IUFRO World Series Volume 44

Global Teak Resources and Market Assessment 2022

Walter Kollert, S. Sandeep, M.P. Sreelakshmy

With contributions by:
Adzo Kokutse, Cristiane A.F. Reis, Nelly Grace Bedijo, Olman Murillo, P.K. Thulasidas

With the financial and technical support of

Food and Agriculture Organization of the United Nations

IUFRO World Series Vol. 44

IUFRO
Interconnecting
Forests, Science and People

Global Teak Resources and Market Assessment 2022

Walter Kollert, S. Sandeep, M. P. Sreelakshmy

With contributions by:
Adzo Kokutse, Cristiane A. F. Reis, Nelly Grace Bedijo, Olman Murillo, P. K. Thulasidas

Funding support for this publication was provided by the United States Forest Service and the Austrian Federal Ministry of Agriculture, Forestry, Regions and Water Management. Financial and technical support was provided by the Food and Agriculture Organization of the United Nations. The views expressed within this publication do not necessarily reflect the official policy of the governments represented by these institutions/agencies or the institutions to whom the authors are affiliated.

Publisher:
International Union of Forest Research Organizations (IUFRO)

Photo: Stephen Midgley (in Midgley et al., 2015a)

This report is dedicated to the late Mr. Ramkrishna Tulsidas Somaiya (1932 to 2023, on the right), former President of the All India Timber Importers Association and long-standing TEAKNET Steering Committee member.

"Teak is flowing in my blood. I learned the A to Z of teak and became an encyclopedia of teak. It is teak that has kept me alive."
Somaiya, R.T., 2023

Recommended catalogue entry:
Kollert, W., Sandeep, S., Sreelakshmy, M.P., 2024.
Global Teak Resources and Market Assessment 2022.
IUFRO World Series Volume 44. Vienna. 92p.

ISBN 978-3-903345-27-0
ISSN 1016-3263

Published by:
International Union of Forest Research Organizations (IUFRO)

Disclaimer
This report addresses issues that are part of the professional work programme of IUFRO and TEAKNET. It does not reflect the official position of these institutions.

For further information please contact
Dr. S. Sandeep
TEAKNET Coordinator,
Kerala Forest Research Institute (KFRI)
Peechi, Thrissur, India
E-mail: coordinator@teaknet.org

Cover photos
Left: The closed canopy of a mixed deciduous natural forest in Bago Yoma, Taungoo District, Myanmar. The estimated share of teak trees in the growing stock is 30 percent.
Photo: R. Glauner

Centre: Rough sawn lumber from planted teak forests in Ecuador surfaced on four sides (S4S)
Photo: W. Kollert

Right: A planted teak forest of ca. 80 years managed by the Kerala Forest Department as permanent research plot in Nilambur North Forest Division, India.
Photo: P. K. Thulasidas

Preface

Since 2010, when FAO conducted the former "Teak Resources and Market Assessment" (TRMA 2010) as a special study of the Global Forest Resources Assessment 2010 (FRA 2010), the global teak sector has been faced with a significant data gap on the present status of global teak resources and trade. This situation was addressed at the 4th World Teak Conference (WTC) held in Accra, Ghana in September 2022 calling for an update of TRMA 2010 to improve the statistical data on teak forests and provide more reliable information on the development of teak resources, wood harvests, and international trade.

IUFRO through its Special Programme for Development of Capacities (SPDC) along with FAO and TEAKNET[1] have taken up this recommendation and initiated the "Global Teak Resources and Market Assessment 2022" (TRMA 2022) as a follow-up to previous projects. Earlier on, IUFRO in cooperation with FAO and ITTO published the `Global Teak Study. Analysis, Evaluation and Future Potential of Teak Resources` (2017) addressing best practices and lessons learnt on the conservation of teak genetic resources and the sustainable management of teak forests in different country contexts in Africa, Asia and Latin America. Within its scientific structure, IUFRO continues to maintain a working party on the `Utilization of Planted Teak` which aims at research and dissemination of scientific information on teak timber produced within the framework of socially and environmentally acceptable norms of sustainable forest management.

The "Global Teak Resources and Market Assessment 2022" aims to present updated country level information on teak (*Tectona grandis* Linn.F.), which continues to be one of the most important tropical hardwood resources in the world. Teak resources were assessed in 80 countries in the tropics through a standardized questionnaire available in Chinese, English, French, Portuguese and Spanish, that was sent to qualified experts with access to the required data on teak. The experts were identified through the large professional networks of IUFRO, TEAKNET, and five regional coordinators, mainly from national forest research institutions, universities or forestry administrations. They were instrumental in the process of data collection and verification by managing the communication with the identified resource persons and monitor the distribution and collection of the questionnaires. Data on the international trade of teak roundwood and sawntimber have been captured from the UN COMTRADE database that publishes teak data based on official customs records since January 2022.

Many planted teak forests are owned or managed by private companies, particularly in South America. It is of utmost importance to note that the resource data reported by such companies in each particular questionnaire have been aggregated at national level to preclude the possibility to trace the resource data back to any public or private entity within a given country.

The results and findings of this report, published by IUFRO with generous support provided by the United States Forest Service, the Institute of Forest Science, Republic of Korea and the Austrian Federal Ministry of Agriculture, Forestry, Regions and Water Management will facilitate an improved assessment of the significance of teak resources and the international teak trade providing policy- and decision-makers, investors, and managers with a better understanding of the important role that teak resources are playing today in the provision of wood products for the national economies of many countries.

Dr. Michael Kleine
IUFRO Deputy Executive Director
Vienna, Austria

Dr. S. Sandeep
TEAKNET Coordinator
Kerala, India

[1] TEAKNET is an international teak information network managed by the Kerala Forest Research Institute (KFRI), India.

Acknowledgements

Many national experts from research institutions and forestry administrations in about 80 countries have contributed to the results of this project. They have ensured that the best and most recent data, information and knowledge on teak resources and markets have been made available and are shared with other colleagues. IUFRO, FAO and TEAKNET are honored to thank all contributors for their vital collaboration and commitment. A list of all contributors by country is provided in Annex 6.2.

Funding support for this project and publication has been made available by the FAO, the Institute of Forest Science, Republic of Korea and the Austrian Federal Ministry of Agriculture, Forestry, Regions and Water Management. We thank them for their vital contributions, without which this project would not have been possible.

Dr. Michael Kleine, Deputy Executive Director of IUFRO, has been very supportive in the search for qualified contact persons through the scientific structures of IUFRO.

We would also like to acknowledge the professional contribution of Mr Kenichi Shono, Forestry Officer at FAO headquarters in Rome, who reviewed the first draft of this report and provided useful comments and information.

Contents

Acronyms, Units and Symbols

FAO	Food and Agriculture Organization of the United Nations
FRA	Global Forest Resources Assessment of FAO
FSC	Forest Stewardship Council
FSI	Forest Survey of India
ha	Hectare
IPCC	Intergovernmental Panel on Climate Change
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
IUFRO	International Union of Forest Research Organizations
m^3	cubic metre
MAI	Mean annual increment
n. i. a.	No information available
PEFC	Programme for the Endorsement of Forest Certification
REDD	Reducing Emissions from Deforestation and Forest Degradation
TEAKNET	International teak information network
TRMA 2010	Teak Resources and Market Assessment 2010
TRMA 2022	Global Teak Resources and Market Assessment 2022
UNEP	United Nations Environment Program
UAE	United Arab Emirates
yr	year

Note on terminology

The use of the terms 'planted teak forests' and 'teak plantations' follows the FRA definitions. Planted teak forest refers to any teak established by planting or seeding; teak plantations refer to intensively managed planted teak with uniform age classes and regular spacing.

The terms 'roundwood' and 'logs' are used synonymously.

Summary and Conclusions

1. The global situation. Teak grows in some 80 countries in tropical regions. In many of these countries it is considered a priority species for large-scale cultivation, as a valuable, fast-growing hardwood that represents the best opportunity to produce quality timber and provide a good livelihood for dependent communities. As such, the establishment and management of planted teak forests has attracted significant investment from the corporate sector in Latin America, Africa and Asia, where teak has made a significant contribution to the forest economy.
2. The growing importance of teak. The area of natural and planted teak forests has expanded, the harvest of teak roundwood has increased and teak's share of the global timber market is growing. In 2022, the total production of non-coniferous tropical industrial roundwood in all tropical countries is estimated to be 323.9 million cubic metres, with a total import value of USD 3.1 billion (ITTO, 2023). The estimated market share of teak in the total production of tropical industrial roundwood is less than 1 percent. Teak occupies a marginal position in the total volume of global timber production. However, it competes in high-value hardwood markets and is an important strategic element in the forest economies of the main producing countries. The global import value of teak roundwood is estimated at USD 311.6 million (UN Comtrade database). The value of teak roundwood imports thus represents 10.1 percent of the total import value of non-coniferous tropical industrial roundwood from all tropical countries, and exceeds its share of global production.
3. Aim and methodology of the study. The objective of the Global Teak Resources and Market Assessment 2022 (TRMA 2022) was to update, evaluate and expand the available data and information on natural and planted teak forests in all teak producing countries selected on the basis of previous assessments and literature references. The data provided by the countries through a standardized questionnaire were subjected to a plausibility check; those data considered unrealistic or doubtful for a particular country were reviewed in cooperation with the respective contact person and corrected. More than 100 people were directly involved in the data collection and review process.
4. Survey coverage, response rate and data quality. The TRMA 2022 was conducted in 71 countries in 2023; nine countries, mainly in Central and South America, could not be contacted. Of these, 51 countries (72 percent) reported that teak is grown in their country, but only 37 (52 percent) returned the questionnaire with national teak resource data, including the major teak producing countries. The data and information presented in the report have gone through a well established process of data collection, processing, validation, compilation and analysis. In this respect, TRMA 2022 is a useful reference for assessing country situations and trends, and there is currently no better up-to-date information available on teak resources and markets. However, users of this data should be aware that the information provided has some shortcomings and should be treated with caution.
5. Natural teak forests. The area of natural teak forests in India, Lao PDR, Myanmar and Thailand combined was estimated at 30.215 million ha, of which more than half is in Myanmar. Comparing the area data of the 2022 assessment with that of the 2010 assessment, it appears that natural teak forests have increased by 1.180 million ha globally (+4.1 percent), probably due to a change in the sampling technology used for the forest survey combined with a reclassification of natural forest cover.
6. Planted teak - an emerging global hardwood resource. The global area of planted teak forests is estimated at 4.854 million hectares, of which 80 percent is in Asia, 13 percent in Africa and 7 percent in Latin America. Taking into account the lack of data from non-reporting countries, these figures certainly underestimate the actual planted area of teak forests in the world. The three teak heavyweights are India with 1.693 million ha (35 percent of the total), Indonesia with 1.269 million ha (26 percent) and Myanmar with 0.477 million ha (10 percent). The reported data indicate that the global area of planted teak forests has increased by 507 thousand hectares compared to TRMA 2010. Significant increases were recorded in Asia (+261 thousand ha) and Africa (+156 thousand ha).
7. Age class distribution and rotation age. The majority of planted teak (94 percent) is less than 40 years old. The reported age class distribution is indicative of the increased efforts over the last 30 years to increase the area of planted teak forests and to manage them in short rotations, resulting in a significant increase

in the supply of small diameter logs to the international market as a general utility timber.

8. Ownership. Public ownership is still prevalent in Africa, but a shift towards private ownership is evident in many countries on all continents, where a growing number of companies and farmers have recognised the commercial potential and growing demand for teak. A quarter of the world's planted teak forests (1.2 million hectares) are owned and managed by smallholders.
9. Growth performance. The vast majority of planted teak (99 percent) is grown and managed for timber production. The growth performance of planted teak depends on the soil and climatic conditions and the application of good silvicultural practices. The mean annual increment (MAI) reported in most countries for TRMA 2022 does not exceed 12 m^3/ha/year.
10. Log harvesting. The production of mature, high quality teak is limited to the traditional producers of Myanmar, as well as India, Indonesia and Sri Lanka, which produce some large dimension logs from planted forests managed in rotations of over 60 years. The data reported for TRMA 2022 suggest that the supply of teak from natural forests is declining to below 0.5 million m^3, while the supply of teak from planted forests is estimated to be around two million m^3 per year. Taking into account non-reporting teak producers, illegal logging in natural forests and unrecorded harvesting by smallholders and local communities, this estimate could be revised upwards to at least three million cubic metres, according to the professional opinion of the experts consulted. Given the declining supply of teak from natural forests, the long-term prospects for plantation-grown teak appear promising and demand is likely to continue to grow.
11. Prices. Reliable and meaningful teak prices are difficult to obtain. They vary considerably depending on the quality and dimensions of the tree. This is exacerbated by the lack of international standards for quality or value, and the lack of consistency in volume measurement and pricing of teak logs. The average prices of plantation grown teak reported by 24 countries are indicative of this:
    a. Domestic and export market prices in Africa and Asia have increased in all dimensions since 2010, in contrast to domestic market prices in Latin America, where prices have fallen significantly;
    b. Domestic and export market prices are highest in Asia, followed by Africa. Latin America had the lowest price level across all dimensions;
    c. In most countries, domestic and export market prices show a clear gradation across log dimensions. Domestic market prices for larger logs are 1.5 to 4 times higher than those for smaller logs. This trend also continues in the export market, but is less pronounced.
12. Trade. The international teak market has been and will continue to be driven by trends in the Asian market. Asia holds more than 95 percent of the world's teak resources and India alone manages 35 percent of the world's planted teak forests. The salient points in the timber trade are:
    a. India remains the dominant trading power in the teak roundwood and sawntimber market. India imports 97 percent of the total trade volume from 43 source countries, including many African and Latin American countries. The second largest importer is China with 2.5 percent of the total. All other teak roundwood importing countries account for less than 1 percent of the total trade;
    b. Compared to the TRMA in 2010, more countries in Africa, Asia and Latin America have a log export ban in place that prohibits the export of unprocessed roundwood. As a result, Myanmar has lost its position as a leading exporter of teak roundwood, but it is still the third largest exporter of sawntimber after Singapore and Brazil;
    c. Important trading centres with little or no teak resources have developed in Singapore for teak roundwood and sawntimber, and in the Netherlands for teak sawntimber;
    d. An increasingly important issue affecting the trade in plantation grown teak is forest management certification and legality. Meeting consumer expectations and legal requirements significantly influence growers and processors, particularly those dependent on the markets in North America and Europe.
13. Environmental and social features of planted teak. The global increase in the area of planted teak forests by approximately 500,000 ha between 2010 and 2022 may raise concerns about the resulting environmental and social impacts, which have long been the subject of controversy, reflected in arguments for or against the conservation of biodiversity, water supply, soil erosion, carbon sequestration, landscape management or other environmental and social services. The report provides a condensed overview of the main positive and negative features that have been compiled from the technical literature.

Chapter 1
Introduction

Teak (*Tectona grandis* Linn. f.) is one of the most valuable tropical hardwoods of the world. Together with other high-grade hardwoods such as mahogany *(Swietenia macrophylla),* red cedar *(Cedrela odorata),* Indian rosewood *(Dalbergia sissoo)* or Brazilian walnut *(Handroanthus spp.),* teak is sought in the global markets for its beauty, strength and stability, natural resistance and wide array of applications ranging from heavy duty construction and railways, utility poles for transmission lines, ship building and yacht furnishing, quality furniture, interior joinery, veneers, flooring, to cultural uses (see Figure 1). The recently published anthology, The Social Life of Teak, charts the historical importance of teak in fostering political, economic and cultural exchange through forest management, traditional and modern uses of teak and international trade (Webster and Henderson, 2023).

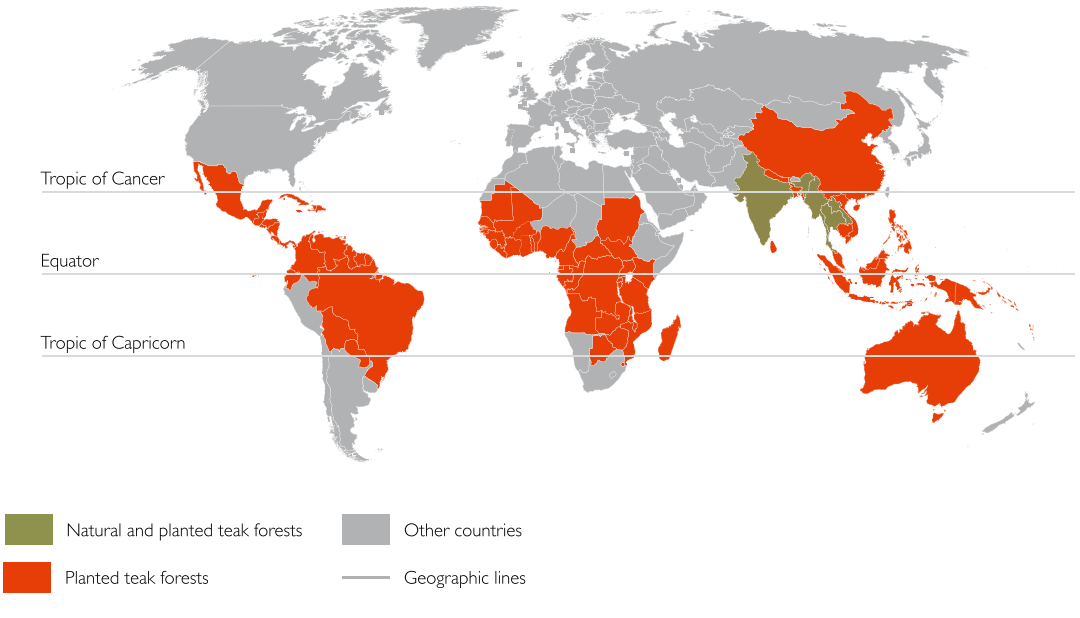
Teak grows in about 80 countries in tropical regions (see Figure 2). In many of these countries it is rated as a priority species for large-scale cultivation as the valuable fast-growing hardwood represents the best opportunity for them to produce quality timber and it offers good livelihood options for dependent communities (FAO, 2014). In recent years, the establishment and management of planted teak forests have attracted large investments from the corporate sector in Latin America, Africa and Asia, where teak has made a major contribution to the forestry economies.

Figure 1

Detail of intricate teak carvings at the Shwe Nan Daw Buddhist Temple built in 1878 in Mandalay, Myanmar.
Photo © W. Kollert

Figure 2

Teak world map



Credit: J. Walotek, Waka Serviços De Investimentos Florestais Ltda., Brazil.

Chapter 2
Teak Surveys Since 2010

CONTENTS

2.1 Teak Resources and Market Assessment 2010 (TRMA 2010)

In 2012 FAO conducted a comprehensive systematic teak resources and market assessment referring to the year 2010 as a special study of the Global Forest Resources Assessment (FRA) 2010 (Kollert and Cherubini, 2012). The main results of this study are briefly summarized in Box 1. The results and findings of TRMA 2022 and TRMA 2010 are 12 years apart. They are not fundamentally different,

Box 1

Summary of the main results of the Teak Resources and Market Assessment 2010

Survey Coverage. TRMA 2010 covered 69 countries, nine of which reported that they do not grow teak. 43 countries reported that they grow teak, but of these only 38 countries were able to give data on the species.

Teak areas. Natural teak forests were estimated to cover 29.035 million ha in India, Lao PDR, Myanmar and Thailand. Almost half of the total was in Myanmar. The area of planted teak forests reported by 38 countries was estimated to be 4.346 million ha, of which 83 percent was in Asia, 11 percent in Africa, and 6 percent in tropical America. Taking into account the data missing from 22 teak-growing countries, this figure certainly underestimated the actual area of planted teak forests.

Planted teak – a globally emerging hardwood. Planted teak is considered the only valuable hardwood that constitutes a globally emerging forest resource. Compared with previous assessments (Tewari, 1992; FAO, 1995; Ball et al., 1999; Maldonado, 1999; Pandey and Brown, 2000; Del Lungo, 2001; De Camino et al., 2002; Demenois et al., 2005; Katwal, 2005; Keogh, 2009; ITTO, 2010; Myint, 2010) the planted teak area has increased greatly in tropical countries in Africa, Central America, South America and Asia.

