teak in Solomon Islands



Map 1. Solomon Islands urban centres

The context of developing a teak industry

Tectona grandis is not native to Solomon Islands, a widely dispersed collection of islands east of Papua New Guinea administratively comprised of nine provinces and the capital of Honiara, but the tropical rainforest ecosystem that dominates the geography is suitable for growing this highly prized hardwood. Teak was first planted on a large scale in Solomon

Islands in 1984, a few years after the former British Protectorate was made fully independent in 1976. This technical report arose as part of continuing Australian Government efforts to stabilise and assist the development of a neighbouring country still struggling to become a coherent society and political entity following years of turmoil from civil war, violence and natural disasters. These disasters included earthquakes, tsunamis and tropical cyclones (which continue to endanger life and public and private

resources). The leading export activity of Solomon Islands is the production of rough wood (Figure 39).

The Pacific Agribusiness Research for Development Initiative (PARDI) funded by the Australian Centre for International Agricultural Research seeks to develop sustainable livelihoods in the South Pacific forestry, fisheries and crop-based sectors through supply-chain and market-driven research to identify constraints impeding local economic development. The aim in Solomon Islands was to research the conditions to develop a market for a potentially high-value resource—planted teak—for which global demand is greater than global capacity to supply without further deterioration of critical worldwide forest resources.

Development efforts in Solomon Islands, of any kind, face a similar set of challenges. Solomon Islanders are a multi-ethnic, multilingual population estimated at 515,870 in 2009. According to Solomon

Islands National Statistics Office (SINSO), a considerable majority of them are engaged in subsistence agriculture and hunting (Table 18). The next dominant economic activity, and the main generator of exports, is forestry and logging (Figure 39). Per capita GDP has been growing slowly but steadily for the past 3 years, and was estimated at US\$1,769 in 2012 (IMF 2012). Education is not compulsory, only 60% of school-age children have access to primary education and literacy is low. Knowledge of the outside world, and how it works, is also relatively limited. The leading source of electronic media is radio (Solomon Islands National Broadcasting Corporation). Getting television signals, much less more modern forms of electronic communication, is difficult in most places. Finally, transport infrastructure throughout the country generally needs substantial improvement, even to meet the needs of tourism activity.



Figure 39. Treemap of Solomon Islands' exports, 2012 (The Observatory of Economic Complexity, Harvard Center for International Development-MIT Media Lab)

Solomon Islands teak estate

There are now an estimated 4,000–6,000 ha of planted teak across the Islands (Midgley and Laity 2009), much of it concentrated in the Western province. There is little precise information available on the extent of the teak resource in plantations and smallholdings. Kolombangara Forest Products Limited (KFPL) manages 783 ha of commercial plantation teak stands, and plans to increase this to 3,000 ha (Johns 2012). Government plantings have also been established in the Shortlands (248 ha) and Viru (500 ha), the latter managed by Eagon Pacific

Plantations Ltd (Midgley and Laity 2009). Much of this teak resource was established during 1980–89.

In recent years, teak has become the primary species planted by farmers and communities, often in small plots among crops and natural forest, an activity promoted by government extension services. Since 2003, an estimated 3,500 ha of teak has been established in several thousand smallholdings of an average 0.5 ha in size. Smallholders established about 2,000 ha of planted teak in 2003 and 1,400 ha in subsequent years (URS 2003). The progress in establishing a resource of planted teak in Solomon Islands is tracked in Table 19.

Table 18. Solomon Islands GDP by economic activity at 2009 prices (SIS000,000)

Activity	2003 ^a	2004 ^a	2005 ^b	2006 ^b
Agriculture, fisheries & forestry	974.8	1,034.1	1,053.1	1,217.4
Agriculture and hunting	554.7	547.4	575.5	655.9
Forestry and logging	242.3	280.7	306.1	353.2
Fishing	177.8	206.0	171.5	208.4
Industry	263.3	259.9	247.8	230.6
Mining and quarrying	4.8	6.7	2.1	1.7
Manufacturing	156.6	176.2	173.5	165.5
Electricity and water	43.5	45.5	49.2	44.6
Construction	58.4	31.4	22.9	18.8
Services	1,203.6	1,452.6	1,755.6	1,966.7
Trade	226.1	317.4	344.8	402.7
Hotels and restaurants	29.9	57.2	68.6	75.2
Transport and storage	161.6	191.8	226.7	246.3
Communications	43.5	62.3	73.3	75.9
Financial intermediation	24.1	36.6	50.8	64.2
Insurance services	4.8	11.7	16.3	20.6
Real estate and renting	97.4	105.8	124.4	128.3
Owner-occupied dwellings	215.4	229.8	268.3	279.5
Business services	16.6	17.1	19.5	22.6
Public administration and defense	160.2	165.4	222.9	238.1
Education	86.2	102.2	135.0	157.6
Health	29.6	36.1	47.6	57.2
Other services	108.3	119.2	157.5	198.4
Taxes on products less subsidies	71.3	82.4	84.5	88.6
Less imputed bank charges	-15.6	-21.4	-24.2	-28.1
GDP at market prices	2,497.5	2,807.6	3,116.7	3,475.3

Source: SINSO (2014)

^a revised estimates

^b preliminary estimates: Provisional estimates are derived using proxy price deflators based on CPI and HFCE price indexes or volume movement indicators developed during the previous mission. Further work is required to identify more appropriate volume indicators and/or develop more appropriate price deflators.

Table 19. Timeline for teak development in Solomon Islands

Timeline	Major activity	Market implications
1960–89	Commonwealth Development Cooperation with Solomon Islands Government (SIG) brings teak from Burma for planting.	Established first large-scale teak plantations, mainly in Kolombangara, Viru and Shortlands, with some in Guadalcanal.
1975–92	SIG teak breeding program established, including extension and promotions.	Quality of genetics assessed, and foundations established for high-quality genetic material for plantations.
1999	KFPL obtains FSC certification.	Global recognition for Solomon Island plantations.
2001–11	KFPL sales of FSC certified logs sold in break bulk loads to Vietnam.	Teak quality acceptable for Asian markets.
2001–06	Solomon Islands Forest Management Project (SIFMP) promotes smallholder teak plantations.	Teak estate expanded with scattered resources. High expectations of profitability by land owners.
2003	SIFMP 2 facilitates the sale of some mature (25yr+) teak to India.	Clear understanding of the export process for smallholders.
2006–07	SIFMP assesses the suitability of Lucas mills and potential production of carved handicraft products from teak thinnings.	Processing/drying of timber required improvement.
2010	KFPL facilitates limited teak sales from local Kolombangara villages.	Vietnam client required FSC logs at this time and offered lower prices for non-certified logs.
2011	Kohinoor Traders from India buy and export six containers from Guadalcanal.	Challenges for teak growers, government and Indian buyers.
2011–12	Secretariat of the Pacific Community (SPC) supports second trial of four containers of young teak thinnings logs to India.	Price was insufficient for landowners and traders to be interested. SPC and Kohinoor Traders shared stakeholder experiences.
2012	Lagoon Eco Timber sells sawn teak timber to Australia.	Successful squaring of logs, export with locally available technology.

Source: Laity and Crawford (2012)



Photo 6. Solomon Islands teak logs being assembled for a break bulk to Vietnam.
Photo: Stephen Midgley

Silvicultural management of the smallholder teak estate has been minimal, and much remains unthinned. Markets for small thinnings will encourage commercial thinning regimes offering longer term benefit to the plantations. Based upon an assumed growth rate of 12 m³/ha across a national teak estate of an estimated 6,000 ha, it is conceivable that Solomon Islands has the potential to produce some 72,000 m³ of teak wood annually.

It has been reported that most merchantable teak has been harvested from the commercial plantations, and in the short-to-medium term the smallholder estate is likely to be the main source of teak from Solomon Islands. In a strong demonstration of confidence in teak, KFPL added 440 ha to its teak estate in 2010 and 2011. Eagon is reported to have adopted a similar approach with teak comprising a significant proportion of their plantation program. Most smallholder plantings are now around 10 years old, and may soon be suitable for export if non-trivial logistical challenges can be resolved. Industry sources indicate that about 1,000 m³ has been sold so far from smallholders in Western province.

Value chains for Solomon Islands teak exports

Supply chains and value chains for logs and sawn timber from plantation teak were recently researched (Johns 2012), and a draft value chain map (Figure 40) was developed that takes into consideration new and proposed sawmills at KFPL and near the port of Noro, which will offer opportunities for processing and export of squared teak logs and rough-sawn timber.

Complementary work on developing the supply chain and training smallholders on FSC certification was completed in October 2012 (Laity 2013). If Solomon Islands growers and stakeholders hope to penetrate markets in the four major client countries for teak, they must face the issue of legal compliance that dominates the most lucrative markets into which these client countries export. The Value Added Timber Association (VATA) currently manages an FSC chain-of-custody group, which includes certification for teak.

Solomon Islands teak growers have already had some experience of the importance of certification. In 2012 KFPL facilitated a break-bulk shipment of logs to Vietnam. Smallholders with non-certified logs were offered the opportunity to participate. The Vietnamese company buying the logs offered prices for the non-certified teak logs 30% below those for certified

logs of similar quality, which confused and angered many of smallholders who contributed these logs.

At the FSC training meetings, a prototype value chain was presented, which growers and stakeholders used as the basis to consult with processors and exporters, and to consider identified challenges (Laity and Crawford 2012). Among the major issues identified were transport and logistics, access to capital and the challenge of consolidating logs from disparate sources into commercial consignments (Figure 41).

In response to specific opportunities presented by potential sales to Indian markets in 2012, stakeholders (growers and service providers) were asked to provide their perceptions and expectations surrounding commercial sales, using the value chain as the basis for discussion (Laity 2013). The exercise identified conflicting expectations among the stakeholders (Figure 42), some of them quite unrealistic. Some of the challenging expectations turned on the role of traders in the value chain and how log volume measurements are made. Growers wanted to be paid for their logs at harvest, and not wait until the trader had been paid. The Indian standard form of measurement (Hoppus) was poorly understood, and this lack of understanding led to unjustified accusations of opaque business practices. The consultation also demonstrated the critical need for donors supporting teak development in Solomon Islands to be well-acquainted with global teak markets, offer realistic market advice and to follow-up and remain engaged with the export industry as it evolves.

Opportunities for improvement in Solomon Islands teak value chain

Stakeholders at the FSC training meetings also made a number of recommendations.

Government support. Given the immaturity of the teak trading sector, some level of ongoing government support and guidance for plantation expansion and management, including subsidies for planting and maintenance, were viewed as desirable. The government could also help the infant industry by implementing local policies for domestic consumption, such as sourcing plantation and certified wood products for building hospitals and schools, which would ensure that teak plantation management and marketing is directly supported within government. The Solomon Islands Government may also wish to continue support to VATA through establishment of teak-related subsidies.