Age and rotation period. Planted teak forests were predominantly (77 percent) younger than 20 years, which, at that time, documented the prevalent efforts to establish planted teak forests. It was predicted that the enthusiasm of many corporate and private investors for planted teak will maintain the youthful age structure and, in order to improve the economic rate of return, will tend to maintain short rotation periods, which would lead to a significant increase in the supply of small-dimension logs.

Ownership. In Africa, Asia and the Caribbean most planted teak forests were owned by governments, generally the forestry or agricultural administration. In Central and South America state governments own merely a minor share of planted teak forests, the bulk being held by the private sector.

Growth performance. Teak was found not to be a fast growing species per se. Its growth performance depends on the quality of the planting material and the applied best management practices. The mean annual increment (MAI) that was reported by 26 countries appears rather modest and lies, for most regions, between 2 and 14 m^3/ha/year, except for some high-intensity investment schemes in Central and South America.

Log removals. A volume of ca. 0.5 million m^3 was estimated to be harvested in natural forests and 1.5 to 2 million m^3 in planted forests if all teak producing countries were accounted for. Hence, the world's total teak supply from natural and planted forests added up to 2 to 2.5 million m^3, of which at least 60 percent were cut in India, Indonesia and Myanmar.

Supply of quality teak from natural teak forests. Myanmar was found to be the only country producing quality teak from natural forests as India, Lao PDR and Thailand have logging bans in natural forests or log export bans in place.

Global teak market trends. The global teak market was found to be governed by trends in the Asian market. Asia held more than 90 percent of the world's teak resources and India alone managed 38 percent of the world's planted teak forests. The high international demand for general utility teak broadened the traditional teak supply base from natural forests in Asia to include fast-grown, small-diameter plantation logs from Africa and Latin America.

Indian demand dominates the market. The major teak trade flows worldwide were directed towards India, while its own considerable domestic teak production was also processed within the country. Eleven out of fourteen reporting countries named India as their number 1 importer, absorbing 70 to 100 percent of global teak exports including shipments of plantation logs and sawntimber from Africa and Latin America.

Price and quality. Obtaining prices for teak logs and sawntimber proved to be difficult. As no common international log grading rules had been established, most exporting countries' definitions of log dimensions turned out to be different, and the use of various measuring units for dimension and volume further complicated the price survey. As a general rule it could be established that teak prices are very closely related to wood quality. Teak from natural forests to some extent possesses many quality features and sells at comparatively high prices. Logs from planted teak forests are typically smaller in size and will hardly ever reach the dimension, quality features and prices of logs grown in old-growth forests.

but allow for quantitative and qualitative comparisons, as both surveys apply comparable methods through a standardized questionnaire, though the data were delivered by different rapporteurs in each country.

2.2 FAO's Global Forest Resources Assessment 2020 (FRA 2020)

In general, FAO's Global Forest Resources Assessments (FRA), which have been carried out since 1980, provide essential information for understanding the extent, condition, management, and use of forest resources. The country reports submitted for FRA 1990 indicated that teak was the most widely planted high-quality hardwood species. FRA 2020 offered the opportunity for the reporting countries to record the growing stock composition in cubic meters over bark for the ten most common native tree species and the five most common introduced tree species (FAO, 2018).

Six teak-producing countries (see Table 1) took this opportunity to include some information on teak resources in their 2020 country reports (FAO, 2020).

Country information on teak resources reported in FAO's Global Forest Resources Assessment 2020 — Table 1

Country	Information reported
Ghana	In the 1970s about 50,000 ha of plantations (mainly teak) were established within the Forest Reserve of Ghana.
India	The growing stock of teak forests (over bark) has increased since 1990 by 38 percent: 1990: 162 million m^3; 2000: 173 million m^3; 2020: 224 million m^3; 2015: 222 million m^3; 2020: 223 million m^3.
Indonesia	The state-owned forestry company Perum Perhutani has established 10,687.74 ha planted teak forests on Java island with a growing stock of 673,897 m^3 or 63.05 m^3/ha.
Myanmar	The country has 2,854,000 ha under teak forest management (teak selection working cycle), of which 239,000 ha (8.4 percent) are designated to be converted to other land use (teak eradication working cycle).
South Sudan	The country has 68 plantations of mainly teak and a few other exotic species covering up to 187,900 ha.
Trinidad and Tobago	The country has established 16,308 ha teak plantations which correspond to 75 percent of the total plantation area (21,614 ha). The growing stock of teak amounts to 3,297,876 m^3 equivalent to 202 m^3/ha.

Source: FAO, 2020

Chapter 3
The Global Teak Resources and Market Assessment 2022

CONTENTS

3.1 Objectives and Method

The Global Teak Resources and Market Assessment 2022 (TRMA 2022) aimed to update, evaluate and expand the available data and information on natural and planted teak forests in all teak growing countries that were selected according to previous assessments and references from the literature. The selection comprised 80 countries, all of which have their major land area between the Tropic of Cancer to the north and the Tropic of Capricorn to the south. An exception is China. It has its major land area north of the Tropic of Cancer except for tropical southern China and the island of Hainan, where teak plantations have been established since 1820. The countries with the climatic conditions to grow teak are displayed in the teak world map (Figure 2) and listed by geographical region in Annex 6.1.

In order to collect the necessary data, a simple standardized questionnaire of four pages was sent by electronic mail to the national teak experts of the selected countries, with the exception of 9 countries out of 80[2] for which no professional contact could be established. The experts had been identified through a lengthy process with support of IUFRO, TEAKNET and five regional coordinators[3] for (1) eastern, southern and northern Africa (14 countries), (2) western and central Africa (23 countries), Asia and Oceania (18 countries), the Caribbean, South America, Central America & Mexico (25 countries). The questionnaire was available in five languages (Chinese, English, French, Portuguese and Spanish). The English version of the questionnaire is appended as Annex 6.3. The parameters surveyed in the questionnaire were forest area, forest function, age class distribution, the year in which planted teak was introduced in each country, ownership, growth performance, rotation period, log removals, domestic and export market prices.

If there was no response to the first communication, at least two reminders were sent to the identified contact person to trigger a response. Ten months elapsed between the initial sending of the questionnaires and the receipt of the final responses. A particular methodological focus was placed on Brazil, as most of the planted teak forests in this country are owned by large companies, which required great care in data collection.

Upon receipt of the completed questionnaires, all reported data were subjected to a plausibility check; those data that were considered unrealistic or doubtful for a particular country were reviewed in cooperation with the respective contact person and corrected. More than 100 people were directly involved in the data collection and verification process.

A global response rate analysis by region of the 80 tropical countries identified where teak is likely to grow given the prevailing climatic conditions (nine countries could not be contacted despite intensive efforts to identify knowledge experts) is given in Table 2.

[2] In Africa: Equatorial Guinea. In Asia: Timor Leste. In Latin America: Bahamas, Jamaica, Belize, El Salvador, French Guiana, Guyana, Paraguay.

[3] Ms. Nelly Grace Bedijo, Uganda, for eastern, northern and southern Africa; Dr. Adzo Kokutse, Togo, for western and central Africa; Dr. P.K. Thulasidas, India, for Asia and Oceania; Dr. Olman Murillo, Costa Rica, for the Caribbean, Mexico, South- and Central America (except Brazil); and Dr. Cristiane Reis for Brazil.

Questionnaire response rate by region — Table 2

Regions	No. of countries				Response rate (ratio of quest. received to quest. sent)
	Questionnaires and reminders sent to	Questionnaires received from	Teak reported to grow in	Data on teak available in	
Eastern and southern Africa	14	3	7	3	21%
Western and central Africa	22	10	12	9	45%
Asia and Oceania	17	11	16	11	65%
Caribbean, Mexico, Central America	11	8	10	8	73%
South America	7	5	6	5	71%
Total countries	**71**	**37**	**51**	**36**	**52%**

Of the remaining 71 countries contacted, 51 (72 percent) reported that teak is grown in their country, but only 37 (52 percent) returned the questionnaire with national teak resource data, including the major teak producing countries. 'Reporting' in this context does not imply the receipt of a full data-set on all parameters, but rather a report on some parameters only. Hence, the number of reporting countries turned out to be different for most parameters. In few cases, missing data were supplemented by information from published reports, literature and through personal contacts. 34 countries did not reply to the questionnaire, although at least 2 reminders were sent. Most of the non-respondents were rather small countries with small teak areas.

To gather information on teak in Brazil, Embrapa Florestas surveyed and contacted 37 teak companies and forest managers. Of these, 13 companies (35 percent) responded to the questionnaire developed by TEAKNET, including the largest companies, which account for two thirds (64,000 ha) of the total estimated teak resource base (Reis, 2023).

3.2 Data Quality

The data and information presented in the report has gone through a well-established process of data collection, processing, validation, compilation and analysis. In this respect, TRMA 2022 is a useful reference for assessing country situations and trends, and there is currently no better up-to-date available information on teak resources and markets. However, users of this data should be aware that the information provided has some shortcomings and should be treated with caution.

In general, the data were obtained from different sources, which included government departments, research institutions, universities and private companies. A list of contributors by reporting country is provided in Annex 6.2. In most cases the country correspondents found it difficult to source, retrieve or estimate data on teak in the absence of reliable and accurate statistics at the species level. In South and Central American countries most planted teak forests are owned by corporate companies, smallholders and farmers, whose decisions in natural resource management are usually not recorded in national forestry statistics. In relatively larger countries (e.g. Brazil, India) data from reports of many state forestry departments and private corporate companies had to be aggregated to national-level data, which makes it impossible to trace the reported data back to any public or private entity within the country. A full data set that was provided by the reporting countries is compiled in Annex 6.4.

As compared with TRMA 2010 the data quality of TRMA 2022 can be rated higher as more time and diligence have been devoted to identify qualified and knowledgeable resource persons, with the support of the five regional coordinators. In addition, data on international teak trade was obtained from the official customs databases (e.g. UN Comtrade, https://comtradeplus.un.org/TradeFlow), which were not available for TRMA 2010.

3.3 Teak Resources

3.3.1 Forest Areas

Natural Teak Forests

Figure 3

An old-growth natural teak forest with ample natural regeneration in the Parambikulam Wildlife Sanctuary, Kerala, India. Photo © P.K. Thulasidas

The IUCN Red List classifies teak as an endangered species as the teak population and its habitats in the natural forest have been decreasing consistently (IUCN, 2023). The reasons for this decision are set out in Box 2.

Box 2

Reasons for including *Tectona grandis* in the IUCN Red List of Endangered Species

Tectona grandis is a large tree species native to India, Myanmar, Lao PDR and Thailand. This species has been exploited for timber for many centuries. This along with land use changes has left the remaining population to be fragmented and scattered. The area this species occupies has been considerably reduced in each country of origin and the number of mature individuals has also dramatically reduced to varying degrees. In teak forests there has been severe decline and loss of tall straight trees. However, the species can occur in other types of lowland and moist forest, where it can thrive as a small tree in abundance (particularly India). Protective legislation and logging bans for natural teak are in place in India, Myanmar, Lao PDR and Thailand. The demand for teak remains consistently high due to the versatility of the timber. In spite of such high anthropogenic pressures, the species still maintains good genetic diversity but there is concern that locally adapted genotypes will be lost. It is likely that all straight trees are already removed from the wild. The habitat of the species is also at risk due to various anthropogenic threats from fire, overgrazing and land use change. The species occurs in protected areas and log bans are in place, but more resources for enforcement and encouragement of alternative livelihoods are needed. Over the last three generations the population is suspected to have declined in size by up to 50%, with the decline continuing into the future. Therefore, it is assessed as Endangered.

Source : Gua et al. (2022).

According to the results of TRMA 2022 the area of natural teak forests in India, Lao PDR, Myanmar and Thailand combined was estimated at 30.215 million ha, more than half of it growing in Myanmar (see Table 3). If the area data of the 2022 assessment is compared with those of the 2010 assessment it appears that natural teak forests have increased by 1.180 million ha globally (+4.1 percent).

In India, the area of natural teak forests appears to have declined by 875 thousand ha, while substantial increases in Lao PDR (+14.5 thousand ha), Myanmar (+1.95 million ha) and Thailand (+96 thousand ha) have more than balanced this decline.

The decline in India does not necessarily imply an actual loss of natural teak forest. Logging in natural forests is completely banned in India, and the government through several initiatives strives to enhance the forest cover and to halt the degradation of natural forests. A change in the sampling methodology used by the Forest Survey of India (FSI) since TRMA 2010, combined with rigorous field verification by state forest departments, has led to a reclassification of the natural forest cover. The Forest Survey of India now uses four different categories of teak forest (see Table 4), which did not exist before 2014. Any forest containing teak that does not fall into one of these four categories is not classified as teak forest, but as natural forests. The change in the survey methodology and the reclassification of natural forests may have led to a reduction in the area of teak forest in India.

In Lao PDR and Myanmar, the increase in natural teak area is also likely to be due to the reclassification of forest land from non-teak to teak. In Myanmar teak does not grow naturally in pure stands and there is no classified "natural teak forest area". Teak has on average a share of 7.4 percent in the Dry Upper Mixed Deciduous Forest (DUMD) and the Moist Upper Mixed Deciduous Forest (MUMD), both of which are classified as the Productive Forest Working Cycle according to the Myanmar Selection System (MSS) that was developed in the late 1800s and is still in force (FAO, 2001).

In Thailand a complete ban on logging in natural forests was introduced in 1989 which may have contributed to the recovery of natural teak forests. Thailand is said to have once had 16 million ha of natural teak forests (Steber, 1998).

The development of the area of natural teak forests by country — Table 3

	TRMA 2010 (1000 ha)	TRMA 2022 (1000 ha)	Change from 2010 to 2022 (1000 ha)
India	6,810	5,935	-875
Lao PDR	1.5	16	+14.50
Myanmar	13,479	15,424	+1,945
Thailand	8,744	8,840	+96
Total	**29,035**	**30,215**	**+1,180.50**

Source for year 2010: Kollert & Cherubini (2012)

Categories of natural teak forests in India 2023 (data period 2020-2022) — Table 4

Category	Criterion	Area (1000 ha)
Teak	Teak is the predominant species and constitutes more than 50% of the stand composition	2,685
Teak mixed with miscellaneous species	Teak takes between 25% and 50% of the stand composition	2,842
Teak mixed with bamboo	Teak and bamboo together constitute more than 50% of the stand composition with each taking at least 15%	374
Teak mixed with Sal *(Shorea robusta)*	Teak and Sal together constitute more than 50% of the stand composition with each taking at least 15%	34
	Total area	**5,935**

Source: Forest Survey of India (FSI), modified

Figure 4

A 12 year old short rotation teak plantation after thinning in Taungoo District, Bago Yoma, central Myanmar.
Photo © W. Kollert

Figure 5

A planted teak forest of ca. 80 years managed by the Kerala Forest Department as permanent research plot in Nilambur North Forest Division, India.
Photo © P. K. Thulasidas

Planted Teak Forests – a globally emerging forest resource

Historically, the cultivation of teak trees moved from Asian countries towards western Africa and Latin America. The earliest records of teak cultivation originate from Indonesia where teak plantations were introduced from the 14th to the 16th century. In Sri Lanka teak appeared in 1680, while southern China (1820) and Vietnam (1889) followed suit in the 19th century. In western Africa teak was first introduced in Ghana (1900) and Togo (1905). The earliest records in Latin America originate from the 1920s and 1930s when teak was cultivated in Costa Rica (1926), Cuba (1927), and Venezuela (1936). Brazil, which today has one of the largest teak plantations in Latin America, started the cultivation of teak rather late, in 1970.

In 2022, the global area of planted teak forests from 51 countries was estimated at 4.854 million ha, of which 80 percent grew in Asia, 13 percent in Africa, and 7 percent in Latin America (see Table 5). In order to calculate the regional totals, the country reports missing from 14 countries (5 in Africa, 6 in Asia and Oceania and 3 in Latin America) were complemented by data from the TRMA 2010, references found in literature, and FRA 2020.

Table 5

Development of the area of planted teak forests by region

	TRMA 2010		TRMA 2022		Change
Region	**1000 ha**	**%**	**1000 ha**	**%**	**1000 ha**
Africa	469.80	10.8	625.59	12.9	+155.79
Asia and Oceania	3,606.17	83.0	3,866.95	79.7	+260.78
Caribbean	15.32	0.4	24.10	0.5	+8.78
Mexico and Central America	132.78*	3.1	157.82	3.3	+25.04
South America	122.30	2.8	178.94	3.7	+56.64
World	**4,346.37**	**100**	**4,853.39**	**100**	**+507.02**

**Excluding Mexico (ca. 12.9 thousand ha reported for TRMA 2022)*

Taking into account the data missing from altogether 43 teak-growing countries, these figures certainly underestimate the actual planted teak forests in the world. It appears, however, that Asia continues to dominate the production of teak, as it holds more than 97 percent of the world's natural and planted teak resources, and nearly 80 percent of the world's planted teak resources. The three teak heavyweights are India with 1.693 million ha of planted teak forests (35 percent of the total), Indonesia with 1.269 million ha (26 percent) and Myanmar with 0.477 million ha (10 percent).

The data reported for the TRMA 2022 suggest that planted teak forests have increased globally by 507 thousand ha compared with TRMA 2010, that reported an area of 4.35 million ha. Major increases are notable in Asia (+261 thousand ha), Africa (+156 thousand ha) and South America (+57 thousand ha).

Countries of tropical Africa report about 626 thousand ha planted teak forests (13 percent of the total), of which Ghana (210,000 ha), Nigeria (146,000 ha[4]), South Sudan (51,000 ha) and Benin (50,000 ha) have the largest areas. The Ivory Coast did not report; in 2009 ITTO estimated a teak plantation area of 66 thousand ha in this country (ITTO, 2009).

Countries of Latin America (Mexico, Caribbean, Central and South America) have established 337 thousand ha (7%) planted teak forests, of which Brazil (64,000 ha), Colombia (32,000 ha), Costa Rica (49,000 ha), Ecuador (75,000 ha), Guatemala (33,000 ha) and Panama (49,000 ha) hold significant shares.

In South America teak was apparently of no particular significance until 2000; since then Brazil, Columbia, Costa Rica and Ecuador have recorded a considerable increase of the area under planted teak. Brazil, for instance, does not appear at all in previous teak resources assessments of 1976, 1979 and 1995, the main plantation species at that time being pines and eucalypts. Brazil reported for the first time a teak plantation area of 14,000 hectares in FRA 2000.

The ten countries with the largest area of planted teak forests, which account for 88 percent of the total, are shown in Figure 6.

Table 6 compares the development of the area of planted teak forests in the top ten countries from 2010 to 2022. Substantial increases can be observed in Thailand, Myanmar, Ecuador, India and Benin.

3.3.2 Age class distribution of planted production forests

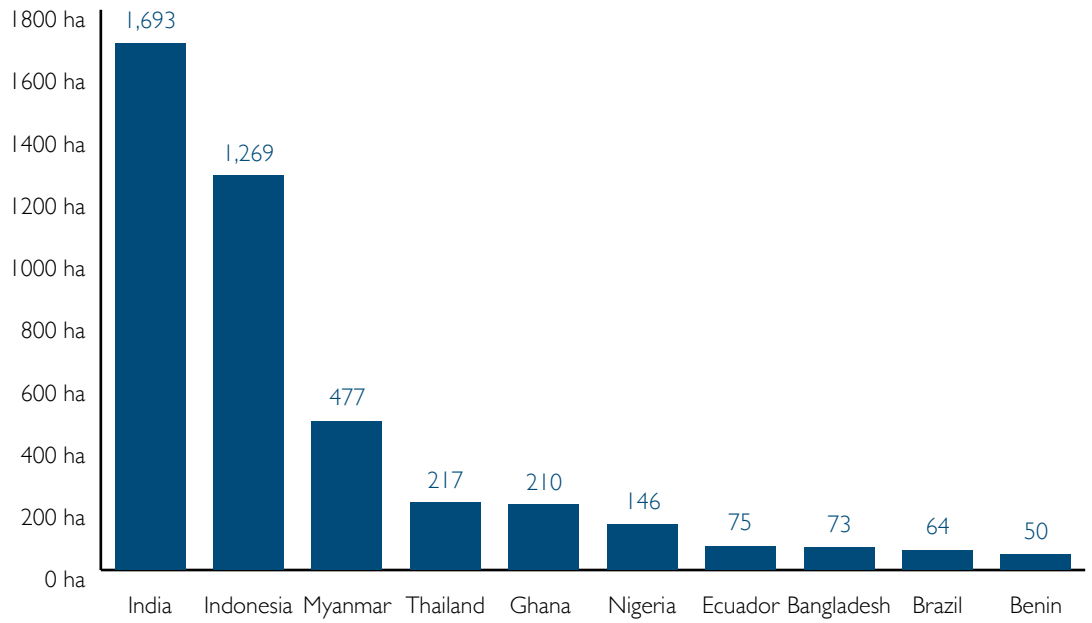
The majority of planted teak forests are young. Their age class distribution shows a very similar pattern in all 34 countries that have reported on this parameter, which is presented for all countries combined in Figure 7. More than 80 percent of planted teak forests fall within the age class from 0 to 20 years, and nearly 14 percent within the age class from 21 to 40 years. Only 3.2 percent of the planted teak forests are older than 40 years (see Figure 7).

The reported age class distribution is indicative of the increased efforts over the past 30 years to increase the

[4] Figure from TRMA 2010

Figure 6

Ten countries with the largest area of planted teak forests (1000 ha)



Development of the area of planted teak forests in the top ten countries (area above 50,000 ha) 2010 to 2022

Table 6

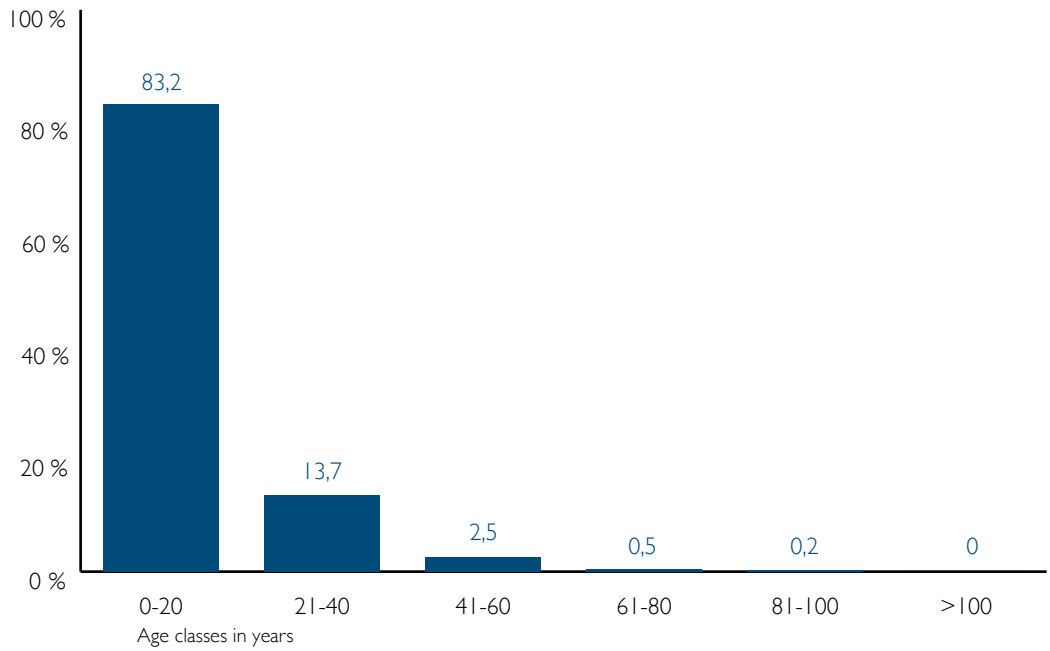
	TRMA 2010	TRMA 2022	Change 2010 to 2022
Country	1000 ha	1000 ha	1000 ha
India	1,667	1,693	+26
Indonesia	1,269	1,269	–
Myanmar	390	477	+86
Thailand	128	217	+89
Ghana	214	210	-4
Nigeria	146	146	–
Ecuador	45	75	+30
Bangladesh	73	73	–
Brazil	65	64	-2
Benin	26	50	+24

Note: (a) red figures taken from TRMA 2010 as countries did not report for TRMA 2022; (b) ranking according to TRMA 2022.
Source for 2010: Kollert and Cherubini, 2012

area of planted teak forests and to manage them in short rotations. This pattern is likely to continue in the future. The current enthusiasm of many corporate and private investors for planted teak will tend to shorten rotation periods and thus allow higher returns, leading to a significant increase in the supply of small diameter logs.

Age class distribution of planted production forests

Figure 7



This global pattern was also observed in TRMA 2010, but there was a marked difference, with more countries reporting an increasing proportion of older teak areas in 2022. In Africa, Cameroon reports a share of 58 percent between 21 and 40 years, South Sudan 29 percent and Benin 22 percent. In the United Republic of Tanzania and in South Sudan almost 10 percent of planted teak forests are older than 41 years. South Sudan reported that most planted teak has been recently harvested or degraded due to social upheaval and that the remaining areas are managed in the coppice system. The United Nations Environment Program (UNEP) estimated in 2007 that teak forests, if sustainably harvested, could generate up to USD 50 million a year in export revenue for South Sudan (Toby, 2019).

In Asia, a number of countries have teak plantations that fall in the age class above 20 years. Lao PDR (35 percent), Malaysia/Sabah (79 percent), Myanmar (54 percent), Sri Lanka (70 percent) and Thailand (55 percent) have considerable areas under teak that is older than 21 years.

In Latin America the age class distribution of planted teak follows the global pattern with 93 percent younger than 20 years and 7 percent younger than 40 years[5]. The majority of Brazilian teak is also between 1 and 20 years old (83 percent) and the rest is between 21 and 40 years old (17 percent).

3.3.3 Ownership of planted production forests

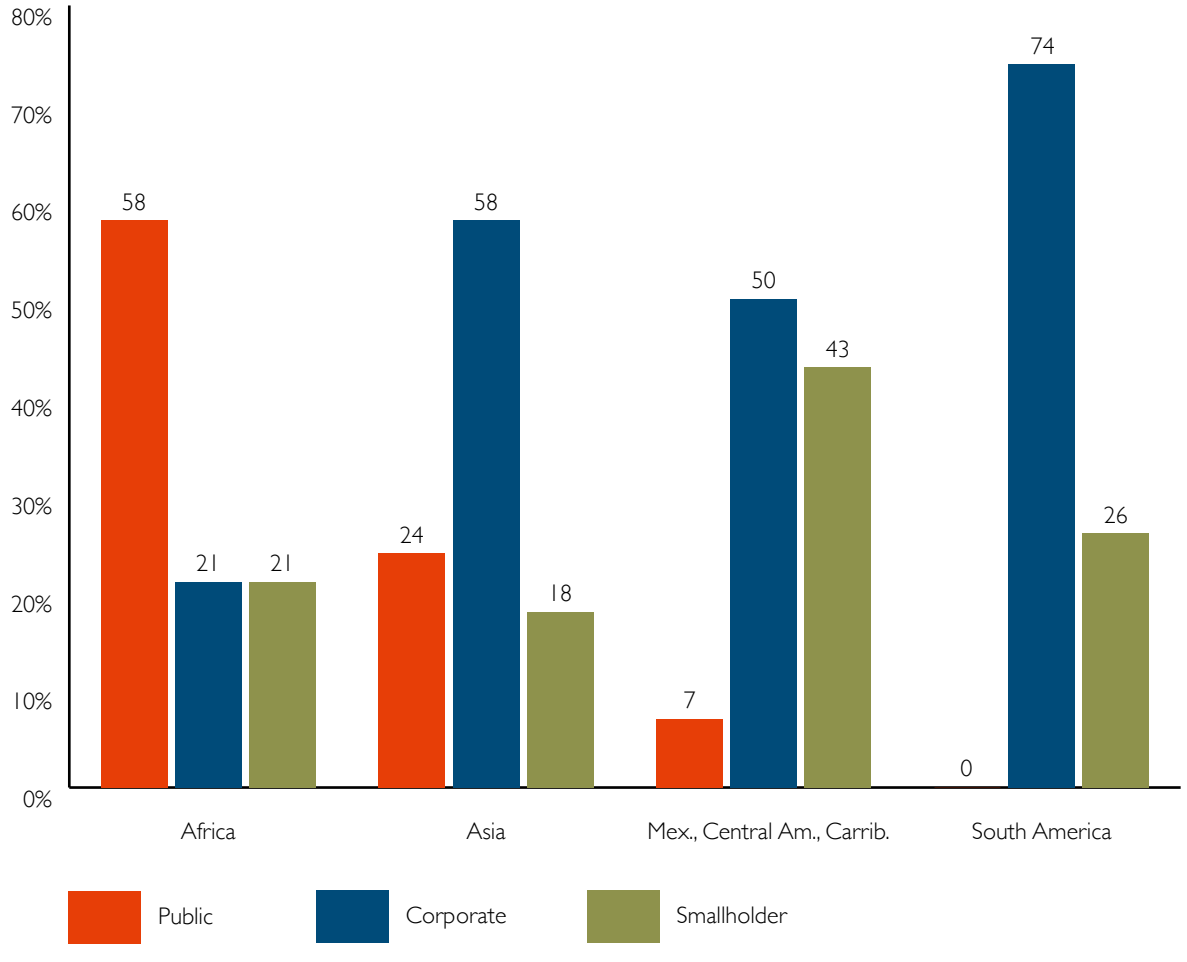
In TRMA 2010 most planted teak forests in Africa (70 percent), Asia (72 percent) and the Caribbean (65 percent) were owned by the public sector, generally the forestry or agricultural administrations. This is still the case in many of the leading teak producing countries: Togo, India, and Peninsular Malaysia (100 percent each), Myanmar (87 percent), Sri Lanka (85 percent), Ghana (70 percent), South Sudan (66 percent), and Benin (64 percent).

A shift towards private corporate and smallholder ownership is evident in many other countries in all continents, where a growing number of private companies

[5] Trinidad and Tobago reported for TRMA 2010 that 70 percent of the planted teak forests are older than 40 years.

Figure 8

Ownership (%) of planted production forests by region



and farmers have recognized the commercial potential and growing demand for teak. They have invested in plantations and agroforestry production systems, where teak is intercropped with annual and perennial crops, as a particularly attractive and viable option to contribute to the income of many smallholders, although in many cases private teak plantations are smaller than 10 hectares (Roshetko, 2022). Globally, one quarter of the teak plantations (1.2 million ha) is owned and managed by smallholders. In particular, in Uganda, Tanzania, Benin, Cameroon, Lao PDR, Vietnam, Costa Rica, El Salvador and Venezuela smallholder teak plantations have contributed to the improvement of rural livelihoods. In some countries corporate owners support teak out-grower schemes for smallholders to expand their resource base.

In Africa public ownership decreased from 70 percent in TRMA 2010 to 58 percent in 2023. This trend is even more pronounced in Asia, where public ownership considerably decreased from 72 percent in TRMA 2010 to 24 percent in TRMA 2023, while corporate ownership has gained in significance, taking the lead at 58 percent.

In Central and South America corporate entities and private smallholders by far own most teak resources. Here, state governments only own up to 7 percent of planted teak forests, while the private sector combined holds 93 percent (50+43) in Mexico, Central America and the Caribbean, and 100 percent in South America (see Figure 8).

3.3.4 Growth performance and rotation age

The vast majority of teak plantations (99%) are grown and managed for timber production. Growth performance and the size of logs required by the market play a key role in determining silvicultural practices and harvesting age.

The growth performance of teak still is a contentious issue. Ball et al. (1999) and Kollert and Cherubini (2012) have already pointed out that fabulous growth projections above 20 m^3/ha/year can be found on the Internet and in literature with the aim to encourage investment. While such figures are theoretically possible over small areas on ideal sites and best-practice management they are unlikely to be achieved over larger areas and over the entire rotation period. Consequently, the actual volume at harvest age obtained from teak plantations from different site classes and countries tends to be much lower than the yields indicated in the projections.

The growth performance of planted teak depends on the soil and climate conditions of the planting site, good nursery practices and selection of genetically improved planting material, application of good silvicultural practices, such as site preparation, planting techniques, pest, disease and weed control, judicious use of fertilizer and frequent and early thinning to focus growth on selected trees with relatively higher growth. Such management practices can influence the growth performance of teak considerably (FAO, 2001) and help to achieve average growth rates of up to 15m^3/ha/yr over a 20 - 25 year rotation period.

The growth performance and rotation age reported for TRMA 2010 and TRMA 2022 are compiled in Table 7. The table only gives minimum and maximum mean annual increments (MAI) and rotation periods as a differentiation according to yield classes was not possible.

The MAI reported for TRMA 2022 appears lower in most regions than the growth rates reported for TRMA 2010. In most countries the reported growth rates do not exceed 12 m^3/ha/year, with the exception of China, which reports a very high growth rate of 28.6 m^3/ha/year and Lao PDR with 21.3 m^3/ha/year. In Brazil, where planted teak forests are mainly owned and managed by the private corporate sector, the maximum annual increment is 19 m^3/ha/year calculated as average of 13 individual reports.

The reported rotation periods are short, in most cases between 20 and 30 years. This only allows for the production of lower quality small diameter logs, which are in high demand on the international market as multi-purpose

Mean annual increment (MAI) and rotation age by region — Table 7

Region	TRMA 2010				TRMA 2022			
	MAI (m^3/ha/yr)		Rotation (yrs)		MAI (m^3/ha/yr)		Rotation (yrs)	
	min	max	min	max	min	max	min	max
Africa	3	21	4	60	3.0	18.0	3	60
Asia, Oceania	2	14	20	80	0.4	28.6	15	80
Mexico and Central America	5	30	6	30	4.2	8.3	16	22
South America	10	27	20	30	5.0	19.0	5	40
World	**2**	**30**	**4**	**80**	**0.4**	**19**	**3**	**80**

timber for less demanding construction purposes, furniture, flooring, reconstituted wood products and power poles. The practice of establishing and managing teak plantations on short rotations of no more than 30 years will continue to result in a significant increase in the supply of small dimension teak to the international market as a general purpose timber.

Good quality logs for high-end applications with special technical and aesthetic properties can only be produced in longer rotations. Some countries such as Benin, Togo, Tanzania, India, Sri Lanka, Thailand and Brazil appear to be responding to this imperative by reporting longer rotation periods of between 40 and 80 years to facilitate the production of higher quality plantation logs.

3.3.5 Removals of teak logs

The harvesting of planted teak forests in 2022 has been reported by 14 countries in Africa, Asia and South America. In Central America, teak harvests were reported to have declined significantly during the Covid-19 pandemic, by 40 to 50 per cent compared to pre-pandemic levels. In addition, teak exports were severely affected as port congestion continued to significantly slow down the circulation and transit times of ships and containers, increasing shipping costs by up to three times (Tirschwell, 2022). As a result, companies limited teak harvests to levels that would just maintain cash flow while waiting for timber prices to rise and shipping costs to fall (Murillo, 2023). As a result, missing data on roundwood removals in Latin American countries were supplemented with data reported to the TRMA in 2010.

Globally, roundwood removals in 2022 were almost twice as high (189 percent) as in 2010. In 2010, 946,613 m^3 of wood were harvested, whereas in 2022, 1,791,963 m^3 were harvested. The largest increases are in Africa and South America (see Table 8).

In Africa significant log removals are reported from Ghana (235,863 m^3), Benin (89,975 m^3), Togo (67,202 m^3) and the United Republic of Tanzania (55,851 m^3).

In South America, Brazil reported the highest removals at 286,054 m^3, which represents an increase by 425 percent as compared to the harvest reported for TRMA 2010 (67,282 m^3).

Asian countries reported the highest log volume harvested at 835,443 m^3, of which 77 percent (639,234 m^3) were from Indonesia and another 8 percent (66,521 m^3) from Thailand. In Myanmar, that had reported log removals of 538,340 m^3 in 2010, no teak was harvested in 2022 in both, natural and planted teak forests, except for some thinnings in state-owned and private teak plantations (24,033 m^3).

In most countries a considerable volume of low-dimension teak logs is produced from thinnings in planted forests for use as utility posts and poles. This, however, is in general not recorded and does not appear in national statistics.

Production of mature, high quality teak is generally limited to the traditional producers of Myanmar, India, Indonesia and Sri Lanka. The latter three countries produce some large dimension logs from planted forests managed in rotations of over 60 years to replace the continuing decline in volume and quality of teak grown in natural forests. In recent years, natural forests in India, Lao PDR and Thailand have been completely protected from logging.

There are very few estimates of the total commercial teak volume harvested globally from natural and planted teak forests. TRMA 2010 reported global teak production of approximately 0.5 million m^3 from natural forests and nearly one million m3 harvested from planted forests. The latest figures from TRMA 2022 suggest that though the supply of teak from natural forests is declining to below 0.5 million m^3, the global supply of teak from planted forests has increased to around 2 million m^3.

The data reported for TRMA 2022 suggest that the supply of teak from natural forests is declining to below 0.5 million m^3, while the supply of teak from planted forests is estimated to be around two million m^3 per year. Taking into account non-reporting teak producers, illegal logging in natural forests and unrecorded harvesting

Log removals from planted teak forests by region 2010 and 2022 — Table 8

	Log removals (m^3)		Change	
Region	**TRMA 2010**	**TRMA 2022**	**m^3**	**%**
Africa	141,146	**454,991**	+313,845	+322
Asia, Oceania	522,710	**835,443**	+312,733	+160
Caribbean, Central America	141,845	**141,845**	–	–
South America	140,912	**359,684**	+218,772	+255
World	946,613	**1,791,963**	+845,350	+189

by smallholders and local communities, this estimate could be revised upwards to at least three million cubic metres, according to the professional opinion of the experts consulted.

Data reported for TRMA 2022 suggests that the supply of teak from natural forests is declining to below 0.5 million m^3, while the supply of teak from planted forests is estimated to be around two million m^3 per year. Taking into account non-reporting teak producers, illegal logging in natural forests and unrecorded harvesting by smallholders and local communities, this estimate could be revised upwards to at least three million m^3, according to the professional opinion of the experts consulted. Given the declining supply of teak from natural forests, the long-term prospects for plantation-grown teak appear promising and demand is likely to increase further.

In 2022, the total production of non-coniferous tropical industrial roundwood in all tropical countries is reported to be 309.8 million m^3 (ITTO, 2023). The estimated market share of teak in the total production of tropical industrial roundwood is less than 1 percent. Teak therefore occupies a marginal position in the total volume of world timber production, but competes in high value hardwood niche markets and is an important strategic element in the forestry economies of the main producing countries.

The top ten countries producing teak from planted forests are shown in Figure 9. By far the largest volume is cut in Indonesia, Brazil and Ghana, the three countries that account for 65% of the globally harvested teak.

3.4 Markets and Trade

3.4.1 Price and quality

Reliable and meaningful teak prices are difficult to obtain. They vary considerably depending on the quality of the wood, which is determined by a number of factors including dimensions, bole shape (roundness and straightness), heartwood/sapwood ratio, regularity of annual rings, number of knots, colour and texture. Another important factor is the soundness of the tree's core; poorly managed plantations on poor sites often show heart rot at ground level, the most valuable part of the tree. Many of these factors are related to the age and size of the tree and are of great importance to commercial investment in planted teak forests and the global teak trade.

The teak prices published in literature or on online platforms are often highly exaggerated rather than a reflection of the actual values. In recent years, much controversy has been generated in several countries by the promotion of teak investments based on fabulous growth and yield projections, unrealistic pricing scenarios and exaggerated rates of return (De Camino and Morales, 2013).