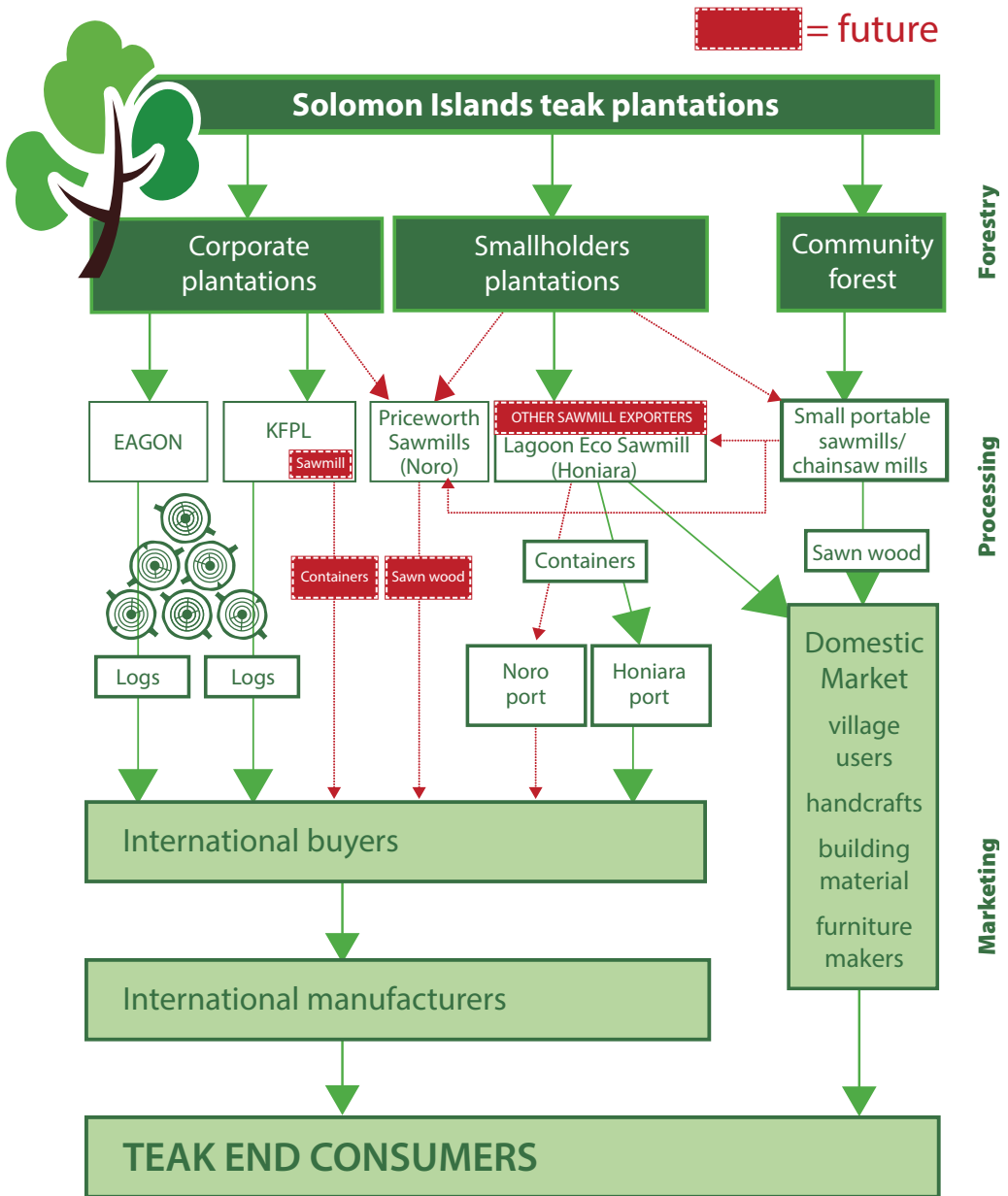


Figure 40. Solomon Islands teak plantation and industry value chain. Source: Johns (2012)

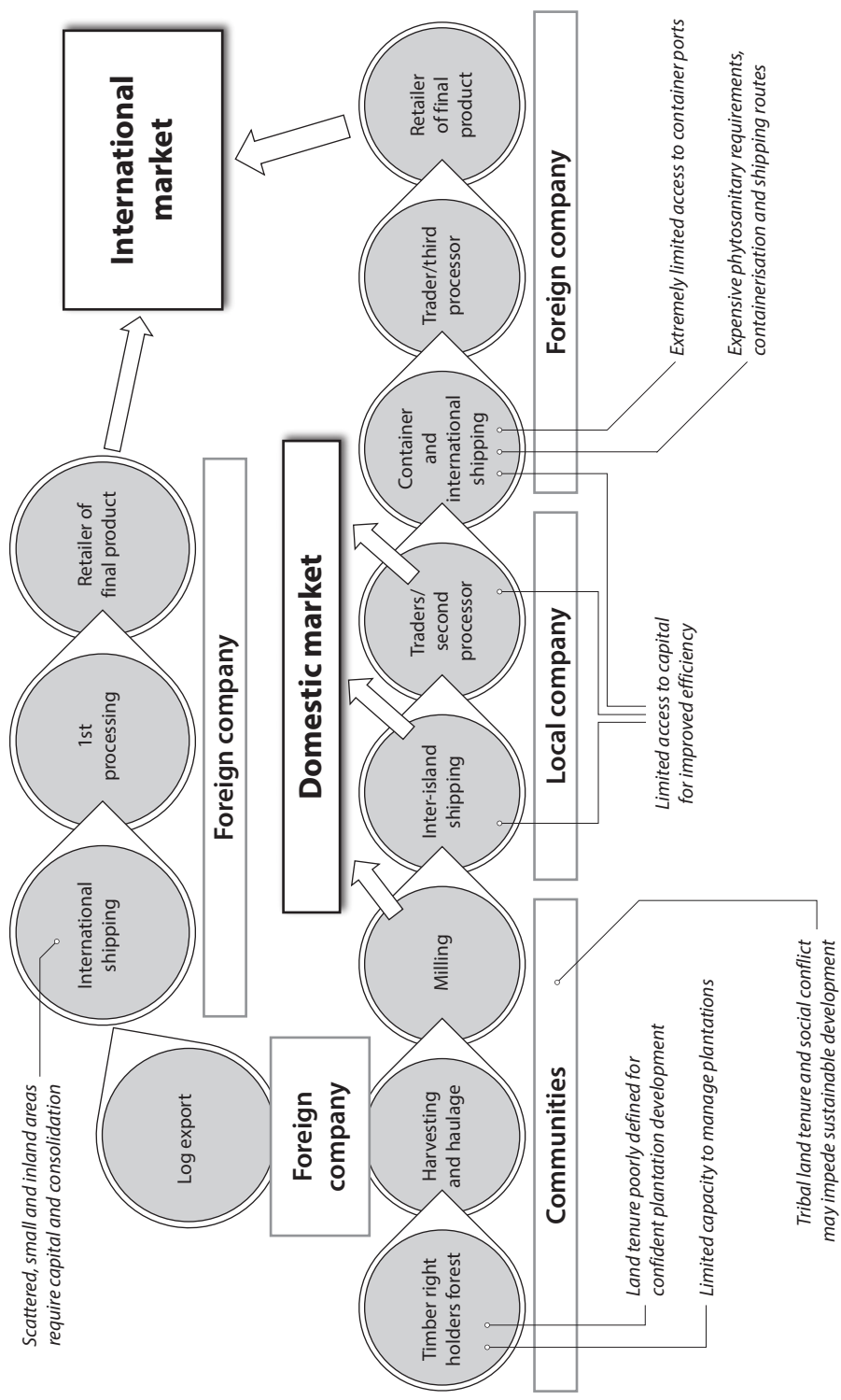


Figure 41. Challenges identified in the Solomon Islands value chain for sawn teak, 2011. Source: Laity and Crawford (2012)

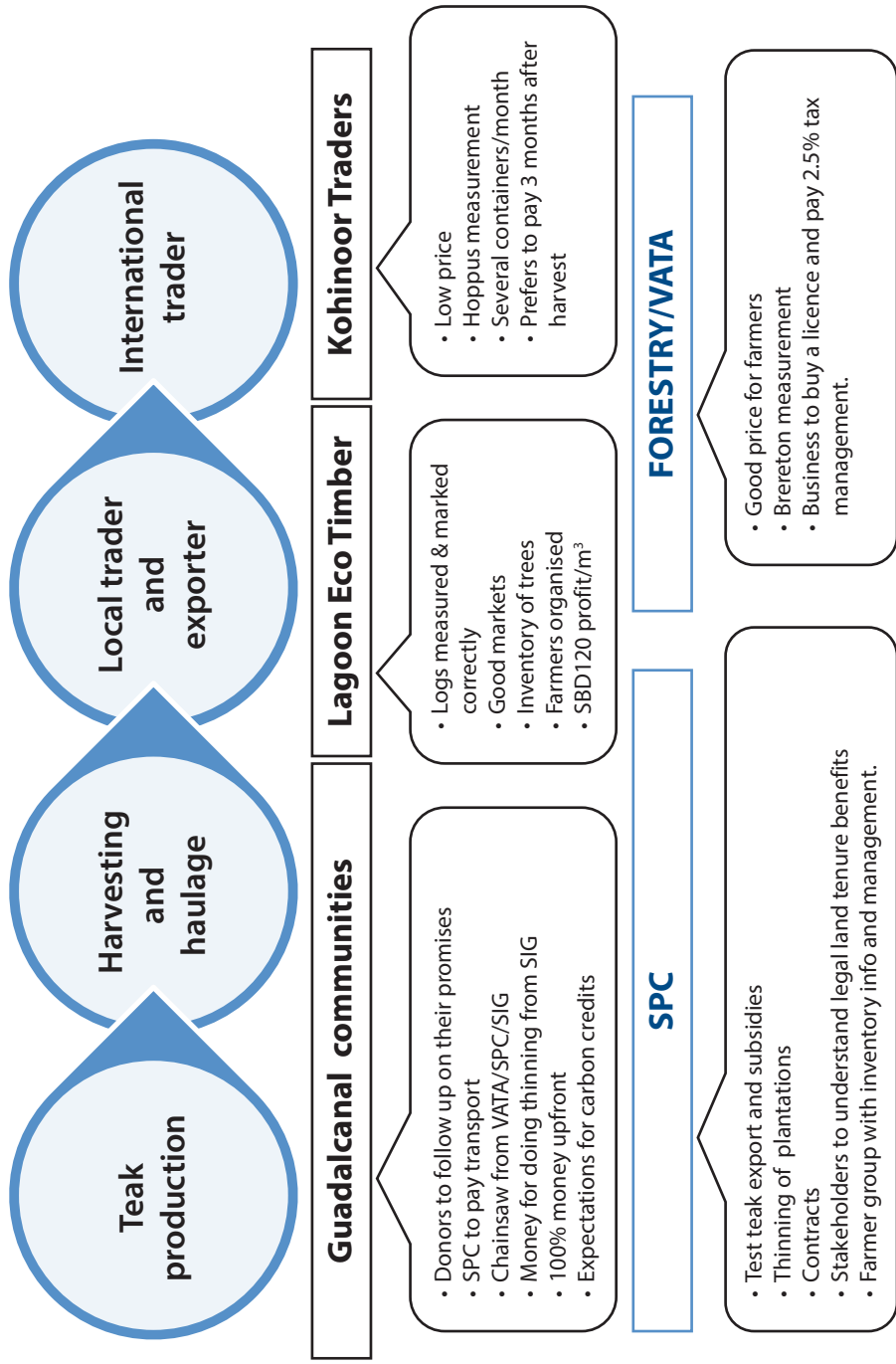


Figure 42. Stakeholder expectations in the teak export value chain, 2011. SIG=Solomon Islands Government, SPC=Secretariat of the Pacific Community, VATA=Value Added Timber Association. Source: Laity (2013)

Local level involvement. Local community-based organisations and small businesses in the Western province may be best placed to deliver interventions to improve value-chain efficiency and economy. These would include the Natural Resource Development Fund (an FSC-certified forest management group), which currently works with seven communities in the Western province on improved forest and wood production, and the Marovo Lagoon Sustainable Timbers (FSC chain-of-custody certified) which might serve as a gateway to responsible local and international markets.