A serious market constraint in the global teak trade is the lack of uniform international log grading rules. Of course, national log grading rules that reflect the high variation in teak prices exist in most teak growing countries, but the global teak trade is hampered by a lack of international standards for quality or value

Figure 9

Top ten countries producing teak roundwood from planted forests

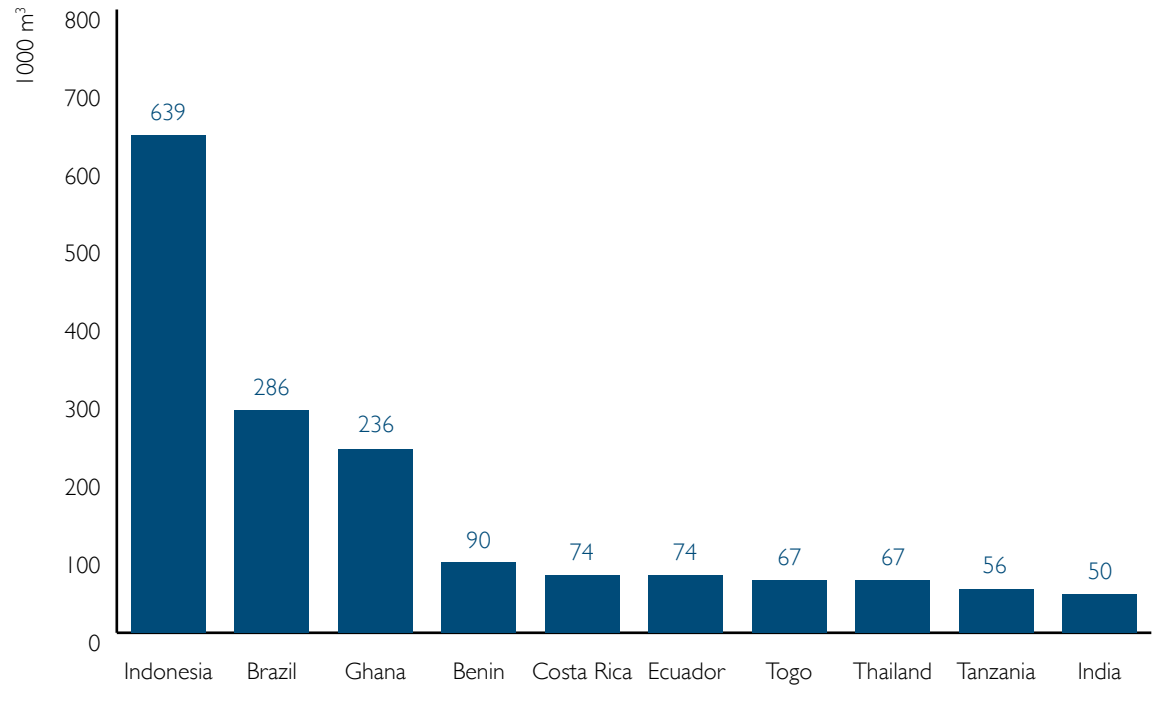


Figure 10

Old-growth teak logs stored at the Ayeyarwady river bank near Sagaing, Myanmar.
Photo © W. Kollert

Figure 11

Rough sawn lumber from planted teak forests in Ecuador surfaced on four sides (S4S)
Photo © W. Kollert

and consistency in measuring volumes and establishing prices for teak roundwood. Such lack of information, and misinformation, result in widespread uncertainty and confusion around teak investments, particularly in relation to prices (Midgley et al., 2015).

Teak grown in natural forests is a precious resource with high quality (see Figure 10) that is sold at comparatively higher prices. Long-term teak price indices have been developed from publicly available long-term time series published in ITTO's Tropical Timber Market Reports since 1998 (Walotek and Glauner, 2017). These indices measured in USD per cubic meter indicate the superior status of natural teak as compared to plantation grown teak. In the Indian market, the average cubic meter value of plantation teak was approximately half that of Myanmar natural teak. In recent years the market appears to have recognized a higher value for plantation grown teak, the price index of which has grown more rapidly than that of natural teak. Plantation grown teak from Latin America and Africa shows a long-term increase in export prices between 1 and 4.5 percent per year since 2010, while roundwood from Asia shows a long-term decrease in export prices by -0.6 percent per year since 2010, probably due to a decline in wood quality (Walotek and Kollert, 2022).

Possible reasons for the observed price development are better forest management in Latin America, where planted teak forests are mainly managed by corporate entities, quality losses in wood exported from Asian countries due to the decline in the volume and quality of natural teak, and the low quality of young plantations managed in short rotations. During the COVID 19 crisis there was a considerable fall in prices, which could be due to export obstacles (higher transport costs, backlog in shipping), shift of trade to local markets deferred felling and export of left-overs of low quality timber (Walotek and Kollert, 2022).

The supply from old-growth natural teak forests is declining and the quality of naturally-grown teak has deteriorated. Myanmar, for example, has four grades of veneer logs and three grades of sawn logs. By 1998, first and second veneer grades were no longer available for export at depots in Yangon. By 2000, third and fourth veneer grades were 1 and 10 percent respectively of the volumes available at the beginning of the 1990s (Coillte Consult, 2006). Balooni (2011) reported that the share of top quality A-grade teak in Indian timber auctions has declined steadily for many years.

Logs from planted teak forests are typically smaller in size and do not have the same technical characteristics of natural teak. They are commonly traded as squared logs (S4S), which offers efficiency in transport (see Figure 11). The standard range of products obtainable from planted teak forests that are harvested at young age are short boards, scantlings and mouldings that are suitable for the manufacture of furniture, parquet flooring, picture frames, boat parts, gift items and carvings. The quality of plantation teak improves where good management practices are applied, and it can be expected that there will be an increasing overlap in terms of 'quality' between natural and plantation grown teak in the future.

The 2022 survey of prices for teak logs proved to be difficult in the absence of common international log grading rules. Teak growing countries use several measuring units for log volumes and dimensions (e.g. diameter, circumference, cm, feet, board feet, hoppus tons etc.). Further, the perception by the countries of log dimensions (small, medium and big logs) turned out to differ from the stipulations given in the questionnaire of the TRMA 2022. In view of these constraints the following data must be interpreted with care.

The average prices of plantation grown teak logs reported by 24 countries for TRMA 2022 are compiled in Table 9. They suggest that:

- The domestic and export market prices in Africa and Asia have increased from TRMA 2010 to TRMA 2022 across all three dimensions, in contrast to the domestic market prices in Latin America, where prices have considerably decreased;
- Domestic and export market prices are highest in Asia due to the prices achieved in China, Cambodia, Indonesia, Myanmar, Sri Lanka, Thailand and Vietnam. Asia is followed by Africa and Latin America that shows the lowest price level across all dimensions.
- Dimension matters: In most countries the domestic and export market prices show a distinct gradation across the three dimensions small, medium and large. The domestic market prices of larger logs are 1.5 to 4 times higher than the prices of smaller logs. This trend persists in the export market, but is less pronounced.

Myanmar was the only country that reported an average export price of 2,372 USD/m³ for teak grown in natural forest which underlines the common knowledge that there is a marked difference in prices of plantation grown teak produced in short rotations as compared to teak from natural old-growth forests.

In Lao PDR, smallholder farmers that grow teak near Luang Prabang reported that they sell roundwood to middlemen at a standard length of two meters. The roundwood originates from short-rotation plantations and is of low to medium quality. The prices that the farmers receive are graded according to the diameter measured at the smaller end of the log (see Table 10). The prices are at about the same level as the log prices reported from Latin America.

Table 10

Teak log prices received by smallholder farmers in Lao PDR at the log yard

Diameter at small end (cm)	USD/m³
16	38
19	96
22	120
25	144

Source: Glauner, 2023.

3.4.2 International trade in teak

Introduction

The international teak market has been and will continue to be governed by trends in the Asian market. Asia holds more than 95 percent of the world's teak resources and India alone manages 35 percent of the world's planted teak forests. Katwal (2005) has reported that the demand for teak in India has increased several-fold in the past

Table 9

Average teak log prices for three different log dimensions

	Planted teak, domestic market prices (USD/m³)					
	TRMA 2010			TRMA 2022		
Region	small	medium	large	small	medium	large
Africa	124	203	271	182	233	284
Asia, Oceania	149	282	448	281	720	1,213
Latin America	129	199	267	54	85	144
	Planted teak, export market prices (USD/m³)					
	TRMA 2010			**TRMA 2022**		
Region	**small**	**medium**	**large**	**small**	**medium**	**large**
Africa	–	–	–	550	613	697
Asia, Oceania	–	–	–	–	513	870
Latin America	–	–	–	203	285	463

five decades. This strong in-country demand makes India the biggest consumer of plantation grown teak in the world and a downturn in the Indian market would result in a drastic impact on the total market for small-dimension teak worldwide (Somaiya, 2005). The growing demand for general utility teak has broadened the traditional teak supply base from natural forests in Asia to include fast-grown, small-diameter plantation logs from Latin America and Africa. In order to meet this demand Singapore has established itself as an important trading hub that imports and re-exports considerable volumes of teak roundwood and sawntimber.

An increasingly important issue affecting the trade in plantation grown teak is forest management certification and legality. Meeting consumer expectations and legal requirements significantly influence growers and processors, especially those dependent upon tertiary markets in North America and Europe, where these concerns are greatest (Midgley et al., 2015b). The North American and European timber markets have responded legislatively through the Lacey Act (USA) and the European Union Timber Regulations (EUTR). India, one of the largest teak markets, has also called for the purchase of only certified timber to promote sustainable forest management through the Green Good Deeds movement. Other markets are likely to follow suit, restricting trade to proven legal or certified timber.

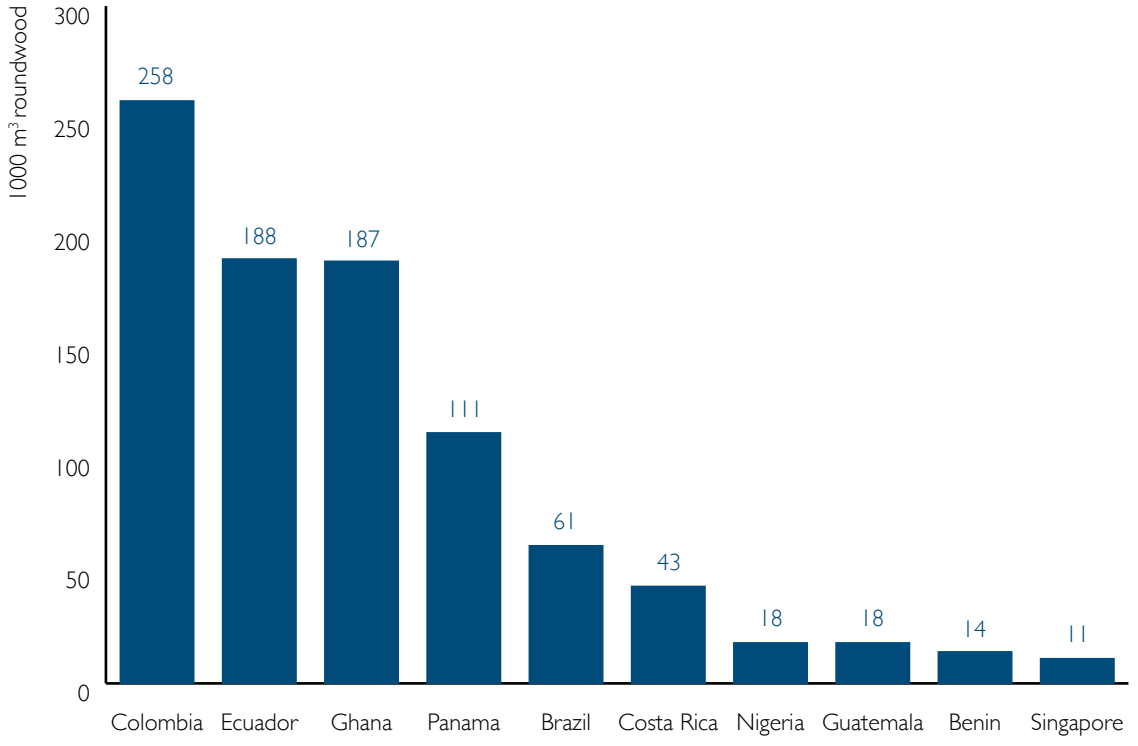
Methodological note

In the TRMA of 2010, data on teak markets and trade was collected from reporting countries through a questionnaire, but the rapporteurs found it difficult at that time to provide quantitative figures on the international trade in teak. From 1st January 2022, international trade in teak roundwood and sawntimber is reported in the Harmonised System Nomenclature 2022 Edition (HS 2022) under the new customs codes 4403.42 (roundwood) and 4407.23 (sawntimber), based on official customs records published, for example, in the UN Comtrade database (https://comtradeplus.un.org/TradeFlow). This will significantly improve the assessment of the importance of the international teak trade and provide policy and decision makers, investors and managers with a better understanding of the important role that teak resources play in providing wood products for the national economies of many countries (Kollert, 2022).

Prior to 2022, international trade in teak was difficult to be assessed from the Harmonised System, as teak was classified under 'other tropical roundwood and sawntimber' (HS 2017 codes 4403.49 and 4407.29). Specific codes for teak and other wood products were created in HS 2022 based on the application of FAO and ITTO to the World Customs Organisation (WCO) (Lebedys, 2022). Allocation of a specific code for teak greatly facilitated assessment of international trade in teak in TRMA 2022.

Figure 12

The top ten countries exporting teak roundwood to India in 2022



Source: UN Comtrade database

The HS 2022 customs codes for teak is still a relatively new tool for exporting and importing countries. For example, India's imports of teak roundwood list 43 countries of origin, many of which (e.g. Ecuador) do not appear in the respective country's export statistics. In addition, export statistics were found to be inconsistent with international standards, with some countries reporting trade volumes in kilograms rather than cubic meters. In the case of sawntimber trade, the world trade volumes reported in the export and import statistics do not match and are in fact far apart. For example, the global export volume of sawntimber is reported at 77 thousand cubic metres, which is in contrast to the total import volume of all countries reported as 1.4 million cubic metres. In this context, it has been found that the import statistics of the recipient countries (as recorded for instance in the UN Comtrade database) are more reliable than the export statistics of the source countries, as formal duties are more often paid on imports and less often on exports (Lebedys, 2023).

Trade in teak roundwood

In 2022, the international trade in teak roundwood was governed by India that imports 97 percent of the total trade volume from 43 source countries. Teak is a well-known and preferred species in India with demand sustained by strong construction activity and economic growth (ITTO 2010a). The second largest importer is China accounting for 2.5 percent of the total. The share of all other teak roundwood importing countries amounts to below 1 percent of the total trade volume.

The top ten exporting countries that are listed in India´s import statistics is shown in Figure 12.

In 2022, more than two thirds (72.5 percent) of India´s import volume was sourced from Latin American countries, while African countries covered the remaining one quarter (25 percent). Significant roundwood exporters in Latin America were Colombia, Ecuador, Panama, Brazil and Costa Rica. Ghana, Nigeria and Benin were the major exporters of teak round wood to India from the African continent. South Sudan and Tanzania did not show up in the statistics as there is a ban on log exports. The roundwood quality of the imports appears to be good with average values (CIF) ranging from 363 USD/m^3 for logs imported from Latin America to 458 USD/m^3 from Africa.

Ghana has a log export ban in place. However, the ban excludes roundwood from plantations. The country appears to be a large exporter of chemically-treated teak poles for power supply and telecommunication lines (WaKa, 2009). Singapore, the only Asian country in the top ten exporters to India has only very few teak resources of its own, but re-exports plantation-grown teak roundwood that was imported from other countries.

The Ivory Coast was earlier reported to be among the most important teak exporters in Africa (Maldonado, 1999). Ivorian exports of teak destined to satisfy demand in India accelerated from a trickle to over 120,000 cubic meters by 1997 accounting for 99 percent of exported Ivorian teak logs. Maldonado and Louppe (2000) had warned that teak exploitation in the Ivory Coast may have already exceeded the sustainable capacity of the country's resource base. This notion may explain the low export volume of only 1,518 cubic metres of roundwood in 2022 to India, Ivory Coast's former exclusive customer.

Since 2014, when Myanmar introduced its log export ban, Indian importers have reported shortages of Myanmar teak and have sought alternative supplies from Latin America and Africa. This shift has to some extent affected the traditional producers of teak from natural forests in Myanmar, who have lost Indian customers to new market entrants.

In 2018, four years after the implementation of Myanmar´s teak log export ban, ITTO reported a growing concern of Myanmar's teak-oriented exporters due to the strengthening of EU Timber Regulation (EUTR). According to a report in the newsletter of the European Timber Trade Federation (ETTF), the Large Yacht Cluster (LYC)[6] has cautioned against the ban on trade in Myanmar teak. Instead, LYC urges industry, governments and NGOs to support Myanmar's efforts to reform forest management and improve legality assurance. The Large Yacht Cluster aims at achieving a 'sustainable teak value chain'. The organization underlines that teak is highly prized in yacht making, not just for aesthetics, but also its durability and anti-slip characteristics, and the fact that it does not warp, attract insects, or absorb moisture. At the same time the cluster says that it is "fully aware of the fragile status of teak and the consequences of unlawful traded timber". However, it warns that banning trade will only promote exports to less environmentally concerned markets, reduce support for Myanmar to strengthen environmental controls and undermine its ability to tackle illegality. The cluster emphasizes that the requirements on legality assurance such as the EU Timber Regulation, US Lacey Act and Australian Illegal Logging Prohibition Regulation have to be promoted in the industry, along with certification references such as FSC and PEFC. But it also urges greater international harmonization of market legality requirements "to ensure a global approach, a level playing field and harmonized enforcement". It additionally backs development of alternative materials to partly spare teak and is working on guidelines for using less teak per vessel to reduce pressure on the growing stock. The core appeals in the position paper are for: international support for Myanmar's efforts to create a sustainable teak value chain; endorsement of this stance from national and international institutions and trade bodies; support for education of the yacht industry on teak issues; national enforcement agencies to work collaboratively – 'taking a constructive approach and refraining from unconstructive and unequal measures and penalties against those that do their utmost' (ITTO, 2018).

[6] The LYC is an international alliance of shipyards, teak importers and suppliers, national and international trade bodies and NGOs active in the yacht sector.

Trade in teak sawntimber

The UN Comtrade database listed 39 countries that export teak sawntimber in 2022. In comparison to TRMA 2010 more countries in Africa, Asia and Latin America have imposed log export bans (e.g. Myanmar, Ghana, Tanzania, South Sudan) that prohibits the export of unprocessed roundwood. These countries have switched to processing teak roundwood to sawntimber prior to export thereby adding to the number of countries exporting teak sawntimber. The top five exporters of teak sawntimber are shown in Figure 13.

The global export volume of the 39 listed countries is reported at 77 thousand cubic meters with a total value (FOB) of 44.5 million USD. The leading sawntimber exporter is Singapore covering 38 percent of the total exports. Singapore serves as the world´s trading hub for teak sawntimber. The city state is reported to be the business location of 261 active teak wood companies that trades with 200 suppliers worldwide (Volza Grow Global, 2023).

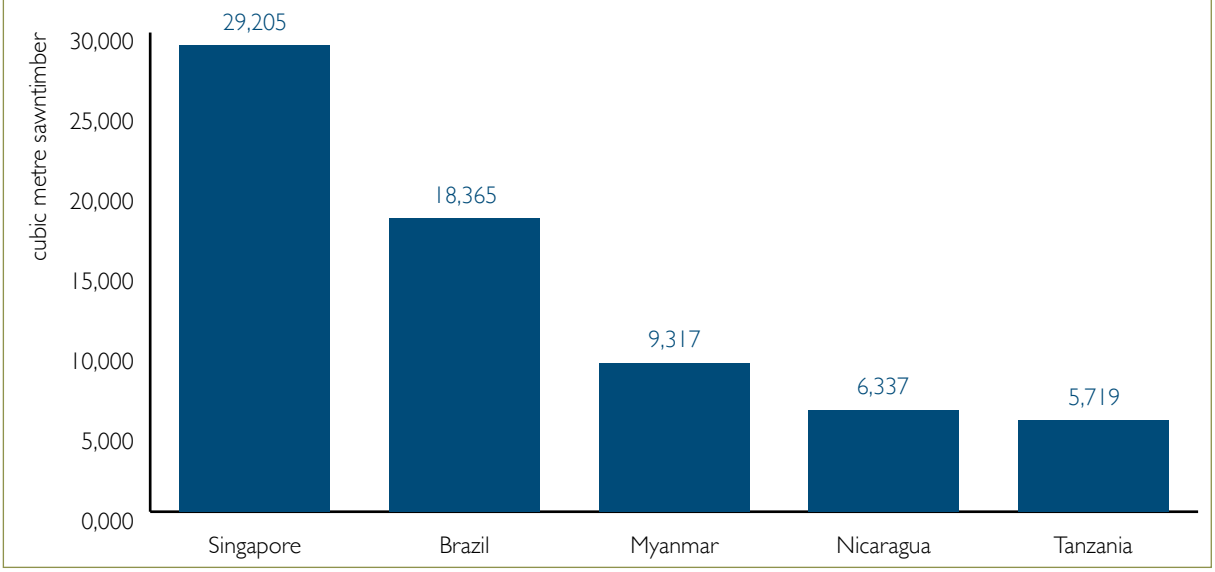
The major exporter in South America is Brazil, accounting for 24 percent of the total trading volume, while Nicaragua in Central America covers 8 percent of the total. In Asia, besides Singapore, Myanmar is an important sawntimber exporter (12 percent of the total). The biggest exporter in Africa is the United Republic of Tanzania accounting for 7 percent of the world exports.