Squared logs. Squared logs are generally easier and less expensive to transport than round logs. Currently, Solomon Islands teak is mostly in the form of round logs. Existing capacity and skills in portable sawmills may be sufficient to support a move toward a trade in squared logs and green, rough-sawn lumber, which might make barge transport between islands less expensive and more efficient. A move towards squared logs will require support to ensure communities have the skills and resources available to use portable sawmills efficiently and to maintain accurate dimensional sawing patterns.

Commercial–smallholder cooperation. Local commercial plantation growers and logging companies may wish to involve themselves in the smallholder estate as part of their programs in community engagement and corporate social responsibility. While there would be obvious advantages in smallholder groups aligning themselves with larger consignments from corporate bodies, it appears that this would be an expensive and time-demanding exercise for the companies and a strong business case (other than community goodwill) would have to be demonstrated.

Shipping and logistics. The fragmented nature of the teak estate across several islands offers logistical challenges to the sale of Solomon Islands teak. Teak logs may be exported as break-bulk cargoes or in containers. Logs are mostly small, reflecting the immature nature of much of Solomon Islands teak estate. Logs are sold according to their average diameter in 5-cm diameter classes. Sales in 2012 of 10-year-old plantations had an average log diameter of 30 cm (the calculated average of two small-end and two large-end diameters), with some logs up to 45 cm. In Solomon Islands a substantial amount of



Photo 7. Squared teak logs are commonly traded globally and offer efficiency in transport. Photo: Stephen Midgley

natural, rough-sawn lumber (estimated at 7,000–10,000 m³) is being transported within the country in passenger ships and small barges (with capacities of 200–500 m³) along with people and cargo. This wood mostly ends up in Honiara for the domestic or the container export market. The dimensions of this lumber are similar to those of teak square logs. As the smallholder teak resource matures, and becomes more valuable it is expected that teak may be moved in a similar fashion.

Break bulk. The larger commercial growers can offer consignments sufficiently large to be shipped as break-bulk cargo through a port close to the resource, and loading on top of their main export species. The challenge for smallholder teak growers on different islands is to assemble consignments of sufficient size to be of commercial interest to the mainstream global markets, and to do this sufficiently regularly to fit with defined shipping schedules. This would require significant consolidation in large barges of large logs that ocean-going ships can handle.

The minimum size for a commercial break-bulk consignment would be of the order of about 3,000 m³. In one recent case, an industrial company was able to supplement its own break-bulk shipment of other logs to Vietnam with teak logs from adjacent smallholdings. This was moved on a relatively small barge of 5,000 m³ capacity for consolidation in Papua New Guinea waters. The smallholders were charged a harvesting fee of US\$60/m³ and a marketing fee of 5%. FOB prices received varied from US\$240 to US\$520/m³ depending on diameter. These smallholders were within 30 km of the loading site, with roads maintained by the plantation company and the operation was completed as part of the company's corporate social responsibility to the local communities.

In other instances, the indicative price for the charter of a vessel to transport 6,000 m³ of *Gmelina* logs from Solomon Islands to Vietnam was about US\$450,000 (about US\$75/m³). Given the current availability of teak, it is likely that only 4,500 m³ of small teak logs could be incorporated in a shipment (P. Whitehead, pers. comm.).

Containers. Although Solomon Islands has a number of ports which can handle break-bulk cargo, only the two international ports at Honiara and Noro can handle containers. These ports are managed by the Solomon Islands Port Authority (SIPA). Regular shipping services (mainly cargo) exist between Solomon Islands and Australia, New Zealand, Asia and other Pacific ports. TEU (20-foot containers) are

the most popular unit for log export although FEU (40-foot containers) could be used if there was a market for longer logs.

A 20-foot container can hold up to 15 m³ of teak logs of up to 5.8 m in length (13 m³ Hoppus), or up to 19 m³ of sawn timber or squared logs, to a maximum weight of 24 tonnes. A 40-foot container can hold about 22 m³ logs, generally cut to 3.9 m lengths or sawn timber up to a maximum weight of 26 tonnes. FEU are not commonly used for shipment of sawn timber from Solomon Islands, however, and there appears to be no premium for logs longer than 3.9 m. Thus, cutting to fit 40-foot containers would present logistical (and expensive) challenges to transport between the stump and the container port.

Teak growers and processors in Solomon Islands alike recognise the potential for containerised shipment of teak consignments. Recently, a Western province landowner who also exports timber used his own plantation, portable sawmill, barge and bandsaws to provide part of a 'pilot' containerised consignment to New Zealand.

Ports. The logistic capacity and regularity of port calls make Honiara a cheaper port than Noro from which to operate. In discussions with logistics and shipping companies as part of this study, it was revealed that most container shipments from Noro would be routed through Honiara anyway. Shipping costs for a 20-foot container of small logs from Honiara to a port in India, Vietnam or China are typically US\$300 less than the same shipment from Noro (Table 20). The cost differential is \$600 for a 40-foot container (J. Midgley and Deugro PNG pers. comm. 2013).

Based upon the assumptions that a 20-foot container can hold 13 m³ of round logs, or 19 m³ sawn timber (or squared logs), and a 40-foot container can accommodate 22 m³ logs, the additional cost to ship from Noro is notionally US\$23/m³ for round logs and US\$17/m³ for sawn timber and squared logs (or US\$27/m³ if FEU are used). Exporters might take advantage of the scheduled monthly service from Noro to Honiara. Prevailing costs for barge transport for logs and sawn timber from Western province to Honiara are of the order SBD800/m³ (US\$110/m³) (Johns 2012). These costs indicate that the option of container shipment direct from Noro to overseas ports could be viable despite the cost differential, provided the volumes to be shipped are commercially attractive to the shipping companies (probably of the order of 20–30 containers/month).

Table 20. Notional costs for container shipment from Solomon Islands to China, Vietnam or India

Origin	Destination	Container size	Estimated cost (US\$)					Teak logs Volume/container (m ³)	Teak sawnwood and squared logs Volume/container (m ³)	Teak logs Notional cost/m ³	Teak sawnwood and squared logs Notional cost/m ³	Shipping route
			OCF	BAF	ICS	Standard fees	Total					
Honiara	Huangpu (China)	20 ft GP	1,000	620	12	79	1,711	18	132	95	via Singapore & Hong Kong	
Honiara	Ho Chi Minh (Vietnam)	20 ft GP	800	620	12	79	1,511	18	116	84	via Singapore	
Honiara	Mundra (India)	20 ft GP	1,300	620	12	79	2,011	18	155	112	via Singapore	
Noro	Huangpu (China)	20 ft GP	1,300	620	12	79	2,011	18	155	112	via Honiara, Singapore & Hong Kong	
Noro	Ho Chi Minh (Vietnam)	20 ft GP	1,100	620	12	79	1,811	18	139	101	via Honiara and Singapore	
Noro	Mundra (India)	20 ft GP	1,600	620	12	79	2,311	18	178	128	via Honiara & Singapore	
Honiara	Huangpu (China)	40 ft GP/HC	1,800	1,240	12	79	3,131	n/a	142	n/a	via Singapore & Hong Kong	
Honiara	Ho Chi Minh (Vietnam)	40 ft GP/HC	1,450	1,240	12	79	2,781	n/a	126	n/a	via Singapore	
Honiara	Mundra (India)	40 ft GP/HC	2,350	1,240	12	79	3,681	n/a	167	n/a	via Singapore	
Noro	Huangpu (China)	40 ft GP/HC	2,400	1,240	12	79	3,731	n/a	170	n/a	via Honiara, Singapore & Hong Kong	
Noro	Ho Chi Minh (Vietnam)	40 ft GP/HC	2,050	1,240	12	79	3,381	n/a	154	n/a	via Honiara & Singapore	
Noro	Mundra (India)	40 ft GP/HC	2,950	1,240	12	79	4,281	n/a	195	n/a	via Honiara & Singapore	

Standard fees: MSA surcharge = US\$95/container + tax; THC = SBD275.00 / container and Bill of Lading fee = SBD300.00. Total US\$79
 Note: BAF=bunker adjustment factor; GP=global positioning, HC=high cubic, ICS=international carrier surcharge, OCF=ocean freight
 Source: Detgro PNG pers. comm. 2014

Shipping costs. Table 21 provides notional costs for shipping containerised consignments of teak round logs, squared logs and sawnwood from Noro and Honiara to ports in processing countries. For shipping a container from Noro to Munda port in India, charges would include the OCF (Ocean Freight), the BAF (Bunker Adjustment Factor) and ICS (International Carrier Surcharge) plus Solomon Islands port charges, including MSA (Maritime Service Authority US\$95 / TEU + tax), TDC (Terminal Destination Charge SBD275.00 / TEU + tax) and a Prepaid Agency Fee (SBD220.00 / LPS + tax). For a consignment shipped in a 20-foot container from Noro to Munda (India, west coast), this would notionally add to:

US\$1,600 (OCF) + 620 (BAF) + 12 (ICS) + 95 (MSA) + 37.75 (TDC) + 41.10 (Fee) = US\$2,395.00.

Based upon the capacity assumptions above, notional shipping costs for container shipment of small teak round logs to India would be US\$178/m³ and for sawn timber, US\$128/m³.

Table 21 offers a notional schedule of estimated costs leading to FOB and CIF values for teak logs from Solomon Islands in 20-foot containers through the port of Honiara (assumes 13 m³/20-foot container). The CIF outcomes reached are in general accordance with actual CIF data recorded in importing countries. It should be noted that the table offers a listing of direct costs, and has not included the various margins for traders and agents who offer a valuable service in managing the complex export process.

For a particular containerised shipment of teak logs to India in 2012, teak growers close to Honiara received roadside prices of US\$50–100/m³ and mill gate prices of US\$100–200/m³. After being loaded into containers, the FOB prices were US\$150–250/m³

depending upon log size (Laity 2012). Significantly, more than 20% of the Indian CIF price (US\$350–500/m³) was the cost of inter-island shipping or trucking logistics.

Impacts of certification and regulatory regimes for Solomon Islands

A strong theme throughout this report is the increasing sensitivity of international markets to the commercial risks of purchasing and processing of illegal timber. The markets that buy Solomon Islands timber have no wish to become the targets of claims surrounding the legality and sustainability of the wood supplied. Laity and Crawford (2012) proposed to the Ministry of Forestry and other stakeholders a series of potential wood categories that may offer a common understanding to the legality and sustainability status of wood from Solomon Islands (Figure 43).

The figure illustrates the key attributes of each category (or claim) that producers and buyers may put with respect to the wood. Depending on the market, the adoption of such a classification may offer Solomon Island teak producers opportunities to access and maintain markets, and potentially receive a price premium or better conditions for sales. Placing a reputable claim on wood will involve investments of time and effort and financial costs. It is therefore important that the costs and benefits of verification and certification programs are assessed to ensure that they are cost-effective for the growers. FSC certification for Solomon Islands teak resource is expected to attract clients who service the needs of the most lucrative markets, Europe and North America.

Table 21. Notional schedule of FOB and CIF values for Solomon Islands teak logs in 13 m³/20-foot containers through the port of Honiara^a

Details	Unit price (SBD/m ³)	Unit price (US\$/m ³)	Price per 20-foot container (US\$) (13 m ³)	FOB	CIF Australia	CIF New Zealand	CIF China (Huangpu)	CIF Vietnam (Ho Chi Minh)	CIF India (Mundra)
Cost of logs delivered to barge landing (including harvesting and transport)	350	48	628						
Cost of transport from barge landing to Noro or Honiara (including loading and unloading)	800	110	1,434						
Stacking and marshalling at port (/m ³)	70	10	126						
Fumigation (per container)			110						
Phytosanitary certificate			41						
Empty container release			69						
Side lift			110						
Labour (3 hr loading @ US\$21.00/hr)			63						
Local port charges (MSA US\$95.00/TEU, THC SBD275.00 and bill of lading fee SBD300.00)			174						
FOB (estimated)			2,755	212	212	212	212	212	212
Insurance			175	175	175	175	175	175	175
Shipping charges (Australia) = US\$700.00/20ft + ES 8% + BAF US\$795.00 + ICS US\$12.00			1,563	507					
Shipping costs (Auckland) = US\$ 1100.00/20ft + BAF 35 % + ICS US\$ 12.00			1,497		502				
Shipping costs to Huangpu (China) = US\$1,000.00/TEU + BAF US\$620.00 + ICS US\$12.00			1,632				513		
Shipping costs to Ho Chi Minh (Vietnam) = US\$800.00/TEU + BAFUS\$ 620.00 + ICS US\$12.00			1432					497	
Shipping Costs to Mundra (India) = US\$1,300.00/TEU + BAF US\$620.00 + ICS US\$12.00			1932						536

^a The table is based on data from Midgley and Laity (2009), Laity (2012) and Gerald Stenzel (pers. comm.). BAF=bunker adjustment factor, CIF=cost insurance freight, ES=equipment surcharge, FOB=free on board, ICS=international carrier surcharge, MSA=Maritime Safety Authority, TEU=twenty-foot equivalent units, THC=terminal handling charge

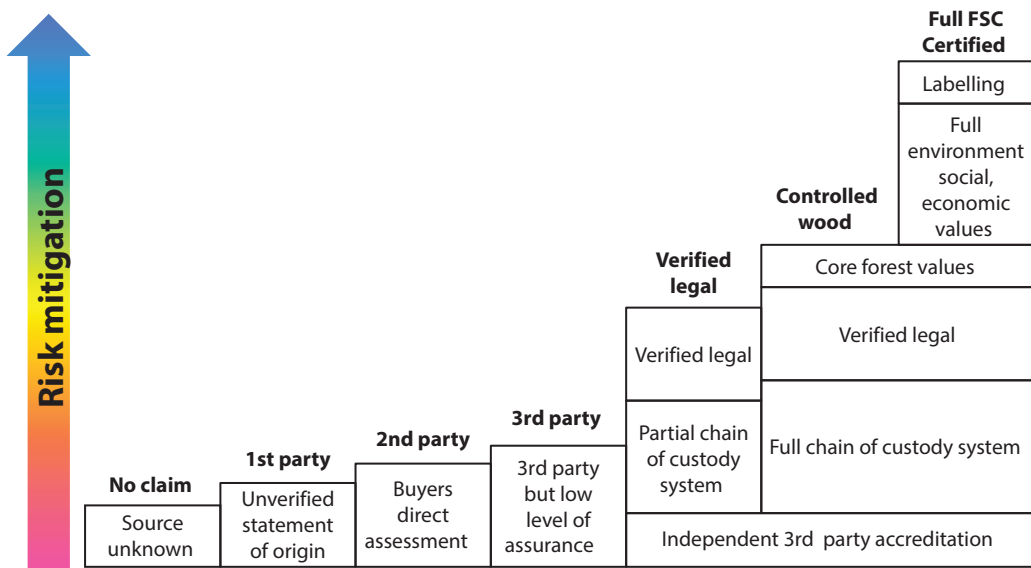


Figure 43. Potential wood categories for Solomon Islands. Source: Laity and Crawford (2012)

Observations on the Solomon Islands teak sector

1. **Legality and certification.** Global supplies of certified teak appear to be limited and processes confirming legality sometimes unclear. While the large domestic markets of India have not embraced legal or certified wood, processors and wood product exporters in China, Vietnam, and Thailand have a strong preference for imported wood that is clearly legal and, in some cases, certified. Growers in Solomon Islands should be equipped with clear, simple and transparent processes that effectively demonstrate the legality of plantation-grown teak. Certification makes sense only when the benefits outweigh the associated costs.
2. **Small logs.** Small teak logs and plantation thinnings are not high-value timbers. Any unrealistic expectations of high prices, held by growers or suppliers, have to be managed carefully.
3. **Market differentiation of Solomon Islands teak.** The global furniture markets are very competitive and furniture manufacturers extremely price-sensitive. Teak thinnings

from Solomon Islands are not cheap and must compete with other tropical hardwoods such as acacia, rubberwood and commonly traded temperate hardwoods. If teak producers are to compete in the international markets they will need to differentiate Solomon Islands teak in a positive way through:

- price and quality (including logistics)
- selling in standardised form as round or square logs and as standard sawnwood
- accurate dimensions required by the markets
- efficiency and ease of doing business
- reliability and capacity to assemble commercial consignments
- responsiveness to the needs of buyers.

4. **Assembling commercial consignments.** The fragmentation of the teak resource across many smallholders makes it challenging to assemble consignments of commercial size which meet market requirements of legality. Regular consignments and uniform quality (dimensional consistency of squared logs or

continued

Observations on the Solomon Islands teak sector (cont'd)

rough slabs) are essential to attract reputable buyers and, to this end, commercial links between smallholders and larger plantations should be encouraged and facilitated.

5. **Inventory of teak plantations in Solomon Islands.** There is an urgent need to complete an inventory of teak plantations in Solomon Islands in order to plan efficient marketing programs. Many smallholder resources will need to be operationally consolidated if teak consignments are to become commercially attractive. Once industry has basic information on locations of plantations, probable available volumes and age structures, commercial decisions can be made, consolidation can begin and reliable markets contacted and developed.
6. **Export facilities.** Although container exports from Honiara port are cheaper than from Noro port, the operational costs and attractive wharf and ancillary facilities at Noro help the teak trade. The Noro via Honiara container rates suggest that Noro can be competitive.
7. **Understanding the markets.** If countries such as India, China and Vietnam offer attractive markets for Solomon Islands teak, it is important that growers, processors and exporters in Solomon Islands understand and engage with these markets. A study tour of Vietnamese furniture manufacturers for a small group of growers and traders might foster value-chain understanding and would help to develop markets for certified teak from Solomon Islands. However, local availability of a resource of high-value, smallholder-grown, plantation-grown tropical hardwood in Solomon Islands clearly offers investment possibilities for local processing rather than export to other countries as low-value 'squared' logs.
8. **The importance of traders.** Traders are vital to marketing of Solomon Islands teak. They provide the link between Solomon Islands and global markets, and assume much of the risk entailed in making successful international trades. Although traders do not alter the physical product, they provide valuable assistance in matters such as information on international markets, wood standards, realistic prices and legal issues relating to imports. They help to transfer information to growers and local buyers, and can assist in the logistics of packaging teak consignments for export. They may also be able to help growers with cash flows. They play a vital role in organising collections from numerous widely spread smallholders to get a consistent supply of the requisite quantity and quality for buyers. Those involved in the development of Solomon Islands teak trade would be wise to moderate an obvious prejudice against traders and middlemen.

Conclusion

Teak wood has a very long history as a high-value trade item. The natural distribution of *Tectona grandis* extends from India to Thailand through Burma and Lao PDR, but teak is cultivated successfully in many different parts of the world. Contemporary global demand for logs, timber and finished products from this highly versatile tropical hardwood remains strong and growing. Global trade in plantation-sourced teak grew by 47% by volume and 58% by value from 2010–12.

‘Burmese teak’ remains the international standard of size and quality of teak logs, and Burma is the leading exporter, although exports from this traditional teak source will change in the near future. In April 2014 a new regulatory regime, including a log export ban, went into effect in Burma. If effective, the reforms may dramatically reduce imports into the major teak markets. However, Burma plans to replace the logs formerly exported with sawn teak timber and processed products, and Indian companies have invested in sawmills in Burma to ensure a steady source of supply.

The leading import markets for teak logs and sawn timber are India (the largest importer, accounting for 75% of the trade), China, Vietnam and Thailand, each of which has its own characteristics and requirements. Of these major importers India and Thailand have natural as well as planted teak estates. These four importers, in turn, export a wide variety of teak products, from logs and sawn timber to parquet blocks, veneers and teak-faced wood panels, flooring (strips and tiles), decking (marine and terrestrial), outdoor and indoor furniture, doors, windows, carved architectural elements and decorative and symbolic objects.

Estimates of the current global resource of planted teak vary, but this report concludes based on available data that plantation areas could be as high as 6.8 Mha. Recorded teak harvests comprise 2.5 Mm³ annually. About 1.3 Mm³ of planted teak logs and sawnwood are traded internationally per year, valued at an estimated US\$723 million. Domestic processing

in the country of origin accounts for the remaining 1.2 Mm³ of harvested teak wood.

Demand for teak has a tendency to wax and wane with the health of the economies in importing countries, and especially the housing markets of those countries. The volume and value of the teak trade declined during the global financial crisis of 2008–09, for example, but began to recover in 2010 and grew robustly through 2012 in the dominant markets of Europe and North America.

Thus, due to its history (long and recent) the global trade in teak is influenced by distinctive factors in addition to the normal challenges of international trade, such as exchange rates, shipping costs, changing trade policies and regulatory requirements, and taxes and tariffs.

First and foremost is the **lack of standards and consistency in measuring logs and in establishing prices** for teak logs. Despite considerable international dialogue over many years, there is still no single international standard for measuring log volumes and thereby calculating prices. Three common methods for calculating log volumes exist, and all are used. Many producing countries use one method for calculating log volumes and dimensions (e.g. Brereton) while a purchasing country, India for example, uses Hoppus as the standard throughout their supply chain, a system that attempts to remove waste during processing from price calculations. Conversion factors enable movement between systems, but neither is there any international standard for conversion factors. Solomon Islands, for example, recently adopted a modified version of the Brereton method, which will offer a standard for the country, but it may need explaining to overseas buyers.

The lack of consistent standards for calculating volume and price as a teak log makes its way from stump to port to shipping consignment to import market, leads to widespread uncertainty and confusion among growers and investors amid a dearth of reliable information and the high potential for misinformation. The need is urgent for standardised,

transparent, up-to-date information on plantation teak prices, a responsibility that might logically fall to the ITTO.

Deforestation and overexploitation of forest resources has increasingly sensitised global wood markets to the legality and sustainability of timber sources. In particular, the large markets of North America and Europe, which pay premium prices for teak products, have responded with laws that prescribe specific compliance measures. Examples of such measures are found in the Lacey Act (USA), the European Union Timber Regulations (EUTR) and the *Australian Illegal Logging Prohibition Act 2012*.

Confidential discussions with wood processors and wood product exporters in China, Vietnam, Lao PDR and Thailand indicate that importers have a strong preference for imported wood which is clearly legal and, in some cases, certified. The continuing competitiveness of the large Vietnamese wood furniture export sector, most of whose products are destined for Europe and North America, will depend upon compliance with requirements about legality. A substantial proportion of the export furniture markets of Thailand and India also is based on teak, much of this bound for Europe and North America.

Growers and processors of teak will need to tackle the challenge of complying with importing nations' statutory requirements as a matter of urgency. Indonesia has completed domestic regulations to comply with a Voluntary Partnership Agreement (VPA) with the EU, and Vietnam will soon also promulgate similar regulations. Although designed for the EU markets, the conditions of a functioning VPA will meet the requirements for export to the USA.

Legality is not an issue in all markets, however. Although India represents three-quarters of global markets, most of its production of teak products is for domestic consumption. At present, the Indian domestic market is generally unresponsive to legal verification or certification, and thus is unwilling to pay for these additional costs.