The top five importing countries that account for 98 percent of the total import volume are shown in Figure 14.[7]

[7] It should be noted that the amount of sawntimber exported worldwide (about 77 thousand cubic metres) is much lower than the amount of sawntimber imported worldwide (about 1.4 million cubic metres). An explanation for this discrepancy is given in the last paragraph of the methodological note.

Figure 13

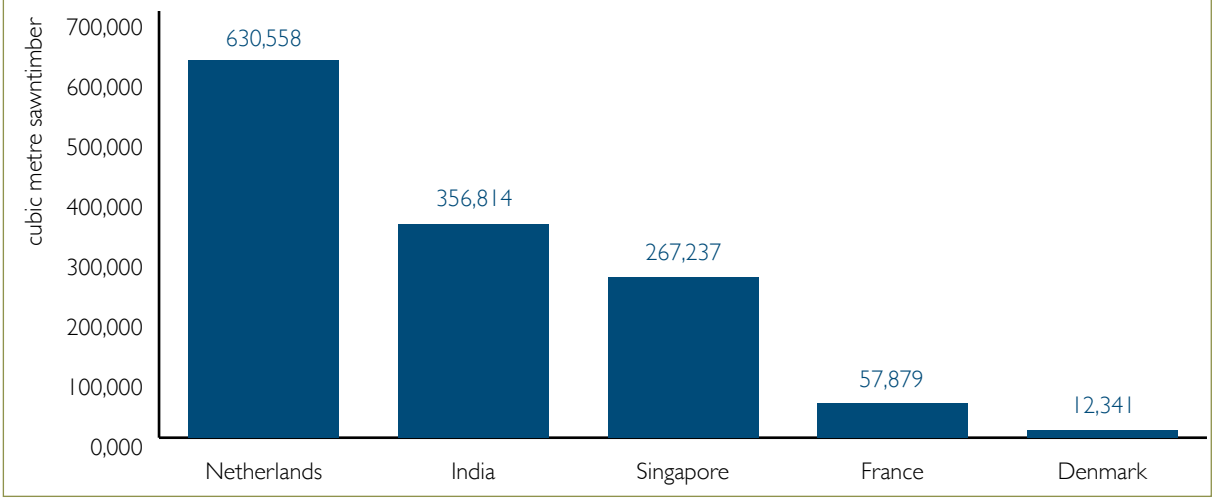
The top five exporters of teak sawntimber 2022



Source: UN Comtrade database

Figure 14

The top five importers of teak sawntimber 2022



Source: UN Comtrade database

The Netherlands serve as an inter-European trading hub for teak sawntimber. The country imports teak sawntimber from 29 countries, mainly from Belgium, Italy and Germany, and re-exports it to many other European countries.

India imports its sawntimber from 39 countries, mainly from Africa (Ivory Coast, Togo, Benin, the United Republic of Tanzania and Ghana) and Latin America (Brazil, Nicaragua, Mexico). The top ten source countries of teak sawntimber exports to India covering 95.4 percent of the global imports are shown in Figure 15.

Myanmar appears to have lost its large Indian market. In 2022, the country supplied only a minor volume of 3,010 cubic meters sawntimber to India. The United Arab Emirates (UAE) and Singapore are important trading partners without having teak resources on their own. Nearly 100 percent of the Myanmar exports is now towards Singapore.

In summary, it can be stated that

- India remains the dominant trading power in the teak roundwood and sawntimber market;
- Myanmar appears to have lost its position as a leading teak exporter;
- African countries (Ivory Coast, Togo, Benin, Nigeria, United Republic of Tanzania, Ghana) and Latin American countries (Colombia, Ecuador, Panama, Brazil, Costa Rica, Nicaragua, Guatemala) continue to be important trading partners for the Indian market;
- Important trading centers without their own resources have developed in Singapore for teak roundwood and sawntimber, and in the Netherlands for teak sawntimber.

3.5 Environmental and Social Features of Planted Teak Forests

As the global area of planted forests continues to grow, they have become a significant component of productive forest resources in many countries and provide a significant proportion of industrial roundwood production (Jürgensen et al., 2014).

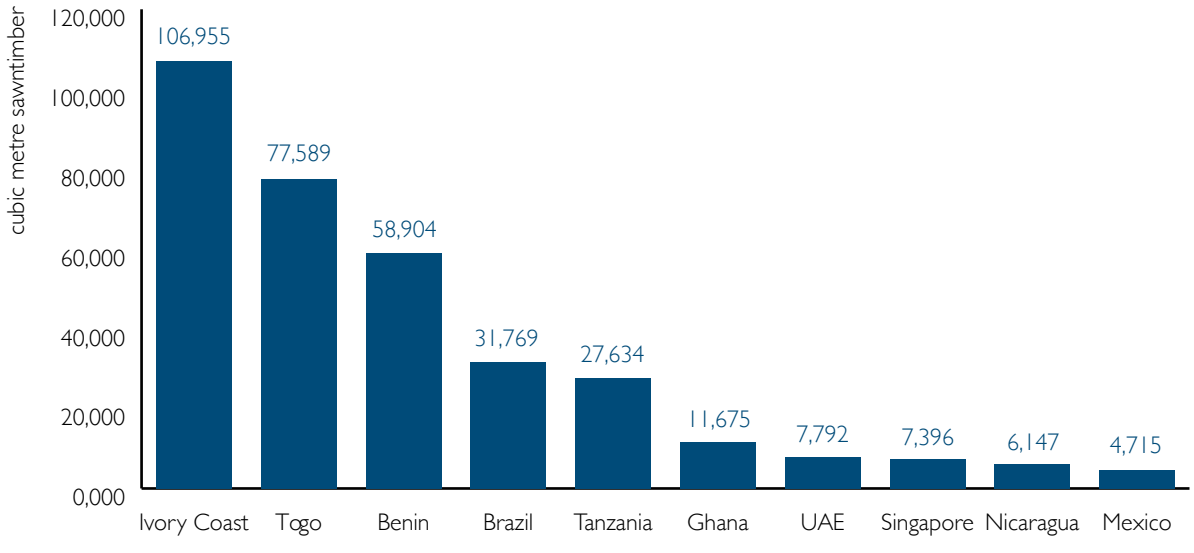
The global increase in the area of planted teak forests by approximately 500,000 ha from 2010 to 2022 may raise concerns about the resulting environmental and social impacts, particularly in those countries where teak is not an indigenous species. The environmental and social impacts of planted forests, including teak, eucalyptus, pine and other species, have long been the subject of controversy, reflected in arguments for or against the conservation of biodiversity, water supply, soil erosion, carbon sequestration, landscape management or other environmental and social services provided by forests.

The expansion of the planted forest area will certainly have an impact on the provision of such services. Planted forests do not purport to provide the same social, environmental and economic functions as natural forests. Therefore, planning, management, use and monitoring mechanisms for planted forests need to be designed and implemented in a way that promotes positive impacts and minimizes negative ones. On deforested and degraded forest lands, unprofitable or marginal agricultural land, shifting cultivation areas or other abandoned and fallow land, planted forests is a viable land use option, similar to intensively managed livestock and cash crops in agriculture, horticulture or aquaculture (FAO, 2010a). In this context, it does not seem helpful to compare the environmental and social services of ideal natural tropical forests with those of planted forests. Rather, such comparisons should be made with realistic alternative land uses, such as agriculture or livestock farming.

Quantifying and qualifying the environmental and social features of planted teak forests was not included in the questionnaire survey on which this report is largely based, as substantial information on this subject can be found mainly in the technical literature. Boxes 3 and 4 provide a condensed overview of the main positive and adverse aspects drawn from these sources.

Figure 15

The top ten source countries of teak sawntimber exports to India 2022



Source: UN Comtrade database

Box 3

Summary of positive environmental and social features of planted teak forests

Use of ssupportive regulatory framework and management practices. The use of policy and regulatory frameworks, environmental impact assessments and good management practices in the establishment, management, harvesting and use of planted teak forests helps to maintain environmental functions and improve forest health. The application of sound biosecurity measures and the adoption of integrated pest management approaches can reduce the risk of forest fires, control pest and disease outbreaks, and minimize the incidence and impact of invasive species.

Socio-economic significance. The vast majority (99 percent) of planted teak forests are grown for timber production, with the aim of producing large homogeneous quantities of timber. As the harvest from natural teak forests continues to decline, planted forests will continue to emerge as an alternative source of wood and wood products for corporate and smallholder investors for commercial or subsistence purposes. As such, planted teak forests can support rural livelihoods, help communities improve their standard of living, provide a financially attractive option for forest landscape restoration and contribute to sustainable development.

Multiple values. Planted teak forests can reduce the pressure on natural teak forests for forest products and allow them to be designated for other protection and conservation purposes. They can also complement and supplement the REDD and REDD+ initiatives to reduce greenhouse gas emissions from deforestation and forest degradation in tropical countries. As such, planted teak forests have multiple values, many of which cannot be provided by other types of land use.

Ecological landscape element. Planted teak forests form ecological corridors and maintain biological connectivity in the landscape, particularly where intact remnants of natural forest are maintained within the planted area as reservoirs for biodiversity conservation.

High carbon sequestration. Planted teak forests are a fast-growing resource with the capacity to sequester carbon on a large scale, helping to mitigate climate change. A model calculation based on IPCC technical specifications shows that the area of 4.85 million hectares of planted teak in the world would have the potential to sequester annually 22.54 million tonnes of carbon or 82.64 million tons of CO_2 (see Table 11). For the investor, carbon sequestration is seen as an additionality or environmental service that adds value to the resource and can help increase its cash flow. Even after harvesting, teak is mainly used in durable products and is a good choice for generating carbon credits.

Sources: Arbaro Advisors, 2022. Centeno, 1997. Chandrashekara, 2023. De Camino and Morales, 2013. FAO, 2010a. Thanuthamcharoen, 2023. Vílchez and Luján, 2013.

Table 11

Potential annual carbon capture by planted teak forests

Continent	Area 1000 ha	MAI m^3/ha/yr	Carbon capture	
			10^3 tons C/yr	Gg CO_2/yr
Africa	625.59	10.5	2,162.94	7,930.78
Asia and Oceania	3,866.95	14.5	18,462.98	67,697.61
Latin America	360.85	16.1	1,913.01	7,014.38
World	4.853.39	14.1*	22,538.94	82,642.77

*Notes: *weighted average; Gg = Gigagrams; 1 Gg is equivalent to 1,000 tons. Calculation method according to the IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG-LULUCF).*

Source: Glauner, 2024.

Box 4

Summary of adverse environmental and social features of planted teak forests

Lack of regulatory framework and poor management. The lack of professional capacity and ability to provide enabling policies, laws, regulations, plans and technical support systems (e.g. forest extension services) has led to controversies and poor management of planted forests. The selection of unsuitable sites for teak plantations has resulted in negative impacts on the physical environment, particularly on soil fertility and erosion.

Socio-economic impacts. Poor planning and management of planted teak forests can affect landscapes that people value, alienate people from their traditional lands, and undermine the relationships that hold communities and societies together. These impacts are exacerbated and often lead to the failure of reforestation projects when local forest-dependent communities, Indigenous peoples and minority groups have not been involved in management decisions that affect their lives and livelihoods.

Clearance of valuable natural ecosystems and impacts on biodiversity. The impact of planted teak forests on landscape diversity depends largely on the resource conditions that existed before the land was planted. Replacing natural forests, especially primary forests, ecologically important ecosystems (e.g. protected areas, high conservation value forests, wetlands, peatlands) or fertile agricultural land with planted teak forests is unacceptable as it would cause unwanted damage to valuable ecosystems or threaten livelihoods. These areas need to be integrated and managed at a landscape scale within comprehensive forest plantation programs to promote connectivity between existing native ecosystems.

Impacts of monoculture. The cultivation of pure teak monocultures reduces the natural plant and animal biodiversity and promotes the outbreak of pests and diseases due to the limited diversity of species. During the dry season, teak leaf fall is significant and without soil moisture, these leaves cannot decompose and pose a serious fire risk. The risk of fire is thought to be highest in those management units close to local farmers or people. In the wet season, with little undergrowth and no mixed root system ecology, water run-off causes soil erosion, especially on slopes, and the soil can become compacted and nutrient deficient. Negative soil effects can be offset by planting nitrogen-fixing legumes (e.g. *Pueraria spp.*) to provide a temporary ground cover with the consequent benefits of retaining moisture and reducing erosion during the dry season.

Pollution from the use of chemicals. The use of chemical products (herbicides, insecticides, fungicides) is concentrated in the nurseries, after planting and in the first few years, decreasing as the trees grow.

Sources: Arbaro Advisors, 2022. Centeno, 1997. Chandrashekara, 2023. De Camino and Morales, 2013. FAO, 2010a. Thanuthamcharoen, 2023. Vílchez and Luján, 2013.

Chapter 4
Short Profile of Major Teak Producing Countries

CONTENTS

4.1 Africa

Benin

The planting of teak has a long tradition in Benin. It was introduced in 1916 and has been intensively planted ever since. Most teak plantations are located in the southern half of the country between Cotonou and Tchaourou in the centre. The most commonly used planting material is from Tanzanian and local provenances (Hounlonon et al., 2017). Many plantations have been established by farmers and are managed under a coppice regime (Yevide et al., 2014). In Benin, it is common to use teak leaves as a substitute for polyethylene bags in food packaging to combat environmental pollution (Aoudji et al., 2015).

Statistical country data	Benin
Areas	
Total forest area	3.135 million ha
Natural teak forests	–
Planted teak forests	50,000 ha of which 15,000 ha have protective function
Age class distribution of production forest	77% in age class 0-20 yrs; 22% in age class 21-40 yrs; 1% in age class 41-60 yrs
Ownership of production forest	64% public ownership, 1% private corporate ownership, 35% private smallholder ownership
MAI	5.0 to 6.4 m^3/ha/yr
Rotation period	30 to 40 yrs
Log removals 2022	89,975 m^3
Log prices	
Domestic	112/172/330 USD/m^3 (small/medium/big logs)
Export	–/690/890 USD/m^3 (small/medium/big logs)
Roundwood trade	
Exports	to India: 14,021 m^3 at 8,652,540 USD; to China: 256 m^3 at 89,682 USD;
Imports	no records
Sawntimber trade	
Exports	to USA: 39 m^3 at 148,584 USD;
Imports	no records

Ghana

Ghana is the number one producer of teak in Africa and is committed to increasing its production. Teak is also the most exported timber species from Ghana in terms of both volume and value. Teak was introduced in 1900 with seeds mainly from India and Myanmar. In the 1970s, the government embarked on a large-scale plantation initiative as part of the Rural Development Programme. The Ghana Timber Legality Assurance System (GhLAS) was developed under the European Union's Forest Law Enforcement, Governance and Trade (FLEGT) framework to improve transparency, efficiency and legality in the downstream industry and timber trade (NN, 2022).

In September 2022, the Forestry Commission of Ghana hosted the 4th World Teak Conference, the first to be held in Africa.

Statistical country data	Ghana
Areas	
Total forest area	7.986 million ha
Natural teak forests	–
Planted teak forests	210,000 ha, of which 10,500 ha have protective function
Age class distribution of production forest	91% in age class 0-20 yrs; 5% in age class 21-40 yrs; 3% in age class 41-60 yrs, 1% in age class 61-80 yrs.
Ownership of production forest	70% in public ownership, 23% in private corporate ownership, 7% in private smallholder ownership
MAI	4.0 to 8.0 m^3/ha/yr
Rotation period	10 to 30 yrs
Log removals 2022	235,863 m^3
Log prices	
Domestic	41/55/91 USD/m^3 (small/medium/big logs)
Export	300/350/400 USD/m^3 (small/medium/big logs)
Roundwood trade	
Exports	to India: 186,643 m^3 at 61,105,220 USD;
Imports	no records
Sawntimber trade	
Exports	to India: 11,675 m^3 at 4,768,241 USD;
Imports	no records

Ivory Coast

Teak is the major plantation species in Ivory Coast which is one of the leading teak producers in Africa. Introduced in 1927 with seeds from Togo (Belouard, 1957), teak was first established in 1929 in the border zone between closed forest and savannah near Bouaké in the center of the country. In 1966, the state-owned Forest Development Company (Société de développement des fôrets, SODEFOR) - was created to conserve and manage the country's forest resources and promote reforestation and plantation establishment. SODEFOR established large mechanized teak plantations in state-owned forests, speeding up the rate of planting (Maldonado and Louppe, 2000). In 2022, Ivory Coast was the largest exporter of sawntimber to India (see Figure 15).

Ivory Coast did not report for the TRMA 2022; all data given below are from other sources.

Statistical country data	Ivory Coast
Areas	
Total forest area	2.837 million ha
Natural teak forests	–
Planted teak forests	66,000 ha (ITTO, 2009)
Age class distribution of production forest	17% in age class 0-20 yrs; 2% in age class 21-40 yrs; 4% in age class 41-60 yrs (TRMA 2010)
Ownership of production forest	63% in public ownership, 1% in private corporate ownership and 36% in private smallholder ownership (TRMA 2010).
MAI	5.0 to 12.0 m^3/ha/yr (TRMA 2010)
Rotation period	4 to 50 yrs (TRMA 2010)
Log removals 2022	n. i. a.
Log prices	
Domestic	n. i. a.
Export	n. i. a.
Roundwood trade	
Exports	to India: 1,518 m^3 at 781,256 USD
Imports	no records
Sawntimber trade	
Exports	to India: 106,955 m^3 at 7,157,604 USD; to China: 476 m^3 at 284, 271 USD ;
Imports	no records

Nigeria

The origin of teak in Nigeria is not well documented, but it was probably imported from Myanmar, possibly in 1889. There was no significant planting programme until the 1960s, when most of the existing stands were managed as coppice (Lowe, 1976). In 2010, FAO estimated the total plantation area in Nigeria to be about 382,000 ha, with teak and gmelina accounting for about 44 percent of the estimated plantation area (FAO, 2010b).

Nigeria is Africa's second largest timber producer (after Ethiopia), with an estimated annual harvest of 77.3 million cubic metres. However, most of this production is burned as fuel (FAOSTAT). The industrial forestry sector is also relatively large, producing sawntimber, plywood, particleboard and paper almost exclusively for local consumption. Small quantities of roundwood and sawntimber are exported to India and China.

Nigeria did not report for the TRMA 2022; all data below are from other sources.

Statistical country data	Nigeria
Areas	
Total forest area	21.627 million ha
Natural teak forests	–
Planted teak forests	146,000 ha (TRMA, 2010)
Age class distribution of production forest	n. i. a.
Ownership of production forest	n. i. a.
MAI	n. i. a.
Rotation period	n. i. a.
Log removals 2022	n. i. a.
Log prices	
Domestic	n. i. a.
Export	n. i. a.
Roundwood trade	
Exports	to India: 18 m^3 at 18,499 USD; to China: 25 m^3 at 9,975 USD.
Imports	no records
Sawntimber trade	
Exports	to India: 366 m3 at 147,935 USD; to China: 69 m3 at 30,690 USD.
Imports	no records

Tanzania (United Republic of)

Teak was first introduced by German foresters in 1906 through seeds originating from the Calcutta region of India, that were later supplemented by other provenances from South India. Most of the teak stands in Tanzania are found in the foothills of the eastern mountain ranges and in well drained low-lying areas of sufficient rainfall in Southern Tanzania, e.g. Kihuhwi, Longuza, Mtibwa, Kiroka, Longuza and Mtibwa Forest Reserves (Rance and Monteuuis, 2004).

Tanzania is the leading exporter of sawntimber in Africa and one of the top five exporters of teak sawntimber in the world (see Figure 13 and Figure 15).