Vietnam, on the other hand, has a world-class wood furniture industry, 90% of whose production is exported, primarily to the markets of the EU and USA, so regulatory compliance is a major issue. Similarly, the furniture industries in China and Thailand are also export-oriented, as are Thailand's manufacturers of marine products, including luxury boat decking, so these manufacturing countries have

an interest in complying with regulatory regimes in their premium markets.

Teak on Solomon Islands

Teak growing is still a relatively young enterprise on Solomon Islands, and is spread across a number of islands. Teak was first brought to Solomon Islands with a view to establishing plantations in 1960. Teak currently is grown in plantations, a sector dominated by two operators, and also on smallholdings, both in plots and interspersed among other forest species. A reliable inventory of Solomon Islands teak estate is yet to be conducted and is badly needed. However, Midgley and Laity (2009) estimate teak holdings at 4,000–6,000 ha, much of it concentrated in the Western province. The SPC Land Resources Division has a policy of encouraging further planting.

Although teak logs are already exported from Solomon Islands to the major markets, developing an export-oriented industry in the country that would benefit smallholders as well as the major producers faces many challenges. The prime challenges are the small plantation area and the scattered nature of the resource, which is located in remote areas lacking suitable infrastructure. This increases the difficulty of assembling consignments of commercially viable volumes to make shipping to major markets worthwhile. To overcome these constraints it will be vital that smallholders cooperate to develop a reliable process for consignment assembly.

In addition to the logistical challenges it will be important to ensure that the market preference for larger logs is met, which means efforts should be directed towards smallholders growing logs as large and as quickly as possible. This requires knowledge of sound silvicultural management techniques and urgent thinning of teak smallholdings in order to grow remaining stocks to a good commercial size with a desirable ratio of heartwood to sapwood. Logs produced from thinning are smaller and of lesser quality, which means they may be competing with other (non-teak) 'utility' woods such as rubber, eucalypt and acacia, which are cheaper.

Smallholder growers often want to be paid soon after logs are harvested from their land, which is not how the market works. Many steps remain between stump and payment. Smallholder growers thus tend to be suspicious of traders, who assume most of the risk in trades, negotiate differences in standards between

exporters and importers, and play an important role in the value chain.

The larger teak growers and traders in Solomon Islands encourage widespread adoption of certification schemes and chain-of-custody procedures, which are necessary for products manufactured from SI teak to penetrate the lucrative North American and European markets via China, Vietnam and Thailand. Given that Solomon Islands has made considerable progress towards systems for legality compliance and certification for its teak resource, it seems logical that marketing efforts should be directed towards countries whose industries produce certified wood products. However, gaining certification for processing facilities and logs sourced on Solomon Islands will require a non-trivial commitment of resources, human effort and considerable expense. There is little evidence to suggest that consumers in North America or Europe are willing to pay a premium for certified wood products so the cost of certification must be met elsewhere in the supply chain. Whether such investment will be worthwhile for Solomon Islands growers remains to be seen; a commitment to legal compliance may offer better returns.

Unless other obstacles to an economical teak industry are also resolved, including identifying

reliable and regular buyers with a commitment to certification and legality, certification will offer uncertain rewards to Solomon Islands growers and traders.

However, India remains by far the world's largest importer of teak and predictions indicate that this will increase substantially. Most Indian imports are directed towards domestic markets which are concerned more about price and quality than the origins of the wood used. The Indian market has a strong preference for importing logs and squared logs so they can take advantage of the low processing and conversion costs in that country. It would seem logical that a concerted effort be made to establish reliable and transparent conversion factors between different measures of volume to avoid any misunderstanding with this valuable market.

Another option in the development of a Solomon Islands teak industry is the domestic use of logs from thinnings and smallholdings in the local building industry or in indigenous arts and crafts. Whichever final market Solomon Islands teak is destined for it will be important to continue to understand the supply chain and how to meet market and end consumer requirements and build relationships in a fashion that can benefit everyone along the chain.

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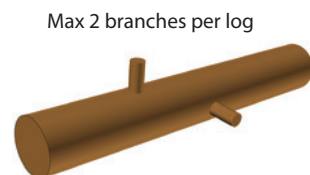
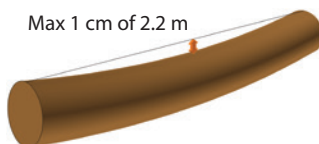
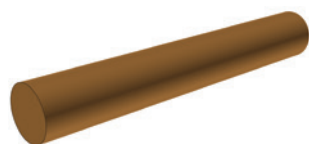
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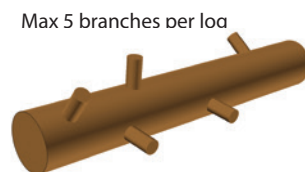
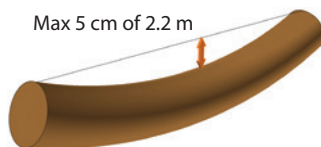
Appendix 1. Draft log grading rules, Solomon Islands⁴

Fault	Grade A	Grade B
Heartwood (in %)	>70%	50–70%
Knots	Should be less than 5 cm in diameter, and maximum of 2 knots in every 2 m linear length	Should be less than 10 cm in diameter, and maximum of 5 knots in every 2 m linear length
Rotten knots	Not allowed	Maximum of 2 knots in every 2 m linear length
Bend (sweep)	Not allowed (0.5 cm/m)	Maximum of 2.5% of log length (5 cm on 2.2m log) (2.3 cm/m)
Double bend (reverse sweep)	Not allowed	Not allowed
End crack	Allowed, but length measured from half of crack	Allowed, but length measured from half of crack
Side/insect holes	Not allowed	Allowed, but 'affected area deducted from volume'
Nails, barbed wire or other metal objects	Not allowed	Not allowed
Channels	Not allowed	Allowed if not protruding more than 3 cm

Grade A



Grade B



Not acceptable



⁴ From Laity and Ahsan (2012)

Appendix 2. Market opportunities for teak grown in Solomon Islands

R.T. Somaiya, M.I.A.W.Sc. (2013)

A report commissioned for this study

This report was commissioned as part of the study on 'Planted teak: global production and markets, with reference to Solomon Islands'. The author, Mr Ramkrishna Somaiya, is a respected member of the global teak community. Mr Somaiya was sought out as the teak expert in India to contribute his knowledge of how teak is imported into India (volume, value, countries, product type, port of entry) as well as his professional insights and perspectives on the teak import trade, the major influences, prime end markets, and final consumer products. His report is included in its entirety.

Understanding the dynamics of India's teak imports

The role of teak in India

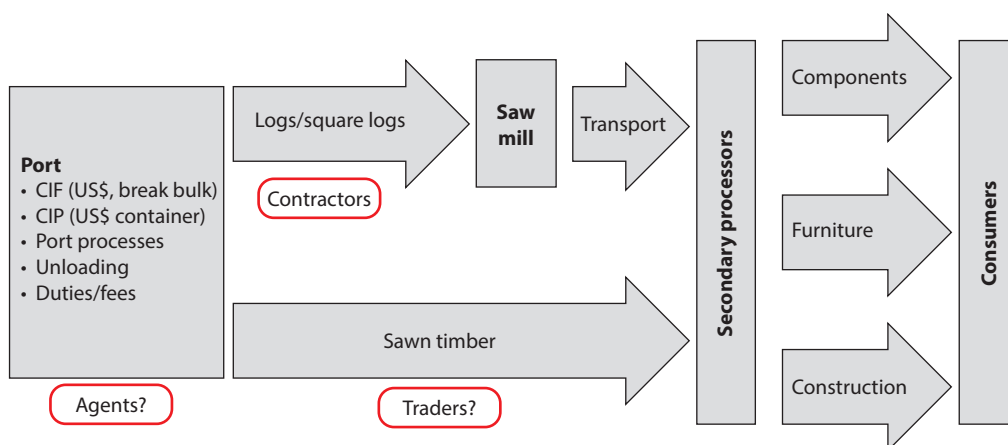
Why is teak so important in India? Why does India constitute 75% of the global teak industry?

The first reason for its importance is the liking for excellent qualities of teak as a durable all-purpose wood, so for Indians teak is the king amongst woods.

Secondly, its abundant local availability at a price affordable by all has made it popular.

Since Independence our population has increased over three times and economic conditions have improved. With both factors combined, the requirement for teak went up so much that our forests could not cope.

To remove stress on our forests and to allow them to recuperate, fresh felling was curtailed. This necessitated imports. The policy is liberal. Bring timber from anywhere. This policy has improved our forest



cover, which had depleted to 8% has come up to 23%. Teak growers have a ready and willing buyer in India, both for thinning material or four-star quality teak.

Public perceptions and cultural traditions

For any woodwork, every Indian first thinks of teak because for centuries this wood was abundantly available and has proven durability. Since 1982 the situation changed as forest preservation was given top priority and the age-old system of harvesting was stopped. Dead, dying, fallen and defective trees and those which had attained maturity were brought out for sale, plus wood available from road-making, hydro-power station activity and areas to be submersed by dams. This policy was intended to be for 15 years only, but has continued with some modifications. We also get good timber through auctions held by forest departments of teak-growing states. This is about 300,000 m³; in addition about one million cubic metres is imported mainly to meet internal demand.

Products from teak

Doors, windows and their frames are used for huge realty projects. Being a developing country with improving economic standards, the home building industry is quite active. New houses need a lot of joinery products and sap wood is also included. The buyers are not very fussy about it.

New houses also need new furniture like beds, wardrobes, cabinets, side tables, coffee tables, kitchens and dining tables; various chairs for homes, gardens and swimming pools, hotels, schools, etc., and everybody wants everything made out of teak!

Other items made are floorings, mats for bathrooms and swimming pools, stools, ladders, kitchen boards, rolling pins, salad bowls, etc.

Among industrial products, there are handicrafts and reproductions of ancient furniture for both local consumption and export. A major percentage of fancy plywoods have a veneer of teak either from local forests or Burma.

Large-diameter and long-length teak logs, local as well as imported, are used for making fishing boats and large sea-going sailing vessels for the coastal cargo trade with Middle Eastern and East African destinations. Many varieties of small and medium-sized boats for passenger services and pleasure activities are also manufactured. India specialises in making excellent teak decking for boats and ships for both domestic use and export. Arabs get their

dhows, with a capacity 300–1,000 tonnes, built in south India—all made of teak. India is blessed with a long navigable coastline of 7,517 km, with 14 major and innumerable minor ports. These all are large consumers of teak.

The role of traders and agents inside and outside India

Purchasing teak

To purchase teak of Indian origin in India, a buyer may walk straight in to the seller and complete the deal without involving any agent or broker. If buyer and seller know each other well, then there will be no problem.

If they are new to each other, then they involve an agent who knows both and fixes the deal, charging Rs10 (ten Rupees) per cubic foot. He will check measurement, arrange transport and supervise the loading. If he was engaged by the seller then the seller will pay him; if engaged by the buyer, the buyer will pay him.

The same system applies when imported teak is bought from the port of arrival in India. Buyers from seventeen states of India come to buy at Kandla/Mundra; the system is similar at Mumbai, Mangalore and Tuticorin. These five ports have the greatest turnover of timber, break-bulk as well as containers. Vishakhapatnam and Calcutta are other large ports, but they have more of the non-teak hardwood cargo.

For purchases of teak and other timbers from outside India, there are agents in Singapore, Hong Kong, London, Dubai etc. who know the sellers/exporters. Depending on the size of a deal, they charge a commission from 1–5% of the f.o.b. value. Here clarity is needed as otherwise the agent may charge on C&F or C.I.F. value. If shipping is difficult from the exporting port and the agent has to arrange it, he may ask for the charge to be based on the C&F value.

Indians prefer to buy teak following personal inspection, get it loaded in their presence and then return back home. The larger importers have office/s in the country of export with a team of inspectors and shipping experts. They supervise loading of containers to ensure they are filled to capacity. In case of mid-stream loading they supervise rafting and safe loading—otherwise lots of logs are lost in the sea while loading or during transit. Local staff take care of proper documentation as well as smoothing transactions with banks.

Measuring volume

India buys timber from all over the world and different scales are used by sellers.

Scales such as Hoppus, Doyle, Scribner, etc. are based on a conversion factor; the 'wastage' goes to the seller's account.

We also buy on Brereton, JAS and other scales that follow geometrical formulae and which are always a losing proposal for the buyer. For preparing good lumber, bark and sap have to be removed, therefore a deduction for these is always sought.

Whether it is softwood or hardwood, Hoppus is the only scale followed in India. Importers have to sell by Hoppus irrespective of what scale was used by the original sellers.

This anomaly in timber transactions is corrected by adjustment of prices and/or deductions in measurement. After all, water has to find its own level.

Shipping teak

Depending upon quantities and the frequency of shipping availability, the mode of shipment is decided. With larger quantities and regular availability, break-bulk shipments are preferred. When this is not possible, shipments are effected by containers. Container shipments are also arranged if delivery is desired at non-port destinations like Delhi, Hyderabad etc.

Delivering teak to processors

After the arrival of a shipment at a port or ICD, importers help arrange the transport to buyer's/processor's warehouse or factory by trucks. If an agent has been the intermediary then he will do the job. If the buyers have their own transport facilities and their own staff at the port they use these services. The importer sells on 'free on truck' basis, and all subsequent costs are born by the purchaser. In any case the exporter is not involved in this exercise.

The role of associations (log importers association for example)

India is a large country. There are numerous associations of timber importers and timber merchants. Their role is to represent grievances of traders to the state or the central government as the case may be. Mostly the matters are related to import-export policy, duties and other levies, local taxes covering sales etc. The activities are based on the principal that unity is strength. The associations also try to resolve disputes between members.

What influences the price paid to growers in the exporting country?

Size of log package available

For new business, it is best to offer as large a quantity as possible to encourage the buyer to come for an inspection. Once mutual understanding on quality, measurements and payments is reached, the exporter may be permitted to provide further shipments on trust.

Quality of logs (straightness, size, proportion of sapwood, presence/absence of knots)

Each of these four things will certainly influence the price.

To get a good price logs should be kept as long as possible, subject to straightness. If the growth of trees is not good and long lengths are not possible, then a length of seven feet is the next preference. Long lengths go for ship/boat building and for wooden rural houses. The short ones are mainly used for doors, windows and their frames.

Log diameter or girth ('size'): Girths of 60 cm and more are desired by buyers. However, quantities of logs of girth 45–59 cm are also accepted at a lower price.

Sapwood proportion is also an important factor influencing price. If care is taken while planting, sapwood content can be managed. To offset higher wastage while processing due to too much sapwood, buyers ask for an allowance in measurement while settling the purchase. This is also the case with **thicker bark**. For both these factors, girths may be discounted. The range of allowance in girth varies from 0–10 cm. If logs are measured 'under the sap' this discount does not apply.

Presence or absence of knots does play a part in pricing but mainly in large logs, say of girth 90 cm or more. The knots should be dressed down to the level of the main growth, irrespective of the size of log. This will help in loading a maximum quantity in the containers, and good presentation also enhances price.

If possible, the growers should be trained to prune the trees religiously, flush with the trunk. This will help the growth of nice clean bole in due course.

If possible the trees should be subjected to a dry period of three months during summer—no drips or watering during that time. This will help form annual

rings, giving the timber a more attractive look, and will speed the conversion of sapwood into heartwood.

Draining the soil of excess water will also reduce the sap content. Planting teak on sites with a slope is best—here will be automatic draining, and sapwood and bark will be thinner.

Sovereign risk (Is the country stable? Are supply lines liable to be disrupted?)

The country, India, is stable; there are no problems like those in several countries in the Middle East. But if import policy should be changed, preventing trade, or an exporting country bans exports, or there are significant fluctuations in the currency of the buyer's or seller's country, making a transaction impossible, problems can arise between buyers and sellers.

These risks are inherent in our trade. In 1962 Burma nationalised forests and forest-based industries; multimillion companies like Bombay Burmah Trading Co. Ltd of India, East Asiatic Co. of Denmark, Steel Bros of UK and dozens of other giant players were thrown out without compensation. Ghana keeps switching policies. Timber business is like a soldier's life—either you win and return with a trophy or you are dead and back in the coffin. Regular players are quite used to these risks.

Access to ports (break bulk or containers—frequency of ship visits)

Shipping details depend on the quantity ready for shipment and the port of shipment. For large quantities, the break-bulk facility is used. For example from Burma, cargoes of different buyers are combined and ship-load arrangements are made. There may be two or three ports of call such as Tuticorin, Mangalore and Mumbai or Mangalore, Mumbai and Kandla/Mundra.

Container shipments are preferred by purchasers from Delhi, Hyderabad and such other inland destinations, and they get the cargo to their respective Internal Container Depots (ICD). So also when the quantity to be shipped is not sufficient for a vessel load, containers are used for faster movement of goods and money.

Port facilities—loading infrastructure plus supporting bureaucracies (customs, tax)

The ports named above have been handling timber regularly for a long time, so all departments of the government are familiar with this commodity. No

problems creep up as long as the rules have been followed and no mis-declarations made.

For example, loading cargo belonging to category 4407⁵ and declaring 4403 to take advantage of lower duty will create a problem. Cargo coming without a phytosanitary certificate can cause delay or force treatment to be done at the point of entry, or the cargo may be jettisoned in the sea if it is infected with exotic pests or it is a banned cargo likely to affect the environment of an importing country.

Import duty for logs and rough squares satisfying 4403 criteria is 5.15%. For sawn timber (4407) the duty is 14.712%. All duties are on CIF or C&F value. Phytosanitary inspection charges at port of discharge are Rs.75 per ton.

Most (99%) of squared logs coming into India fall into category 4403. They are rough squares, cut with a chainsaw or circular saw without a guide—so the piece may be 4.5' at one end and 5.3' at the other. All of them have centre heart, some wane, some bark, etc. and all go as rough-sawn logs. With this crude cutting, you can load 19 m³ in a 20-foot container, whereas without this preparation only about 13 m³ of round logs will fit in. For Indian customs a note such as the above and a classification of 4403 is accepted without question.

The criterion for sawn timber dutiable under category 4407 is that the pieces have to be parallel-sawn, and square on all four sides.

All the above are paid by the importer. The exporter is not debited unless he has defaulted as explained above.

Ease of logistics (trucks or barges available for transport, roads, loading/unloading)

All facilities are available for unloading, loading and transport to the buyer.

Reliability of supply (including regularity of supply)

If all terms between the sellers and buyers are clear at the time of contract, reliability is no problem.

⁵ These codes are described in Appendix 5

Port procedures in India

Unloading and port costs/inspection fees

For 20-foot containers, unloading, loading and forwarding costs about Rs.10,000/- and for a 40-footer about Rs.12,000/-

Shipping companies charge about Rs.15000 per container, irrespective of size, towards THC, delivery order charges, stamp duty, etc.

Besides these, warehouse charges of about Rs.16000 are levied per container, irrespective of size.

Inspection charges are collected by the Phyto-Sanitary Department which charges Rs.75/- per ton.

All these costs are borne by the importer.

Demurrage fees

Container demurrage/detention charges:

- US\$8.50 per day for the first seven days for 20-ft containers and double the amount for 40-ft ones
- US\$13.50 per day of the second week for 20-ft containers and double for 40-ft ones
- US\$17.50 per day of the third week for 20-ft containers and double for 40-ft ones
- US\$48.00 per day thereafter for 20-ft containers and double for 40-ft ones.

If detention is caused by defective documentation from the shipper's side then he will have to bear the charges, while if due to any default by the buyer he will pay it.

Delivery to mills and processing

Logs/squared logs to sawmills. Trucks?

Estimated costs

If delivered within the same town, the charges are about Rs.6000 to Rs.9000 per truck load, depending upon the size of truck used. If delivered beyond the town, charges depend on the travel distance.

Sawn wood to processors. Trucks

Same as above.

What do the processors want—size, quality, price?

All the three are important but for preference, size would be first, quality second and price third.

Product destination—export or domestic markets?

This pattern gives stability to the demand for logs.

Current prices

Size/quality/grades and estimated CIP/CIF price

For a better understanding of the market, I am copying a couple of teak log offers received recently from different origins.

An offer of teak logs from Nicaragua and Panama

- We have 6000 cubic metres of teak round logs.
- We can ship 15 containers weekly from Nicaragua (Puerto Corinto) and Panama (Puerto Balboa).
- Formula to cube: Hoppus
- Allowances: 5 cm girth, 5 cm length
- Species: Teak, from man-made forests of *Tectona grandis*
- Origin NICARAGUA and PANAMÁ

Table: PRICE × m3 FOB'

Circumference			US\$
35	50	cm	\$245.00
51	60	cm	\$285.00
61	70	cm	\$340.00
71	80	cm	\$380.00
81	90	cm	\$410.00
91	100	cm	\$430.00
101	110	cm	\$455.00
111	120	cm	\$510.00
121	130	cm	\$535.00
131	140	cm	\$555.00
141	150	cm	\$625.00
151	160	cm	\$655.00
161	170	cm	\$725.00
171	180	cm	\$755.00
180	190	cm	\$825.00
190	191	cm	\$875.00

Length: 2.10 m to 2.5 m

An offer for teak logs ex Benin

Kindly find attached below Benin Teak logs from government plantations. Please let us know your order, price as given below:

- Length: 4 ~11 m
- Average girth: Varies according to loading containers.
- Price: CNF/Tuticorin/Nhava Shewa/Mundra per cubic m as given below
 - Below 60: 575 US\$
 - 60–69: 625 US\$
 - 70–79: 675 US\$
 - 80–89: 725 US\$
 - 90–119: 815 US\$
 - 120–149: 865 US\$
 - 150 up: 895 US\$
- For Mangalore Port price add 10 US\$ extra
- Measurement: Exact at center girth
- Allowance (Guarantee) : No measurement loss
- Minimum order quantity: 5 × 40 ft containers

An offer of teak logs ex Ghana and several other sources is given hereunder

Thank you very much for your inquiry of teak logs, we supply the teak logs from Ghana/Volta/Burkina Faso/Benin/south Sudan/Costa Rica only.

We hereby sending you below teak logs available stock. If you interested to buy this load then confirm the order soon. We can offer you the sizes and rates below:

Short lengths 2.15 m to 2.5 m

- Check below our average rates:
- 60–79 cm = 550/- US\$ per cubic m
- 80–99 cm = 650/- US\$ per cubic m
- 100–119 cm = 750 US\$ per cubic m
- 120–139 cm = 850 US\$ per cubic m
- 10% acceptable from 1.3 m, 1.5 m, 1.8 m

Long lengths : 4 m to 6 m

- 60–79 cm = 600 US\$ per cubic m
- 80–99 cm = 700 US\$ per cubic m
- 100–119 cm = 800 US\$ per cubic m
- 120–139 cm = 900 US\$ per cubic m
- Note that we provide 2 cm allowance in the girth
- Rates are valid for premium logs with average sapwood of 2.5 cm and bark of 1 cm

- Extra sap and bark attracts an additional discount on the packing list.
- Rates valid for Chennai and Tuticorin port.
- Further, please note that if you can open LC at sight then add 10 US\$
- And for Usance LC add another 10 US\$.