Statistical country data	Tanzania (United Republic of)
Areas	
Total forest area	45.745 million ha
Natural teak forests	–
Planted teak forests	13,531 ha
Age class distribution of production forest	89% in age class 0-20 yrs; 1% in age class 21-40 yrs; 10% in age class 41-60 yrs.
Ownership of production forest	33% in public ownership, 59% in private corporate ownership, 8% in private smallholder ownership
MAI	3.0 to 12.0 m^3/ha/yr
Rotation period	18 to 60 yrs
Log removals 2022	55,851 m^3
Log prices	
Domestic	193/283/320 USD/m^3 (small/medium/big logs)
Export	n. i. a.
Roundwood trade	
Exports	to India: 213 m^3 at 126,002 USD;
Imports	no records
Sawntimber trade	
Exports	to India: 27,634 m^3 at 15,314,762 USD; to China: 218 m^3 at 64,608 USD;
Imports	no records

Togo

Teak is the main commercial tree species in Togo, a country with little forest cover. Teak plantations were introduced from Myanmar in 1905 by German foresters and have adapted well to the country. The species is widely used in agroforestry plantations using the taungya system, as street trees and in commercial plantations. A silvicultural system to induce natural regeneration has been developed by ODEF (office de développement et d'exploitation des forêts) and is practised in some of the older teak stands. Most of the teak plantations are located in the Permanent Forest Estate. Since 2000, there has been some modest private investment in teak plantations on private land (ITTO, 2005).

Teak is mainly exported as sawntimber to India.

Statistical country data	Togo
Areas	
Total forest area	1.209 million ha
Natural teak forests	–
Planted teak forests	30,680 ha
Age class distribution of production forest	80% in age class 0-20 yrs; 20% in age class 21-40 yrs;
Ownership of production forest	100% in public ownership
MAI	5.2 to 7.1 m^3/ha/yr
Rotation period	30 to 40 yrs
Log removals 2022	67,202 m^3
Log prices	
Domestic	210/330/600 USD/m^3 (small/medium/big logs)
Export	n. i. a.
Roundwood trade	
Exports	to India: 183 m^3 at 65,869 USD;
Imports	no records
Sawntimber trade	
Exports	to India: 77,589 m^3 at 24,162,004 USD; to China: 33 m^3 at 16,429 USD;
Imports	no records

4.2 Asia

China

Teak has been present in China for almost 200 years and is now extensively planted in more than 60 counties or cities in 10 provinces in tropical southern China, including Guangxi and Xishuangbanna provinces and Hainan Island (Baoguo et al., 2020). Unlike many other countries, China has a significant area of teak plantations that are over 40 years old (approximately 3,700 ha) and managed in longer rotations. The term 'China teak', widely used in the timber trade, is not *Tectona grandis* but a fast-growing species of *Paulownia spp.*

China is the world's largest importer of timber. The total value of China's imports of forest products exceeded USD 50 billion in 2022 (FAOSTAT). Although China's imports of teak roundwood in 2022 are less than 3 percent of India's imports, China has a strong demand for teak sawntimber, valued at around USD 30 million in 2022. In contrast to India, where teak is mainly used for construction, China uses teak mainly to produce wooden furniture for export (Midgley et al., 2015a).

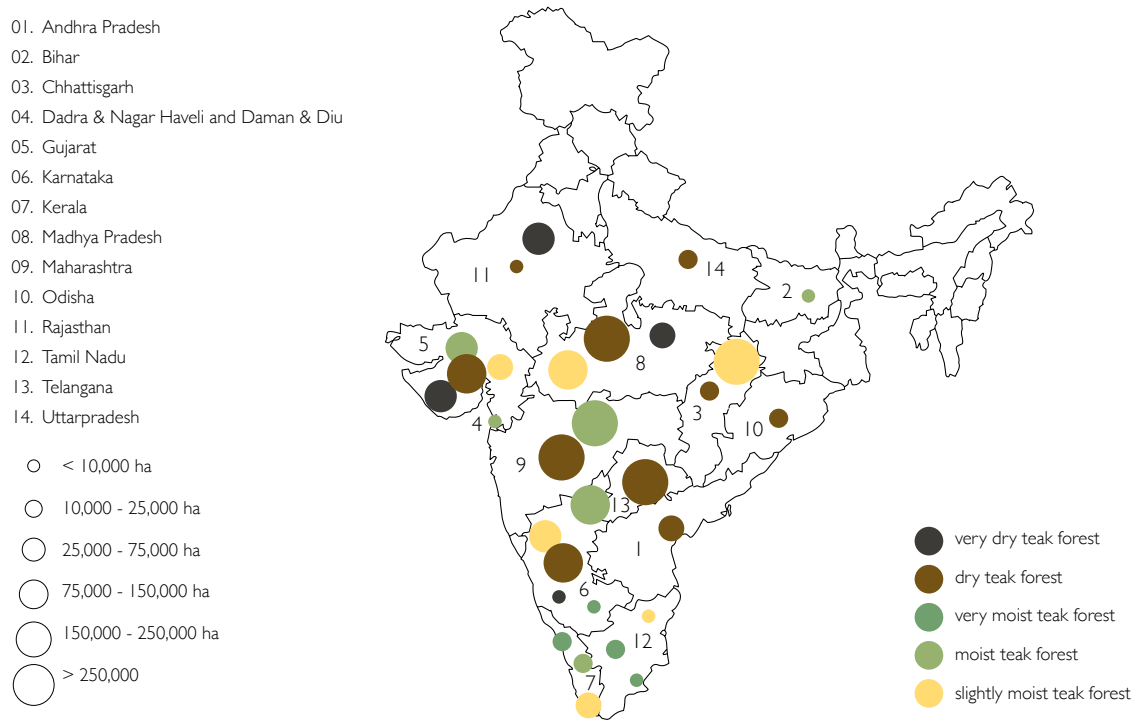
Statistical country data	China
Areas	
Total forest area	219.978 million ha
Natural teak forests	–
Planted teak forests	35,000 ha, of which 7,000 ha have protective function.
Age class distribution of production forest	48% in age class 0-20 yrs; 36% in age class 21-40 yrs; 11% in age class 41-60 yrs, 3.5% in age class 61-80 yrs, 1.5% in age class 81-100 yrs.
Ownership of production forest	29% in public ownership, 40% in private corporate ownership, 31% in private smallholder ownership
MAI	0.40 to 28.6 m^3/ha/yr
Rotation period	20 to 50 yrs
Log removals 2022	3,500 m^3
Log prices	
Domestic	363/1070/2094 USD/m^3 (small/medium/big logs)
Export	n. i. a.
Roundwood trade	
Exports	Total: 87 m^3 at 107,669 USD;
Imports	Total (from 13 countries): 24,481 m^3 at 12,360,494 USD Top 3 countries: 1) Brazil: 8,397 m^3 at 3,863,030 USD 2) Venezuela: 6,089 m^3 at 2,287,745 USD 3) Myanmar: 3,969 m^3 at 3,564,982 USD
Sawntimber trade	
Exports	Total: 1,172 m^3 at 1,758,167 USD;
Imports	Total (from 25 countries): 54,241 m^3 at 30,583,486 USD Top 3 countries: 1) Lao PDR: 40,665 m^3 at 20,683,637 USD 2) Myanmar: 6,900 m^3 at 5,720,442 USD 3) Brazil: 2,027 m^3 at 1,749,210 USD

India

India holds one fifth (22 percent) of the world's teak resources. It has the third largest area of natural teak forests (after Myanmar and Thailand), all of which are protected from logging. Madhya Pradesh and Maharashtra are the states with the largest area of native teak (see Figure 16). Historically, the teak forests in Kerala along the south-western coast of India were known as Malabar teak. India has also the largest area of planted teak forests. The town of Nilambur in Kerala is home to the world's oldest teak plantation (Conolly's plot), established in 1841. India usually manages its teak plantations in longer rotations above 50 years. On the demand side, India accounted for 97 percent of global roundwood imports and 26 percent of global sawntimber imports (356,814 cubic metres) in 2022. The teak sawntimber imports to India were surpassed only by the Netherlands as the largest importer of teak sawntimber (630,558 cubic metres). India's imports have increased 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 percent of the teak wood processed (Midgley et al, 2015a). The increase in Indian demand has been met largely by plantation teak from South America (roundwood) and Africa (sawntimber).

Figure 16

Distribution map of teak forests in India



Source: Forest Survey of India, 2021. Credit: S. Sandeep, Kerala Forest Research Institute.

India

Statistical country data	
Areas	
Total forest area	72.160 million ha
Natural teak forests	5,935,000 ha
Planted teak forests	1,693,0894 ha
Age class distribution of production forest	n. i. a.
Ownership of production forest	100% in public ownership
MAI	n. i. a.
Rotation period	50 to 80 yrs (planted teak)
Log removals 2022	50,000 m^3
Log prices	
Domestic	n. i. a.
Export	n. i. a.
Roundwood trade	
Exports	Total: 359 m^3 at 7,880 USD;
Imports	Total (from 43 countries): 954,348 m^3 at 292,385,568 USD Top 3 countries: 1) Colombia: 257,729 m^3 at 11,467,290 USD 2) Ecuador: 187,728 m^3 at 71,520,205 USD 3) Ghana: 186,643 m^3 at 61,105,220 USD
Sawntimber trade	
Exports	Total: 1,285 m^3 at 3,459,860 USD;
Imports	Total (from 39 countries): 356,814 m^3 at 111,321,306 USD Top 3 countries: 1) Ivory Coast: 106,995 m^3 at 7,157,604 USD 2) Togo: 77,589 m^3 at 15,517,065 USD 3) Benin: 58, 904 m^3 at 24,162,004 USD

Indonesia

Indonesia has the second largest area of planted teak forests (after India). The dominant teak growing provinces are Central Java (23 percent of teak), East Java (23 percent), Yogyakarta (7 percent) and Southeast Sulawesi (14 percent); (see Figure 17). The teak plantations on the island of Java are controlled and managed by Perum Perhutani, a state-owned forest enterprise.

Introduced by Buddhist monks from Myanmar in the 14th -16th centuries, teak is said to have been expanded into larger plantations by the Dutch to construct their ships on the spice routes of the Dutch East Indies (Gloster, 2023). Some of Indonesia's teak, for both domestic and international markets, comes from small, family-owned plantations, often established in the taungya system, which provides additional income for farmers throughout Java (Hickman, 2014).

The teak harvested in Indonesia is mainly used for the production of furniture for export. To this end, the Indonesian government established its own forest certification scheme - Lembaga Ekolabel Indonesia (LEI) - in 1993. By 2022, nearly 500,000 hectares of forest plantations managed by Perum Perhutani have been certified (Prabowo, 2022).

There is no export of roundwood and negligible export of sawntimber from Indonesia.

Figure 17

Distribution map of planted teak forests in Indonesia

The greater the intensity of green, the greater the teak plantation area.

Source: Badan Pusat Statistik (BPS).

Statistical country data	Indonesia
Areas	
Total forest area	92.133 million ha
Natural teak forests	–
Planted teak forests	1,269,000 ha (TRMA 2010).
Age class distribution of production forest	75% in age class 0-20 yrs; 25% in age class 21-40 yrs;
Ownership of production forest	n. i. a.
MAI	up to 10.0 m^3/ha/yr
Rotation period	20 to 30 yrs
Log removals 2022	639,234 m^3
Log prices	
Domestic	62/165/464 USD/m^3 (small/medium/big logs)
Export	n. i. a.
Roundwood trade	
Exports	No records
Imports	No records
Sawntimber trade	
Exports	Total (to 16 countries): 170 m^3 at 319,023 USD
Imports	No records

Lao PDR

Teak is a priority native species in Lao PDR. In the 1970s, the country had about 70,000 ha natural teak forests, which by 2022 was found to have decreased to about 16,000 ha. They are mainly located in Provincial Protected Areas in Sayabouly and Bokeo provinces in northwestern Lao PDR, bordering Thailand and Myanmar. They form the easternmost limits of teak's natural range in the world, play an important role in environmental protection and are a recognized source of seed for plantations. They enjoy special protection status under national legislation (Vongvilay et al., 2022).

Teak has been established by private companies and rural communities in plantations and agroforestry production systems on abandoned farmlands in the provinces of Luang Prabang, Sayabouli, and Champassak. The expansion of smallholder teak plantations in the past decade has contributed to a transition from swidden farming landscape to a forested landscape, in line with the government policy objective to eliminate swidden agriculture and increase the nation's forest cover. Today, teak occupies about 10 percent of the total plantation area in Lao PDR, while rubber occupies about 50 percent (Vongvilay et al., 2022).

Lao PDR exports of timber from plantations are dominated by teak, a large proportion of which is in the form of sawntimber. The main markets are China and Thailand. Recently, India is emerging as a purchaser of Lao teak (Midgley et al., 2011, Midgley et al., 2015b).

Statistical country data	Lao PDR
Areas	
Total forest area	16.596 million ha
Natural teak forests	16,000 ha
Planted teak forests	50,000 ha
Age class distribution of production forest	65% in age class 0-20 yrs; 35% in age class 21-40 yrs;
Ownership of production forest	10% in public ownership, 13 % in private corporate ownership, 77% in private smallholder ownership
MAI	3.4 – 21.3 m^3/ha/yr
Rotation period	15-30 yrs
Log removals 2022	10,000 m^3
Log prices	
Domestic	–/100/260 USD/m^3 (small/medium/big logs)
Export	–/275/375 USD/m^3 (small/medium/big logs)
Roundwood trade	
Exports	to China: 608 m^3 at 258,392 USD; to India: 152 m^3 at 74,080 USD
Imports	No records
Sawntimber trade	
Exports	to China: 40,665 m^3 at 20,683,637 USD; to Thailand: 3,492 m^3 at 5,609,000 USD;
Imports	No records

Myanmar

Teak is indigenous to Myanmar. The country has half (51 percent) of the world's natural teak forests and the third largest area of planted teak (after India and Indonesia). Substantial experience has been gained since 1856 in the management of natural and planted teak forests that are both concentrated in the hilly Bago Yoma region in central Myanmar. Natural teak forests are traditionally managed under the Myanmar Selection System (MSS) and the Modified Myanmar Selection System (MMSS), both of which are considered outdated and need to be adjusted to cope with modern requirements. `Burmese teak` sets the gold standard for timber quality and Myanmar is the only country to produce large teak logs from natural forests, which have a price advantage over small logs from planted forests that have been established in Myanmar since the 1970s (Zar Chi Zlaing, 2022).

Forests in Myanmar are classified into six major types: (1) mangrove forests (including tidal, beach and dune, and swamp forests), (2) tropical evergreen forests, (3) mixed deciduous forests, (4) dry forests, (5) deciduous dipterocarp forests, and (6) hill and temperate evergreen forests.

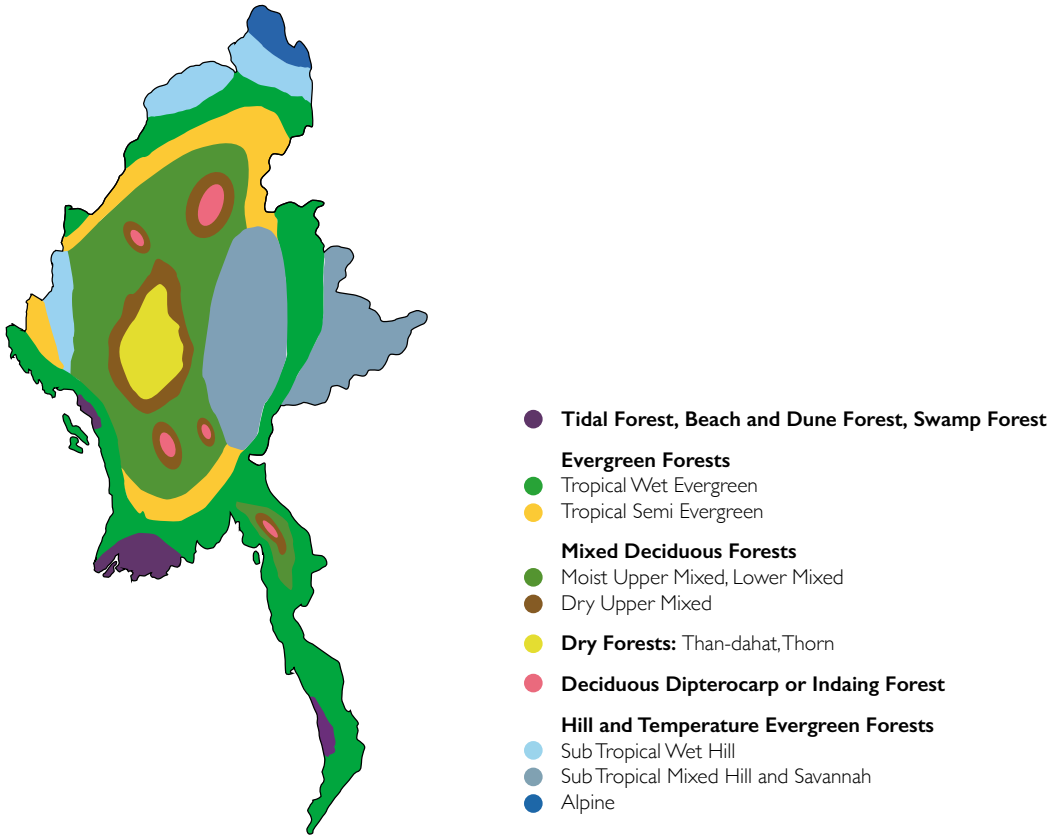
Teak is common in the mixed deciduous forests of central Myanmar, which make up the majority of the forest area (38 percent), where teak is mixed with a number of other species (see Figure 18).

The best quality teak with a smooth cylindrical bole is said to grow in the dry upper mixed deciduous forests where growth is slow, logs are short and the wood has a high density. In the moist deciduous forests growth is faster and the logs are longer, but they may be fluted, and the wood is not as dense (Ko Ko Gyi, 2023).

The forestry sector has contributed significantly to the country´s economy and teak has been a major source of export earnings since a long time. In recent years, substantial new policy regulations have been imposed to support the conservation and sustainable management of teak forests. In April 2014, Myanmar introduced a log export ban to promote local processing, which triggered a rapid increase in the global demand for high-quality logs. Until then, Myanmar was the world's largest supplier of teak logs and sawntimber, a supply largely maintained through harvesting of natural forests. The log export ban coupled with forest trade reforms has considerably reduced the

Figure 18

Distribution map of major forest types in Myanmar



Source: Armstrong, K., 2004, quoted after Zar Chi Zlaing, 2022.

availability of mature high-quality teak from Myanmar to global markets (Midgley et al., 2015b).

Still, in 2022, there was a small amount of roundwood exported to China, and according to the UN Comtrade export statistics, Myanmar was the third largest sawntimber exporter after Singapore and Brazil; sawntimber exports amounted to 9,317 cubic metres valued at 7 million USD (see Figure 12). It should be noted, however, that these data do not correspond to the volume of trade reported by all countries that imported teak sawntimber from Myanmar. The total volume of sawntimber reported as imported from Myanmar by nine countries is 285,709 cubic metres with an estimated value of USD 538 million (see the compilation of statistical data below). The reasons for this large difference could not be clarified.

Statistical country data	Myanmar
Areas	
Total forest area	28.544 million ha
Natural teak forests	15,424,000 ha
Planted teak forests	476,831 ha
Age class distribution of production forest	46% in age class 0-20 yrs; 50% in age class 21-40 yrs; 4% in age class 41-60 yrs;
Ownership of production forest	87% in public ownership, 13% in private corporate ownership
MAI	n. i. a.
Rotation period	30 yrs
Log removals 2022	24,033 m^3 (thinnings in planted teak only)
Log prices (planted)	
Domestic	–/78/313 USD/m^3 (small/medium/big logs)
Export	–/71/1365 USD/m^3 (small/medium/big logs)
Log prices (natural)	
Domestic	–/101/458 USD/m^3 (small/medium/big logs)
Export	–/–/2372 USD/m^3 (small/medium/big logs)
Roundwood trade	
Exports	to China: 3,969 m^3 at 3,564,982 USD;
Imports	No records
Sawntimber trade	
Exports	Total (to 9 countries): 285,709 m^3 at 537,843,922 USD Top 3 countries: 1) Singapore: 266,949 m^3 at 481,309,768 USD 2) China: 6,900 m^3 at 5,720,442 USD 3) India: 3,010 m^3 at 7,587,436 USD
Imports	No records

Thailand

Teak is indigenous to Thailand. The country has almost one third (29 percent) of the world's natural teak forests and the fourth largest area of planted teak (after India, Indonesia, Myanmar). Natural teak mainly grows in the mixed deciduous forests of north-western Thailand. They display a high genetic diversity and form the genetic resource base for the production of teak germplasm (seedlings and clones) that is globally used in many tropical countries for plantation establishment. In 1989, the Royal Forestry Department introduced a logging ban in natural forests to halt their further depletion, which may have contributed to the recovery of natural teak forests that have been intensely harvested since the end of the 19th century. Currently, teak logging in Thailand is only possible in planted teak forests.