You will see from the above examples that each supplier quotes his own terms.

Finally the details get settled at the negotiation table. There are no fixed rules for these because a lot depends on the quality on the wood and shipping facilities.

Rates for plantation-grown teak logs from Kerala, India

The feeling that plantation-grown teak is always cheaper than forest-grown material is also not correct. In India the oldest plantations of teak are in the southern state of Kerala. They are harvested normally on a 60-year cycle and annually about 50 000 m³ are sold by public auctions at various depots.

The following table shows the steady rise in price of teak logs. A comparison of prices that were prevailing in the years 2005 and 2009 with current rates clearly shows the upswing in rates over the period. It was difficult to arrive at average current rates, so the rates obtained for good lots in those particular grades have been taken. This study should encourage plantation owners to grow large-girth good-quality logs. By following good silvicultural practices, the rotation period can be reduced and much higher returns obtained.

Table: Rates per cubic metre ex-depot

Grade	Average rate 2005	Average rate 2009	Current rates 2013
Teak I B	Rs.45,500	Rs.128,940	Rs.193,500
Teak I C	Rs.39,000	Rs.75,244	Rs.157,500
Teak II A	Rs.46,000	Rs.85,800	Rs.117,467
Teak II B	Rs.40,000	Rs.93,046	Rs.115,100
Teak II C	Rs.31,000	Rs.53,667	Rs.90,000
Teak III A	Rs.34,500	Rs.72,905	Rs. 77,598
Teak III B	Rs.29,000	Rs.58,644	Rs. 82,433
Teak III C	Rs.21,500	Rs.41,819	Rs. 62,236

Current rates C & F Indian ports per cubic metre for recent shipments are as under:

Origin	Price (US\$)
Benin teak logs	350 to 650
Benin teak sawn	700 to 800
Brazil teak squares	350 to 650
Columbia teak logs	350 to 750
Congo teak logs	450 to 550
Costa Rica teak logs	380 to 650
Ecuador teak squares	300 to 540
El-Salvador teak logs	350 to 650
Ghana teak logs	300 to 650
Guatemala teak logs	350 to 550
Guyana teak logs	300 to 450
Ivory Coast teak logs	450 to 750
Kenya teak logs	450 to 500
Laos teak logs	300 to 450
Nicaragua teak logs	350 to 550
Nigeria teak squares	300 to 450
Panama teak logs	350 to 550
Papua New Guinea teak logs	400 to 575
Sudan teak	400 to 700
Tanzania teak logs	350 to 700
Thailand teak logs	350 to 450
Togo teak logs	350 to 500
Trinidad & Tobago	400 to 550
Uganda teak logs	450 to 650

Size/quality/grades and estimated mill door price

For a vast country like India, with thousands of processing centres, it is impossible to have exact door delivery prices. So, given hereunder are the going rates at the latest auctions held in the interior of our country by the forest department. The imported logs cost around the same, so it is a fair picture.

Table: Average rates per cubic foot ex- forest depots of Central India

Log length (m)	Price per cubic foot (Rs)			
	46–60 cm girth	61–75 cm girth	76–90 cm girth	91 cm girth and up
2–3	900–1000	1050–1150	1200–1300	1400 & up
3–4	1050–110	1200–1300	1400–1500	1550 & up
4–5	1150–1250	1300–1400	1500–1600	1700 & up

Table: Average rates per cubic foot ex- forest depots of Western India

Commodity	Price per cubic foot ex depot (Rs)
Teak logs A quality for ship building	2200–2300
Teak logs B quality for ship building	2100–2200
Teak logs A quality high girth for sawing	2000–2050
Teak logs B quality high girth for sawing	1950–2000
Teak logs A quality long-length	1850–1900
Teak logs B quality long-length	1800–1850
Teak logs medium quality long-length	1500–1600
Teak logs medium quality short	1050–1100
Teak logs short thin	950–1000

Impacts of Government of India and state taxes, tariffs and other fees

Fees payable

The Government of India charges import duty and phytosanitary inspection fees. Details of these have been given.

State governments charge sales tax/VAT which varies from 3% to 15% from state to state. This is not paid by the importer, but by local buyers when they buy from the importer.

Import requirements (inspections for import duty, quarantine)

For **customs duty**, an invoice detailing the commodity is necessary.

For **quarantine**, a certificate of origin and a phytosanitary certificate detailing the treatment given to the logs under shipment are required.

Restrictions/regulations on transporting teak logs and sawn wood across districts

At the port of arrival, the Forest Department of the concerned state issues a 'Forest Transit Pass' indicating the valid destination. It also describes the cargo—whether logs or squares or sawn timber, and indicates the number of pieces and quantity loaded in each truck/trailer.

Ports of entry

What are the main ports for delivery (of African teak, Asian teak and Pacific teak)?

Following are the major ports and ICDs to which wood and wood products are imported: Bangalore ICD, Chennai, Cochin, Delhi ICD (Tughlaqabad), JNPT Nhava Sheva, Kandla, Mundra, Kolkata, Mulund ICD, Mumbai, Tuticorin, Vishakhapatnam, Jodhpur ICD, Coimbatore ICD, Hyderabad SEA, Jaipur SEA, Mangalore, Nagpur ICD, Moradabad SEA, Paradeep, Pipavav (Victor), Raipur SEA.

Where are most teak processing factories located?

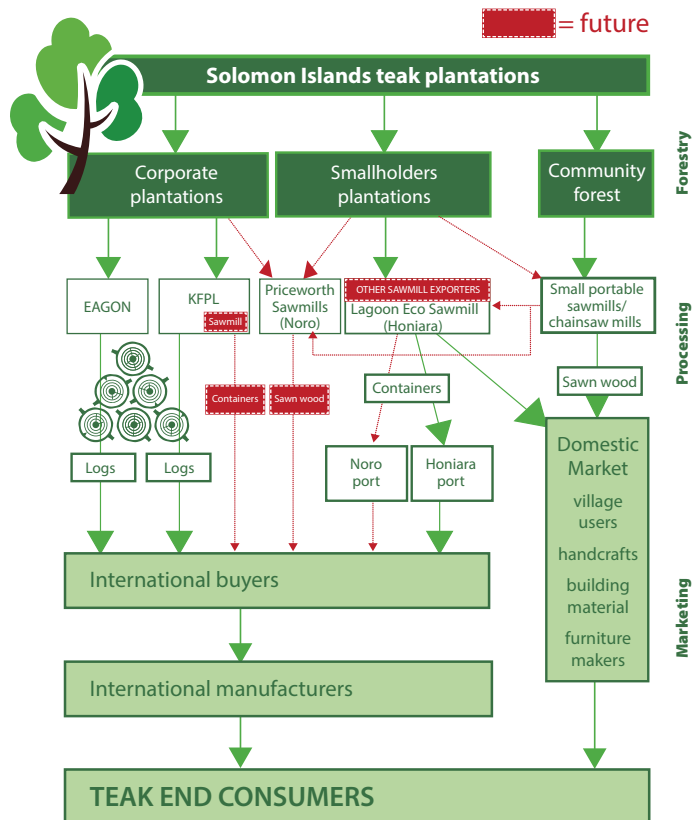
Factories are dispersed in thousands of villages and small towns, as well as in every major and minor town of India.

A reflection on marketing teak from Solomon Islands

Comments on the chart sent by Mr Craig Johns

How can growers in Solomon Islands become suppliers of choice in the Indian market?

1. Give logs in lengths as long as permitted by the tree/log
2. Give logs as clean or well dressed as possible
3. Be fair in measurements to build up confidence of buyers
4. Give estimates of quantities as correctly as possible
5. Same thing for shipping schedules. Be candid
6. Follow the tips given for reducing the thickness of bark and sapwood, and prune to get clear bolts from the trees



Notional supply chain diagram for plantation teak from the Solomon Islands

7. Offer *Gmelina arborea*, *Pterocarpus santalinus* and other species you have to India. This will increase the quantities to be shipped, enabling more frequent shipments and possibly lower freight charges.

Quarantine, forestry and related costs

Not known for Solomon Islands

Facilities, availability of containers

Should not be a problem as shipments are already coming from Solomon Islands as well as Papua New Guinea.

State boundaries

Conditions in Solomon Islands are not known to the author.

No problems within India.

Break bulk versus containers

Break bulks are cheaper for freight and related expenses prior to shipment. They are also cheaper

on arrival at their destination— but the problem is to collect sufficient cargo to make a shipload.

Break bulk from West Africa to Western India costs around US\$100 per cubic m, while containers from Africa, Central and South America are about US\$125 per cubic m.

With containers, the shipments are faster and sellers get their money sooner, and the goods sail as fresh as possible avoiding cracks and splits on the logs.

Markets

In my opinion, India has buyers for teak of all girths, lengths and qualities, and they pay rates equivalent to those prevalent elsewhere. Absorption of quantity is no problem.

Wishing you all success in your marketing projects.

R.T. Somaiya

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Appendix 3. Data for Chinese imports

Provided through a Commissioned Report from Woodmarkets,
Canada (<http://www.woodmarkets.com>) Original source: China Customs

China: commodity 44034910, teak wood in the rough. Log import volume by country (m³)

Partner Country	2012	2011	2010
Myanmar	88,905	60,114	58,705
Taiwan, China	9,829	4,901	1,869
Lao PDR	5,069	4,337	3,855
Costa Rica	4,795	2,122	2,776
Panama	1,719	1,340	2,256
Angola	932		
Brazil	735	1,106	961
Colombia	544	19	24
Malaysia	378	401	24
Indonesia	238	160	36
Ecuador	179	1,341	79
Ghana	163	179	424
Viet Nam	139	17	
Trinidad & Tobago	110	41	
Guatemala	100		
Timor-Leste	68	30	226
Nigeria	61		
Nicaragua	50	185	93
Togo	43		198
Benin	37	613	39
Cameroon	31	17	
Gambia	27	15	
Singapore	5		
Philippines	2	45	
India	-		
Solomon Islands		7,616	
Sri Lanka		1,738	
Thailand		924	1,510
Mozambique		332	197
Vanuatu		66	
El Salvador		48	
Uganda		35	
Sierra Leone		34	
Papua New Guinea		19	
Guinea		17	
Madagascar		1	
Chile			92
Kenya			23
Bolivia			19
Cote d'Ivoire			10
Total	114,159	87,813	73,416

China: commodity 44034910, teak wood in the rough. Log import value by country (US\$)

Partner Country	2012	2011	2010
Myanmar	76,670,824	48,510,304	42,175,758
Taiwan, China	7,254,964	3,405,740	1,377,412
Lao PDR	2,953,744	2,687,817	2,015,096
Costa Rica	2,448,592	1,101,568	1,476,210
Panama	883,430	705,046	1,202,812
Angola	528,170		
Brazil	431,432	475,109	477,790
Colombia	303,980	6,837	4,911
Malaysia	200,190	260,632	62,517
Indonesia	122,800	81,418	19,613
Ecuador	93,373	687,736	35,484
Ghana	102,515	136,353	240,526
Viet Nam	106,259	13,230	
Trinidad & Tobago	78,804	22,535	
Guatemala	69,714		
Timor-Leste	64,511	13,541	132,022
Nigeria	84,995		
Nicaragua	31,393	74,290	50,441
Togo	18,818		109,394
Benin	18,036	360,471	24,835
Cameroon	22,673	14,603	
Gambia	14,139	7,523	
Singapore	8,971		
Philippines	2,608	69,491	
India	385		
Solomon Islands		1,356,569	
Sri Lanka		52,487	
Thailand		508,245	776,675
Mozambique		99,396	77,181
Vanuatu		19,859	
El Salvador		33,918	
Uganda		26,655	
Sierra Leone		20,708	
Papua New Guinea		13,895	
Guinea		8,387	
Madagascar		881	
Chile			45,993
Kenya			9,384
Bolivia			13,272
Cote d'Ivoire			7,075
Total	92,515,320	60,775,244	50,334,401

China: commodity 44072910, teak sawnwood.
Import volume by country (m³)

Country	2012	2011	2010
Myanmar	41,280	37,478	38,833
Benin	6,292	6,129	1,852
Indonesia	4,043	7,357	6,461
Sudan	1,547	422	
Lao PDR	1,048	505	612
Taiwan, Prov.of China	486	321	546
Malaysia	259	736	226
Kenya	224		
Zambia	136	84	
Tanzania	127	73	56
Thailand	110	134	64
Brazil	70	106	413
Viet Nam	49		10
Estado Plurinacional de Bolivia	47		
Philippines	33		
India	23		
Mozambique	20		
Cote dlvoire	16		
Nicaragua	16		
Cameroon	9	148	
Italy	6		-
Ecuador	5		-
Romania	-		
Panama	-		
Timor-Leste		114	30
Trinidad and Tobago		105	146
Singapore		48	-
Argentina		40	
Bolivia		40	65
Papua New Guinea		36	19
South Africa		21	78
Japan		5	
France		-	
Gabon			53
Nigeria			20
Costa Rica			41
Togo			20
Colombia			8
Cambodia			2
China			1
Paraguay			162
Total	55,846	53,902	49,718

China: commodity 44072910, teak sawnwood.
Import volumevalue by country (US\$)

Country	2012	2011	2010
Myanmar	39,384,075	34,877,867	35,927,659
Benin	3,767,315	3,827,826	883,686
Indonesia	2,326,185	4,311,166	3,112,268
Sudan	1,157,057	246,300	
Lao PDR	650,039	350,236	392,271
Taiwan, Prov.of China	541,154	317,361	420,892
Malaysia	71,391	404,159	97,146
Kenya	112,165		
Zambia	92,102	61,312	
Tanzania	100,191	53,479	55,041
Thailand	170,857	197,770	172,349
Brazil	69,060	55,483	296,407
Viet Nam	54,094		2,744
Estado Plurinacional de Bolivia	57,938		
Philippines	34,338		
India	9,200		
Mozambique	38,550		
Cote dlvoire	18,511		
Nicaragua	10,344		
Cameroon	4,031	62,862	
Italy	290		1,603
Ecuador	3,335		121
Romania	735		
Panama	774		20
Timor-Leste		80,304	21,247
Trinidad and Tobago		78,581	113,186
Singapore		54,023	240
Argentina		16,196	
Bolivia		34,698	59,447
Papua New Guinea		27,268	14,156
South Africa		14,323	37,900
Japan		1,928	
France		394	
Gabon			21,839
Nigeria			1,429
Costa Rica			18,732
Togo			11,430
Colombia			5,125
Cambodia			1,568
China			112
Paraguay			68,720
Total	48,673,731	45,073,536	41,737,338

China: teak lumber import volume by custom post (m³)

Custom	Province	2012	2011	2010
Shenzhen	Guangdong	7,096	10,645	7,133
Shanghai	Shanghai	3,405	1,956	1,155
Huangpu	Guangdong	2,030	1,948	441
Guangzhou	Guangdong	463	865	679
Shantou	Guangdong	265	40	146
Xiamen	Fujian	143	85	90
Hangzhou	Zhejiang	127	53	
Nanjing	Jiangsu	77	47	
Dalian	Liaoning	71	113	212
Gongbei	Guangdong	71	420	874
Nanning	Guangxi	49		
Jiangmen	Guangdong	39	105	26
Fuzhou	Fujian	22	16	
Hefei	Anhui	14		
Ningbo	Zhejiang	2	45	
Tianjin	Tianjin	-		
Qingdao	Shandong	-	50	40
Kunming	Yunnan	41,972	37,511	38,922
Chongqing	Chongqing		3	
Haikou	Hainan		-	
Beijing	Beijing			-
Total		55,846	53,902	49,718

China: teak lumber import volume by custom post (US\$)

Custom	Province	2012	2011	2010
Shenzhen	Guangdong	3,594,075	6,408,605	3,157,870
Shanghai	Shanghai	2,604,813	1,328,821	743,515
Huangpu	Guangdong	1,376,974	921,899	233,458
Guangzhou	Guangdong	459,969	690,218	453,869
Shantou	Guangdong	346,279	68,931	236,698
Xiamen	Fujian	184,142	125,356	107,014
Hangzhou	Zhejiang	100,191	22,845	
Nanjing	Jiangsu	74,511	63,507	
Dalian	Liaoning	83,610	121,283	207,711
Gongbei	Guangdong	45,959	291,919	635,970
Nanning	Guangxi	52,963		
Jiangmen	Guangdong	48,373	69,574	25,936
Fuzhou	Fujian	24,236	26,713	
Hefei	Anhui	14,042		
Ningbo	Zhejiang	5,121	25,898	
Tianjin	Tianjin	380		
Qingdao	Shandong	110	129,186	12,859
Kunming	Yunnan	39,657,983	34,773,081	35,920,835
Chongqing	Chongqing		5,306	
Haikou	Hainan		394	
Beijing	Beijing			1,603
Total		48,673,731	45,073,536	41,737,338

Appendix 4. Data for Vietnamese imports

Provided through a Commissioned Report from Vietnam Academy of Forest Sciences

Commodity: 44034990—Teak wood in rough

Supplying country	Unit	2010		2011		2012	
		Volume (m ³)	Value (US\$)	Volume (m ³)	Value (US\$)	Volume (m ³)	Value (US\$)
Brazil	m ³	1,670	647,646	3,123	1,151,914	1,960	697,833
Costa Rica	m ³	7,129	3,489,999	9,033	4,944,300	11,080	5,572,353
Côte d'Ivoire	m ³	721	392,218				
Ecuador	m ³	102	85,170			218	115,248
Guatemala	m ³	1,405	712,398			179	96,667
Myanmar	m ³					633	559,667
Panama	m ³					42	22,631
Solomon Islands	m ³	1,033	381,247	1,046	379,378		
Uruguay	m ³	48	25,416				
		12,108	5,734,094	13,202	6,475,592	14,111	7,064,399

Commodity: 44039990—Teak round log

Supplying country	Unit	2010		2011		2012	
		Volume (m ³)	Value (US\$)	Volume (m ³)	Value (US\$)	Volume (m ³)	Value (US\$)
Austria	m ³			26	11,514		
Brazil	m ³	1,665	1,196,102	1,426	1,175,861	1,659	1,532,397
China	m ³	138	58,012				
Costa Rica	m ³	5,694	2,561,949	7,485	3,702,243	931	395,678
Côte d'Ivoire	m ³	127	66,497	230	138,154		
Denmark	m ³	438	229,914				
Guatemala	m ³			963	474,707	319	166,975
HongKong	m ³					110	195,321
Laos	m ³	162	48,571	282	89,462	223	44,570
Malaysia	m ³	367	115,964				
Mexico	m ³	182	100,399	340	187,633		
Myanmar	m ³	9,930	7,089,649	4,418	3,686,845	3,103	2,610,960
		18,703	11,467,057	15,170	9,466,419	6,345	4,945,901

Commodity: 44072969—Teak sawn timber

Supplying country	Unit	2010		2011		2012	
		Volume (m ³)	Value (US\$)	Volume (m ³)	Value (US\$)	Volume (m ³)	Value (US\$)
Brazil	m ³	196	98,012	100	51,566	54	21,950
China	m ³					4	5,753
Costa Rica	m ³	278	119,092				
Germany	m ³	64	54,153			33	25,355
Laos	m ³	224	81,390	131	50,942	215	188,343
Myanmar (Burma)	m ³			17	21,527		
Nigeria	m ³			85	27,863		
Philippines	m ³			31	12,785	11	4,860
Taiwan	m ³			10	7,700		
Tanzania (United Rep.)	m ³	377	197,279			37	17,955
Togo	m ³					18	3,580
		1,139	549,926	374	172,383	372	267,796

Commodity: 44089000—Teak veneer

Supplying country	Unit	2010		2011		2012	
		Volume (m ²)	Value (US\$)	Volume (m ²)	Value (US\$)	Volume (m ²)	Value (US\$)
China	m ²	39,700	115,110	70,155	22,450	26,269	55,779
France	m ²					1,916	7,860
Germany	m ²	1,982	9,338				
Taiwan	m ²					216,711	96,347
Thailand	m ²			43,875	29,186	26,033	137,064
		41,682	124,448	114,030	51,636	270,929	297,050

Appendix 5. Timber and timber products listed in the annex to the EUTR

Extracted from Manoharan (2013)

- REGULATION (EU) No 995/2010 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market, *Official Journal of the European Union* L295/31-L295/32 dated 12.11.2010

ANNEX

Timber and timber products as classified in the Combined Nomenclature set out in Annex I to Council Regulation (EEC) No 2658/87⁶, to which this Regulation applies

- 4401 Fuel wood, in logs, in billets, in twigs, in faggots or in similar forms; wood in chips or particles; sawdust and wood waste and scrap, whether or not agglomerated in logs, briquettes, pellets or similar forms
- 4403 Wood in the rough, whether or not stripped of bark or sapwood, or roughly squared
- 4406 Railway or tramway sleepers (cross-ties) of wood
- 4407 Wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or end-jointed, of a thickness exceeding 6 mm
- 4408 Sheets for veneering (including those obtained by slicing laminated wood), for plywood or for other similar laminated wood and other wood, sawn lengthwise, sliced or peeled, whether or not planed, sanded, spliced or end-jointed, of a thickness not exceeding 6 mm
- 4409 Wood (including strips and friezes for parquet flooring, not assembled) continuously shaped (tongued, grooved, rebated, chamfered, V-jointed, beaded, moulded, rounded or the like) along any of its edges, ends or faces, whether or not planed, sanded or end-jointed
- 4410 Particle board, oriented strand board (OSB) and similar board (for example, waferboard) of wood or other ligneous materials, whether or not agglomerated with resins or other organic binding substances
- 4411 Fibreboard of wood or other ligneous materials, whether or not bonded with resins or other organic substances
- 4412 Plywood, veneered panels and similar laminated wood
- 4413 00 00 Densified wood, in blocks, plates, strips or profile shapes
- 4414 00 Wooden frames for paintings, photographs, mirrors or similar objects
- 4415 Packing cases, boxes, crates, drums and similar packings, of wood; cable-drums of wood; pallets, box pallets and other load boards, of wood; pallet collars of wood
- (Not packing material used exclusively as packing material to support, protect or carry another product placed on the market.)
- 4416 00 00 Casks, barrels, vats, tubs and other coopers' products and parts thereof, of wood, including staves
- 4418 Builders' joinery and carpentry of wood, including cellular wood panels, assembled flooring panels, shingles and shakes
- Pulp and paper of Chapters 47 and 48 of the Combined Nomenclature, with the exception of bamboo-based and recovered (waste and scrap) products
- 9403 30, 9403 40, 9403 50 00, 9403 60 and 9403 90 30 Wooden furniture
- 9406 00 20 Prefabricated buildings.

⁶ Council Regulation (EEC) No 2658/87 of 23 July 1987 on the tariff and statistical nomenclature and on the Common Customs Tariff (OJ L 256, 7.9.1987, p. 1).



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