Thailand has a history of more than 100 years of establishing and managing teak plantations. The first teak plantation was established in 1903 adopting the taungya agroforestry system from Myanmar. Since the 1960s teak has been planted on large scale to substitute for the rapid decline of natural teak forests and to meet domestic and international demands. Today, teak is promoted as one of the priority species for planting in Thailand and exempted from the list of restricted species (Boonsermsuk, 2022).

The country has mature, sophisticated wood-processing industries that were heavily reliant upon Myanmar, particularly for supplies of high-quality teak from native forests. Myanmar´s log export ban and policy reforms have had a considerable impact upon wood supply and industry output in Thailand and resulted in a shift to use more plantation-grown timbers from both domestic and imported sources (Midgley et al., 2015b). Trade is now highly dependent on the import of sawntimber from Lao PDR and Myanmar and the export of finished and semi-finished teak products.

In March 2013, the Plant Genetic Conservation Project (RSPG) under the Royal Initiative of Her Royal Highness Princess Maha Chakri Sirindhorn hosted the 2nd World Teak Conference in Bangkok.

Statistical country data	Thailand
Areas	
Total forest area	19.873 million ha
Natural teak forests	8,840,000 ha
Planted teak forests	216,600 ha
Age class distribution of production forest	45% in age class 0-20 yrs; 35% in age class 21-40 yrs; 20% in age class 41-60 yrs;
Ownership of production forest	0% in public ownership, 70 % in private corporate ownership, 30% in private smallholder ownership
MAI	4.5 – 8 m^3/ha/yr
Rotation period	20-40 yrs
Log removals 2022	66,521 m^3 (thinnings in planted teak only)
Log prices	
Domestic	200/840/– USD/m^3 (small/medium/big logs)
Export	–/750/– USD/m^3 (small/medium/big logs)
Roundwood trade	
Exports	to China: 687 m^3 at 563,779 USD to India: 392 m^3 at 235,000 USD to Vietnam: 137 m^3 at 7,000 USD
Imports	from Brazil: 23 m^3 at 13,097 USD
Sawntimber trade	
Exports	Total: 4 m^3 at 2,223 USD
Imports	Total (from 6 countries): 5,943 m^3 at 7,673,802 USD Top 3 countries: 1) Lao PDR: 3,492 m^3 at 1,500,653 USD 2) Myanmar: 2,153 m^3 at 5,599,792 USD 3) Brazil: 194 m^3 at 322,251 USD

Vietnam

Teak is not native to Vietnam. It was first introduced in 1889 by French foresters largely in parks and along road sides. Small-scale plantings were made from 1952, which suffered losses from war and land trespass. Post-war efforts have established plantations in the regions of Northwest (56 percent), Central Highlands (14 percent) and Southeast Vietnam (29 percent) (Dang Thinh Trieu et al., 2022). Teak was a preferred species for planting in the two national large-scale reforestation programs (Re-greening of Barren Land (Project 327, 1993-1998), and the Five Million Hectare Reforestation Program (1998-2010)). Smallholder forest owners currently manage approximately 74 percent of the teak plantation area in agro-forestry production systems with an average size of 2 to 3 ha per household.

Teak improvement programs to produce high-performance clones are under development, as the existing plantations are of poor quality and unknown genetic origin. Still, the financial return of teak plantations is reported to be significantly higher compared to those of other short rotation species such as acacia and eucalypt (Dang Thinh Trieu et al., 2022).

Vietnam has a vibrant, modern, export-oriented wood furniture industry, which is highly dependent upon imported logs and sawntimber. Major trading partners are Latin American countries. Despite the size of the industry, there has been a recent reduction in imports of teak logs and sawntimber. 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 reported to be cheaper (Midgley et al., 2015b).

Statistical country data	Vietnam
Areas	
Total forest area	14.643 million ha
Natural teak forests	–
Planted teak forests	7,650 ha
Age class distribution of production forest	72.5% in age class 0-20 yrs; 24.1% in age class 21-40 yrs; 0% in age class 41-60 yrs; 3.3% in age class 61-80 yrs
Ownership of production forest	0% in public ownership, 26 % in private corporate ownership, 74% in private smallholder ownership
MAI	5.0 – 12.0 m^3/ha/yr
Rotation period	15-30 yrs
Log removals 2022	20,000 m^3
Log prices	
Domestic	300/600/--- USD/m^3 (small/medium/big logs)
Export	n. i. a.
Roundwood trade	
Exports	to India: 1,426 m^3 at 901,146 USD
Imports	Total (from 5 countries): 19,200 m^3 at 7,223,760 USD Top 3 countries: 1) Brazil: 11,964 m^3 at 5,297,709 USD 2) Guatemala: 4,060 m^3 at 619,820 USD 3) Costa Rica: 2,893 m^3 at 1,271,000
Sawntimber trade	
Exports	Total (to 4 countries): 964 m^3 at 363,100 USD
Imports	from Brazil: 1,806 m^3 at 1,152,695 USD from Nicaragua: 57 m^3 at 20,620 USD

4.3 Latin America

Brazil

Brazil is a major player in short-rotation teak plantations, as it has some geographical regions that offer exceptional environmental conditions for teak cultivation, coupled with the use of high-performing clones and the application of best silvicultural practices. Commercial teak plantations were established in Brazil as early as the 1970s (Takizawa and Caldeira, 2023). Figure 19 shows the geographical distribution of planted teak forests in Brazil. which has been developed based on the Agricultural Census carried out by the Brazilian Institute of Geography and Statistics (IBGE) in 2017. In particular, the state of Mato Grosso in central Brazil has the largest teak plantations, followed by Pará and Rondônia.

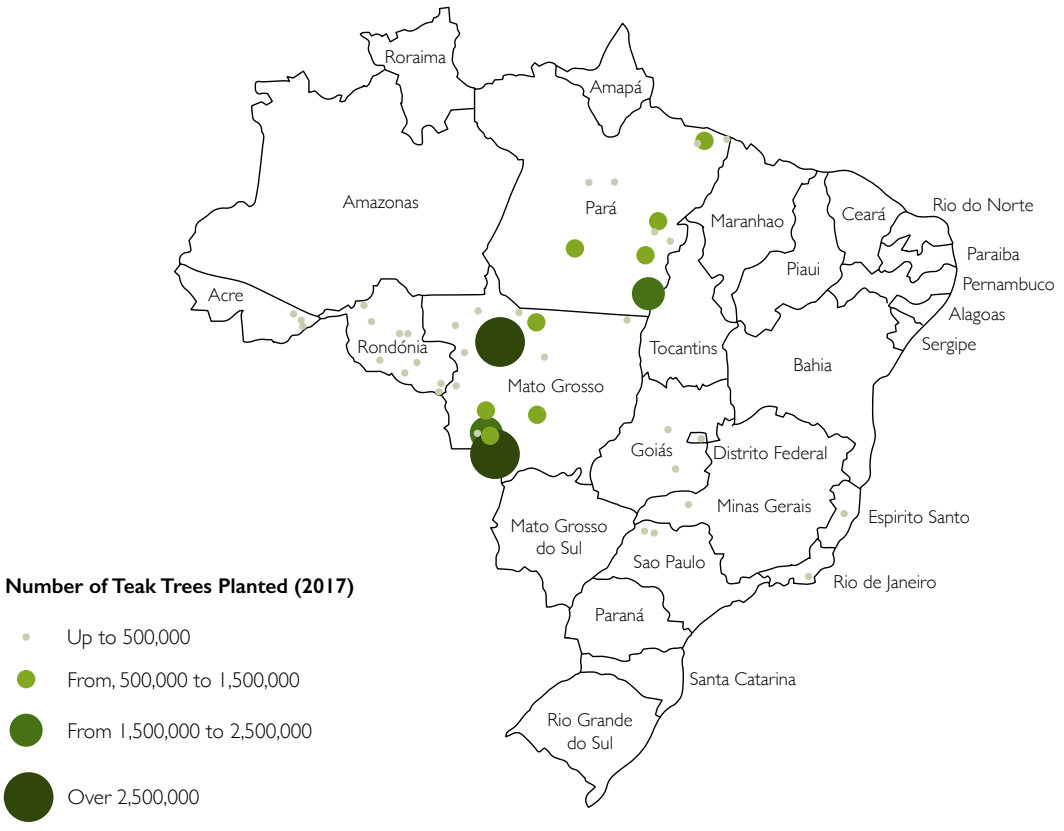
In Brazil, teak plantations are owned and managed by more than 100 companies, making it difficult to obtain complete data. The actual plantation area is therefore likely to be higher than the reported 64,000 ha. It is currently estimated that there are approximately 100,000 ha of planted teak forests in Brazil, all of which are used for production purposes.

Brazil exports teak roundwood and sawntimber to many countries in all continents. Its teak trading volume exceeds USD 30 million.

A comprehensive overview and analysis of the teak sector in Brazil has been recently published in the book 'Teca *(Tectona grandis L. f.)* no Brasil' (Reis et al., 2023, in Portuguese language).

Figure 19

Geographical distribution of planted teak forests in Brazil



Source: Agricultural Census 2017; Brazilian Institute of Geography and Statistics (IBGE). Credit: Alessandra da Cunha Moraes-Rangel, Embrapa Florestas.

Statistical country data	Brazil
Areas	
Total forest area	496.620 million ha
Natural teak forests	–
Planted teak forests	63,919 ha
Age class distribution of production forest	83.4% in age class 0-20 yrs; 16.6% in age class 21-40 yrs;
Ownership of production forest	100% in private corporate ownership
MAI	7.65 – 19.0 m^3/ha/yr
Rotation period	5-40 yrs
Log removals 2022	286,054 m^3
Log prices	
Domestic	58/100/195 USD/m^3 (small/medium/big logs)
Export	218/389/850 USD/m^3 (small/medium/big logs)
Roundwood trade	
Exports	Total (to 10 countries): 71,953 m^3 at 20,709,219 USD Top 3 countries: 1) India: 55,212 m^3 at 13,096,423 USD 2) Vietnam: 11,964 m^3 at 5,297,709 USD 3) China: 4,051 m^3 at 1,845,621 USD
Imports	No records
Sawntimber trade	
Exports	Total (to 14 countries): 18,365 m^3 at 10,493,726 USD Top 3 countries: 1) India: 14,566 m^3 at 6,910,959 USD; 2) Vietnam: 1,806 m^3 at 1,152,695 USD 3) China: 539 m^3 at 589,678 USD
Imports	No records

Colombia

Colombia has a high potential for teak cultivation due to its favorable climatic conditions and the presence of suitable soils (De Camino and Morales, 2013). The first teak seeds were brought to Colombia by the Texas Petroleum Company in the mid-1950s. The first trees were planted in the Magdalena Medio region, in the municipality of Puerto Boyacá in central Colombia (Torres et al., 2012). Later, most teak plantations were established in the Atlantic Coastal Plain region of Córdoba.

Colombia has a vibrant, export-oriented forestry industry. Its main trading partner is India. Teak logs are exported in containers as roundwood or as rough squares (S4S) in lengths of 2.20 m or 5.80m.

Statistical country data	Colombia
Areas	
Total forest area	59.142 million ha
Natural teak forests	–
Planted teak forests	32,370 ha
Age class distribution of production forest	95% in age class 0-20 yrs; 5% in age class 21-40 yrs;
Ownership of production forest	0% in public ownership, 70 % in private corporate ownership, 30% in private smallholder ownership
MAI	n. i. a.
Rotation period	20-24 yrs
Log removals 2022	n. i. a.
Log prices	
Domestic	n. i. a.
Export	200/300/– USD/m^3 (small/medium/big logs)
Roundwood trade	
Exports	to India: 257,729 m^3 at 11,467,290 USD
Imports	No records
Sawntimber trade	
Exports	to India: 727 m^3 at 312,788 USD to USA: 123 m^3 at 161,182 USD
Imports	No records

Costa Rica

In Central America, Costa Rica has led the development of forest plantations. The country has a long tradition of teak cultivation and has the second largest area of planted teak forests in the region, after Ecuador. Most teak plantations have been established on the Guanacaste peninsula on the Pacific side of the country. The species was introduced in 1926, probably from Sri Lankan seeds (FAO, 2002). Ever since, best management practices have been developed for the establishment and management of planted teak forests including the production of optimized planting material (e.g. clones, hybrids, tissue culture) that are also exported to other countries.

The government has established a successful incentive system for financing forest plantations known as Payment for Environmental Services (PES), a payment or compensation for carbon sequestering, soil, water, and bio-diversity protection and scenic beauty provided to society. Some of these services benefit not only the Costa Rican population, but also the global community, as is the case with carbon sequestering.

Many foreign companies, dedicated to plant, manage and sell teak timber and products, invested in Costa Rica, either establishing operations by themselves or subscribing contracts with local forest companies, that provide forestry services.

In November 2011, the research institute CATIE (Centro Agronómico Tropical de Investigación y Enseñanza) hosted the 1st World Teak Conference in San José.

Statistical country data	Costa Rica
Areas	
Total forest area	3.035 million ha
Natural teak forests	–
Planted teak forests	49,000 ha
Age class distribution of production forest	95% in age class 0-20 yrs; 5% in age class 21-40 yrs;
Ownership of production forest	0% in public ownership, 40 % in private corporate ownership, 60% in private smallholder ownership
MAI	5.0 – 8.3 m^3/ha/yr
Rotation period	16-20 yrs
Log removals 2022	74,153 (figure from TRMA 2010)
Log prices	
Domestic	40/75/100 USD/m^3 (small/medium/big logs)
Export	100/250/400 USD/m^3 (small/medium/big logs)
Roundwood trade	
Exports	Total (to 8 countries): 40,761 m^3 at 10,615,426 USD Top 3 countries: 1) to India: 43,202 m^3 at 20,284,317 USD 2) to Vietnam: 2,893 m^3 at 1,271,000 USD 3) to China: 2,144 m^3 at 916,263 USD
Imports	from Nicaragua: 336 m^3 at 50,691 USD
Sawntimber trade	
Exports	Total: 43 m^3 at 32,072 USD to Nicaragua and USA
Imports	Total: 252 m^3 at 31,807 USD from Panama

Ecuador

Ecuador has one of the largest areas of planted teak forests in Latin America, which has increased by 30,000 ha since 2010 (TRMA 2010). In 2015, the Ecuadorian Ministry of Agriculture (MAGAP) had launched a national support program that provides financial incentives for reforestation with commercial species, among them teak. The goal of this program was to reforest 120,000 ha in 5 years (Arbaro Advisors, 2022).

Teak was first introduced to Ecuador in the 1970s. Over 90 per cent of the teak plantations are in the northwestern coastal lowlands, in the provinces of Guayas, Manabí, Esmeraldas, El Oro, Los Ríos, Santo Domingo, and Santa Elena (Aguilar et al., 2019). Smallholder farmers plant teak in silvopastoral systems that span approximately 7,000 ha.

Ecuador has a vibrant timber industry and is one of the major teak exporting countries in Latin America. In 2022, the export value of teak roundwood and sawntimber exceeded USD 73 million, 98 percent from trade with India.

In May 2015, the producer and trade association ASOTECA (Asociación Ecuatoriana de Productores y Comercializadores de Teca y Maderas Tropicales), hosted the 3rd World Teak Conference in Guayaquil.

Statistical country data	Ecuador
Areas	
Total forest area	12.498 million ha
Natural teak forests	–
Planted teak forests	75,000 ha
Age class distribution of production forest	95% in age class 0-20 yrs; 5% in age class 21-40 yrs;
Ownership of production forest	0% in public ownership, 90 % in private corporate ownership, 10% in private smallholder ownership
MAI	6.3 – 8.3 m^3/ha/yr
Rotation period	18-20 yrs
Log removals 2022	73,630 (figure from TRMA 2010)
Log prices	
Domestic	100/–/150 USD/m^3 (small/medium/big logs)
Export	200/–/280 USD/m^3 (small/medium/big logs)
Roundwood trade	
Exports	Total (to 5 countries): 190,223 m^3 at 72,247,676 USD Top 2: 1) to India: 187,728 m^3 at 71,520,205 USD 2) to China: 1,308 m^3 at 322,117 USD
Imports	No records
Sawntimber trade	
Exports	Total (to 6 countries): 2,037 m^3 at 1,165,049 USD Top 2: 1) to India: 1,686 m^3 at 750,113 USD 2) to USA: 200 m^3 at 302,810 USD
Imports	No records

Panama

Panama has the second largest area of planted teak forests in Central America, after Ecuador, and is a major exporter of teak in the region, The country has the third highest proportion of planted teak coverage of any country (7.4 per mill, Kollert and Cherubini, 2012), though it accounts for only 1 percent of the estimated total area of planted teak forests worldwide.

Most teak plantations in Panama are located in the Panama Canal Watershed, in eastern Panama and the Darién Province bordering Venezuela. The members of the National Panamanian Association of Forest Farmers own almost 70 percent of the teak plantations in the country (FAO, 2002). Some of them are FSC certified and a new FSC Interim Forest Stewardship Standard (IFSS) for Panama has been published to become effective on 01 January 2024 (FSC, 2023).

A variety of incentive schemes and tax breaks have been introduced to encourage green investment and reforestation, including immigration visas for foreign investors, although these are not limited to teak. A major challenge for further teak expansion is the high price of suitable land (Sytsma, 2022).

In 2022, the export value of teak roundwood exceeded USD 45 million, 94 percent from trade with India.

Statistical country data	Panama
Areas	
Total forest area	4.214 million ha
Natural teak forests	–
Planted teak forests	49,000 ha
Age class distribution of production forest	95% in age class 0-20 yrs; 5% in age class 21-40 yrs;
Ownership of production forest	0% in public ownership, 90 % in private corporate ownership, 10% in private smallholder ownership
MAI	5.0 - 6.3 m^3/ha/yr
Rotation period	20-22 yrs
Log removals 2022	n. i. a.
Log prices	
Domestic	n. i. a.
Export	n. i. a.
Roundwood trade	
Exports	Total (to 10 countries): 362,037 m3 at 44,988,929 USD Top 3: 1) to India: 354,065 m^3 at 42,479,012 USD 2) to Vietnam: 5,737 m^3 at 2,093,727USD 3) to Germany: 644 m^3 at 139,981 USD
Imports	No records
Sawntimber trade	
Exports	No records
Imports	No records

Chapter 5
References

Aguilar, F., Nemmaoui, A., Peñalver, A., Rivas, J., Aguilar, M.A., 2019. Developing Allometric Equations for Teak Plantations Located in the Coastal Region of Ecuador from Terrestrial Laser Scanning Data. Forests. 10. 1-22. 10.3390/f10121050. Available at: https://www.researchgate.net/figure/Situation-map-of-the-three-teak-plantations-located-in-the-province-of-Guayas-Ecuador_fig1_339787701. Accessed on Dec, 14th, 2023.

Aoudji, A.K.N., Burny, P., Adégbidi, A., Ganglo, J.C., Lebailly, P. 2015. Scaling up the benefits of smallholder forestry beyond timber: success story of Teak (Tectona grandis L.f.) leaves marketing in Southern Benin. Tropicultura, 33, 4, 322-332.

Arbaro Advisors. 2022. Ecuador Teak Project. Environmental and Social Impact Assessment Information Package. https://www.arbaro-advisors.com/. Accessed on Dec 14th, 2023.

Badan Pusat Statistik (BPS), 2023. https://st2013.bps.go.id/dev2/index.php/site/tabel?tid=65&wid=0. Modified by J.M. Roshetko, G. Sabastian, and S. Meisari.

Ball, J. B., Pandey, D. and Hirai, S., 1999. Global overview of teak plantations. Regional Seminar: Site, Technology and Productivity of Teak Plantations. Chiang Mai, Thailand.

Balooni, K., 2011. Analysis of policy framework, structural obstacles and financing barriers in the Asian teak market. Presentation held at the Conferencia Mundial de Teca, San José, Costa Rica, 31 Oct to 2 Nov 2011.

Baoguo Yang, Hongyan Jia, Zhigang Zhao, Shengjiang Pang, Daoxiong Cai, 2020. Horizontal and Vertical Distributions of Heartwood for Teak Plantation. Forests 2020, 11(2), 225; https://www.mdpi.com/1999-4907/11/2/225. Accessed on Dec 12th, 2023.

Belouard, P., 1957. Le teck en Afrique occcidentale française. Abidjan, Côte d'Ivoire, Centre Technique Forestier Tropical (CTFT).

Boonsermsuk, S., 2022. Teak management in Thailand. In: Teak in Mekong for a Sustainable Future. Outcomes of the BMEL-ITTO Project: Enhancing Conservation and Sustainable Management of Teak Forests and Legal Supply Chains in the Greater Mekong Sub-region. Kasetsart University, Bangkok.

Brazilian Institute of Geography and Statistics (IBGE), 2018. Agricultural Census 2017.

Centeno, J.C., 1997. The management of teak plantations. ITTO Tropical Forest Update. Vol. 7(2): 10-12.

Chandrashekara, U.M., 2023. Wants and needs. In: Webster, T., Henderson, V. The Social Life of Teak, p. 237. ISBN 978-616-451-082-1. Bangkok.

Coillte Consult. 2006. Teak market, Central America focus. Consultancy report.

Dang Thinh Trieu, Tran Lam Dong, Nguyen Van Bich, 2022. Teak plantations in Vietnam. In: Teak in Mekong for a Sustainable Future. Outcomes of the BMEL-ITTO Project: Enhancing Conservation and Sustainable Management of Teak Forests and Legal Supply Chains in the Greater Mekong Sub-region. Kasetsart University, Bangkok.

De Camino, R., Alfaro, M.M., Sage, L.F.M., 2002. Teak (Tectona grandis) in Central America. FAO Plantations Working Papers FP/19, Rome. Available at http://www.fao.org/forestry/plantedforests/67508@170537/en/

De Camino, R., Morales, J.P., (Eds.), 2013. Las plantaciones de teca en América Latina: Mitos y realidades. Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), Turrialba, Costa Rica.

Del Lungo, A., 2001. Forest Plantation Resources, FAO data-sets 1980, 1990, 1995 and 2000. FAO Plantations Working Papers FP/14, Rome. Available at http://www.fao.org/forestry/plantedforests/67508@170537/en/

Demenois, J., Heurtaux, A., Depommier, D., Patil, S., 2005. Filière et développement du teck en Inde du Sud: quelle avenir pour les plantations privées? Bois et forêts des tropiques 286(4): 41-53.

FAO. 1995. Forest resources assessment 1990: tropical forest plantation resources. FAO Forestry Paper 128, Rome. Available at http://www.fao.org/docrep/007/v8330e/v8330e00.htm

FAO. 2001. Global Forest Resources Assessment 2000. Main report. FAO Forestry Paper 140. Rome. Available at http://www.fao.org/DOCREP/004/Y1997E/y1997e00.htm

FAO, 2002. Teak (Tectona grandis) in Central America. by R.V. De Camino, M.M. Alfaro and L.F.M Sage. Forest Plantations Working Paper 19. Forest Resources Development Service, Forest Resources Division. FAO, Rome (unpublished). Available at: https://www.fao.org/3/y7205e/y7205e02.htm#TopOfPage

FAO, 2010a. Planted forests in sustainable forest management. A statement of principles. https://www.fao.org/3/al248e/al248e00.pdf

FAO, 2010b. Global Forest Resources Assessment 2010. Country Reports. Rome.

FAO, 2014. The state of the world´s forest genetic resources. Commission on Genetic Resources for Food and Agriculture, Rome.

FAO, 2018. Global Forest Resources Assessment 2020. Guidelines and specifications. Version 1.0. Forest Resources Assessment Working Paper 189. Rome.

FAO, 2020. Global Forest Resources Assessment 2020. Country Reports. Rome.

FAOSTAT. Food and agriculture databank of FAO. https://www.fao.org/faostat/en/#home

FSC, 2023. FSC Interim Forest Stewardship Standard for Panama published. https://fsc.org/en/newscentre/standards/fsc-interim-forest-stewardship-standard-for-panama-published. Accessed on Dec 14th, 2023.

Forest Survey of India, 2021. India State of Forest Report (ISFR). Dehra Dun.

Forest Survey of India, 2023. Annual statistical report. Dehra Dun.

García, M. M., Herrera, M.A., Muñoz, F. 2016. Caracterización del crecimiento de plantaciones jóvenes de teca (Tectona grandis) y estimación de curvas de sitio. Madera y Bosques, vol. 22, núm. 2: 89-103, Campus La Verapaz, Alta Verapaz.

Glauner, R., 2023. Questionnaire survey on the value-chain of teak timber in Nan District. Village Forest Tree Management Project. Unpublished.

Glauner, R., 2024. Written communication. Bad Zurzach, Switzerland.

Gloster. 2023. The teak story. https://www.gloster.com/en/about/the-teak-story. Accessed on Dec. 12th, 2023.

Gua, B., Pedersen, A., Barstow, M. 2022. Tectona grandis. The IUCN Red List of Threatened Species 2022: e.T62019830A62019832. https://dx.doi.org/10.2305/IUCN.UK.2022-2.RLTS.T62019830A62019832.en. Accessed on 15 Dec 2023.

Hickman, S., 2014. Indonesian teak farmers achieve traceability to the tree stump. The Guardian. https://www.theguardian.com/sustainable-business/indonesian-teak-farmers-traceability. Accessed on 12 Dec 2023.

Hounlonon, M., Kouchade, C., Kounouhewa, Basile. 2017. Propriétés physiques et mécaniques du bois de teck de provenances tanzanienne et locale au Bénin. Bois et Forêts des Tropiques. 331. 45-53.

ITTO, 2005. Togo country profile. https://www.itto.int/direct/topics/topics_pdf_download/topics_id=12360000&no=1&file_ext=.pdf?v=. Accessed on Dec. 11th, 2023.

ITTO. 2009. Encouraging industrial forest plantations in the tropics. Report of a global study. ITTO Technical Series No. 33. Prepared by STCP Engenharia de Projetos Ltda, Brazil. 143 pp. Available at https://www.itto.int/direct/topics/topics_pdf_download/topics_id=2165&no=0&disp=inline, accessed on Nov 29th, 2023.

ITTO. 2010a. Teak as potential plantation species. ITTO Tropical Timber Market Report 15, 11: 1-15, June 2010.

ITTO, 2018. Yacht industry calls for co-operation with Myanmar on teak. Tropical Timber Market Report, 16-30 June 2018, quoted in TEAKNET Bulletin, vol. 11, issue 3, July 2018, p. 6.

ITTO, 2023. Online statistics database. https://www.itto.int/biennal_review/. Accessed on August 24th, 2023.

IUCN, 2023. Red list of endangered species. Teak (Tectona grandis). https://www.iucnredlist.org/species/62019830/62019832. Accessed on Dec 15th, 2023.

Jürgensen, C., Kollert, W., Lebedys, A. 2014. Assessment of industrial roundwood production from planted forests. FAO Planted Forests and Trees Working Paper FP/48/E. Rome. Available at http://www.fao.org/forestry/plantedforests/67508@170537/en/

Katwal, R. P. S., 2005. Teak in India: Status, Prospects and Perspectives. In: Bhat, K. M., Nair, K.K.N., Bhat, K.V., Muralidharan, E.M. and Sharma, J.K (eds). Proceedings of the International Conference on Quality Timber Products of Teak from Sustainable Forest Management. Kerala Forest Research Institute, Peechi, India, 2nd-5th Dec 2003, pp. 1-18.

Keogh, R.M. 2009. The future of teak and the high-grade tropical hardwood sector. FAO Planted Forests and Trees Working Paper Series FP/44, Rome. Available at http://www.fao.org/forestry/plantedforests/67508@170537/en/

Kollert, W., Cherubini, L. 2012. Teak resources and market assessment 2010. FAO Planted Forests and Trees Working Paper FP/47/E, Rome. Available at http://www.fao.org/forestry/plantedforests/67508@170537/en/

Kollert, W. 2022. Cost-benefit analysis of teak investments and promoting responsible trade and markets of teakwood. Thematic papers for the 4th World Teak Conference 2022, Accra, Ghana.

Ko Ko Gyi, M., 2023. Provenance. In Webster, T. and Henderson, V., The Social Life of Teak, p. 108. ISBN 978-616-451-082-1. Bangkok.

Lebedys, A., 2022 and 2023. Written communications. FAO, Rome.

Lowe, R.G., 1976. Teak (Tectona grandis (Linn.f.)) thinning experiment in Nigeria. Commonwealth Forestry Review, Vol. 55, No 3, 189-202. https://www.jstor.org/stable/42604543. Accessed on Dec 11th, 2023.

Maldonado, G., 1999. Le teck (Tectona grandis Linn. f.) de Côte d'Ivoire. Mémoire d'ingénieur. Montpellier, France, Centre national d'études agronomiques des régions chaudes (CNEARC)/ French Institute of Forestry, Agricultural and Environmental Engineering (ENGREF).

Maldonado, G., Louppe, D. 2000. Challenges of Teak in Côte d'Ivoire. Unasylva 201, Vol. 51: 36-44. https://www.fao.org/3/x4565e/x4565e07.htm

Midgley, S., Bennett, J., Samonty, X., Stevens, P., Mounlami, K., Midgley, D., Brown, A. 2011. Scoping Study Payments for Environmental Services and Planted Log Value Chains in Lao PDR. ACIAR projects FST/2011/003 and FST/2010/012.

Midgley S., Somaiya R.T., Stevens P.R., Brown A., Nguyen Duc Kien and Laity R. 2015a. Planted teak: global production and markets, with reference to Solomon Islands. ACIAR Technical Reports No. 85. Australian Centre for International Agricultural Research: Canberra. 92 pp.

Midgley , S., Mounlamai, K., Flanagan, A., Phengsopha, K. 2015b. Global markets for plantation teak; Implication for Grower in Lao PDR. Australian Centre for International Agricultural Research: Canberra, Australia. Study completed for ACIAR Project FST/2012/012

"Enhancing Key Elements of the Value Chains for Plantation-Grown Wood in Lao PDR". 74pp. Available at: http://www.laoplantation.org.

Murillo, O.G., 2023. Written communication. Costa Rica.

Myint, W. 2010. An overview of teak resources and plantations in Myanmar. Presentation held at the Conferencia Mundial de Teca, San José, Costa Rica, 31 Oct to 2 Nov 2011. Available at http://web.catie.ac.cr/conferencia_teca/presentaciones/presentaciones

NN, 2022. Ghana targets number-one spot in global teak production. B&FT online. https://thebftonline.com/2022/09/07/ghana-targets-number-one-spot-in-global-teak-production/. Accessed on Dec 11th, 2023

Pandey, D. and Brown, C., 2000. Teak: a global overview. An overview of global teak resources and issues affecting their future outlook. Unasylva 201, Vol. 51, p. 3-13

Prabowo, H., 2022. The future of Indonesia - opportunities, challenges and the way forward. FSC-Indonesia. https://asiapacific.fsc.org/newsfeed/the-future-of-indonesia-opportunities-challenges-and-the-way-forward. Accessed on Dec 12th, 2023.

Rance, W., Monteuuis, O., 2004. Teak in Tanzania. Dossier in Bois et forêts des tropiques, No 279 (1). https://agritrop.cirad.fr/517952/1/document_517952.pdf. Accessed on Dec. 11th, 2023.

Reis, C.A.F., 2023. Written communication. Embrapa Florestas, Brazil.

Reis, C.A.F., de Oliveira, E.B., Santos, A.M. 2023: Teca (Tectona grandis L. f.) no Brasil. Empraba, Brasília.

Roshetko, J.M., 2022. Smallholder teak farming: value-addition management for enhancement of livelihoods in Southeast Asia. Thematic paper for the 4th World Teak Conference, Accra, Ghana.

Somaiya, R. T., 2005. Teak trade in India. Quality Timber Products of Teak from Sustainable Forest Management. Proceedings of the International Conference: 2-5 December 2003. Kerala Forest Research Insititute, Peechi, India.

Steber, B., 1998. International marketing of teak. Unpublished working paper. Singapore

Somaiya, R.T., 2023. Twenty-twenty vision. In: Webster, T., Henderson, V. The Social Life of Teak, p.234. ISBN 978-616-451-082-1. Bangkok.

Sytsma, C., 2022. From teak farms to agroforestry: Panama tests reforestation strategies. Available at : https://news.mongabay.com/2022/03/from-teak-farms-to-agroforestry-panama-tests-reforestation-strategies/. Accessed on Dec 16th, 2023.

Takizawa, F.H., Caldeira, S.F. 2023. Histórico da evolução da teca no Brasil e visão de futuro. In: Reis, C. A. F., Oliveira, E. B. De, Santos, A.M.: Teca (Tectona grandis L. f.) no Brasil. Brasília, Embrapa, 2023. 734 pp. Available at: https://ainfo.cnptia.embrapa.br/digital/bitstream/doc/1154566/1/EmbrapaFlorestas-2023-Teca-Tectona-grandis-L.-f.-no-Brasil.pdf

Tewari, D.N., 1992. A monograph on teak (Tectona grandis Linn.f.). International Book Distributors, Dehra Dun, India.

Thanuthamcharoen, K., 2023. Wood for the trees. In: Webster, T., Henderson, V., 2023. The Social Life of Teak, p.184. ISBN 978-616-451-082-1. Bangkok.

Tirschwell, P., 2022. Container shipping: supply chains will remain disrupted well into 2022. S&P Global Market Intelligence. Available at: https://www.spglobal.com/marketintelligence/en/news-insights/research/container-shipping-supply-chains-will-remain-disrupted-well-into-2022. Accessed on Dec 10th, 2023.

Toby, H., 2019. Amid upheaval in South Sudan, the country's teak forests fall. Reuters. https://www.reuters.com/article/us-southsudan-forest-environment/amid-upheaval-in-south-sudan-the-countrys-teak-forests-fall-idUSKCN1Q20C0/#:~:text=British%20colonists%20planted%20thousands%20of,remaining%20is%20not%20clearly%20documented. Accessed on Dec 5th, 2023.

Torres, D., del Valle, J., Restrepo, G. 2012. Site index for teak in Colombia. Journal of Forestry Research. 23(3): 405–411, DOI 10.1007/s11676-012-0277-x

UN Comtrade, 2023. Trade database, Available at https://comtradeplus.un.org/TradeFlow. Accessed from Sept. to Dec. 2023.

Verhaegen, D., Fofana, I.J., Logossa, Z.A., Ofori, D., 2010. What is the genetic origin of teak (Tectona grandis L.) introduced in Africa and in Indonesia?. Tree Genetics and Genomes, 2010, 6, pp.717-733. Available at https://www.researchgate.net/publication/225535806_What_is_the_genetic_origin_of_teak_Tectona_grandis_L_introduced_in_Africa_and_in_Indonesia.

Vílchez, B., Luján, R., 2013. Argumentos ambientalistas en relación con las plantaciones de teca. In: De Camino, R., Morales, J.P., (Eds.). Las plantaciones de teca en América Latina: Mitos y realidades. Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), Turrialba, Costa Rica

Volza Grow Global, 2023. Directory of teakwood buyers in Singapore. https://www.volza.com/p/teak-wood/buyers/buyers-in-singapore/. Accessed on Nov 13th, 2023.

Vongvilay Vongkhamsao, Baisone Inthirath and Bounthavy Chaleunsouk. 2022. Natural Teak Forests and Plantations in Lao PDR. In: Teak in Mekong for a Sustainable Future. Outcomes of the BMEL-ITTO Project: Enhancing Conservation and Sustainable Management of Teak Forests and Legal Supply Chains in the Greater Mekong Sub-region. Kasetsart University, Bangkok.

WaKa Forest Investment Services AG, 2009. Teak in Ghana. Outline of a forest investment proposal. Unpublished working report. Winterthur, Switzerland.

Walotek, P.J., Glauner, R., 2017. Long-term price trends of teak wood. In: The Global Teak Study. Analysis, Evaluation and Future Potential of Teak Resources. IUFRO World Series No 36.

Walotek, P.J., Kollert, W. 2022. Monitoring price trends of teak wood using teak-price-indices. Presentation at the 4th World Teak Conference 2022, Session II. Accra, Ghana.

Webster, T., Henderson, V., 2023. The Social Life of Teak. ISBN 978-616-451-082-1. Bangkok.

Yevide, A., Goudégnon, E., Ganglo, J., Oumorou, M., Tchéhouali, A., Carnnière, C. 2014. Does heartwood formation early process in Beninese coppice teak stands? International Journal of Science and Technology. 4. 118-123.

Zar Chi Zlaing, 2022. Natural teak forests and teak plantations in Myanmar. In: Teak in Mekong for a Sustainable Future. Outcomes of the BMEL-ITTO Project: Enhancing Conservation and Sustainable Management of Teak Forests and Legal Supply Chains in the Greater Mekong Sub-region. Kasetsart University, Bangkok.

Chapter 6
Annexes

CONTENTS

6.1 Countries with Suitable Climatic Conditions for Growing Teak

Eastern and Southern Africa
01. Angola
02. Botswana
03. Eswatini (Swaziland)
04. Kenya
05. Lesotho
06. Madagascar
07. Malawi
08. Mozambique
09. South Sudan
10. Sudan
11. Uganda
12. United Rep of Tanzania
13. Zambia
14. Zimbabwe

Western and Central Africa
15. Benin
16. Burkina Faso
17. Burundi
18. Cameroon
19. Cape Verde
20. Central African Republic
21. Congo (Brazzaville)
22. Côte d'Ivoire (Ivory Coast)
23. Democratic Rep. Of the Congo (DRC)
24. Equatorial Guinea
25. Gabon
26. Gambia
27. Ghana
28. Guinea
29. Guinea-Bissau
30. Liberia
31. Mali
32. Nigeria
33. Rwanda
34. São Tomé e Príncipe
35. Senegal
36. Sierra Leone
37. Togo

East Asia
38. China (Hainan)

South- and Southeast Asia
39. Bangladesh
40. Cambodia
41. India
42. Indonesia
43. Lao PDR (Laos)
44. Malaysia
45. Myanmar
46. Nepal
47. Philippines*
48. Sri Lanka
49. Thailand
50. Timor Leste
51. Viet Nam

Oceania
52. Australia
53. Fiji
54. Papua New Guinea
55. Solomon Islands

Caribbean
56. Bahamas
57. Cuba
58. Dominican Republic
59. Haiti
60. Jamaica
61. Puerto Rico
62. Trinidad and Tobago

Mexico and Central America
63. Mexico
64. Belize
65. Costa Rica
66. El Salvador
67. Guatemala
68. Honduras
69. Nicaragua
70. Panama

South America
71. Bolivia
72. Brazil
73. Colombia
74. Ecuador
75. French Guiana
76. Guyana
77. Paraguay
78. Peru
79. Suriname
80. Venezuela

6.2 List of Contacts by Country

Region/Country		Contact
Eastern and Southern Africa		
1	Angola	Mr. Nazaré Veloso, Head of Forestry/Environment
2	Botswana	Mr. Ntebaleng Thapelo, Chief Forestry & Range Resources Officer, Division of Forest Resources Conservation, Department of Forestry and Range Resources. Ms. Baitshepi Edith Babusi Hill, Director, Department of Forestry & Range Resources, Ministry of Environment, Natural Resources Conservation and Tourism.
3	Eswatini (Swaziland)	Mr. Solomon Gamedze, Senior Forestry Officer and Head of the Forestry Section
4	Kenya	Mr. Clement Ngoriareng, Kenya Forest Service
5	Lesotho	Mr. Elias Sokoati Sekaleli, Director of Forestry, Ministry of Forestry, Range and Soil Conservation
6	Madagascar	Ms. Lydie Norohanta Raharimaniraka, Direction Générale des Forêts, Coordinateur des Conventions Internationales
7	Malawi	Mr. Henry Utila, The Director of the Forest Research Institute, Ms. Stella Gama, Director of Forestry Mr. Teddie Kamoto, Deputy Director of Forestry Mr. Francis Chilimampunga, Deputy Director of Forestry
8	Mozambique	Mr. Claudio M.I. Afonso, National Directorate of Forests Mr. Hans Lemm, CEO, Green Resources AS
9	South Sudan	Mr. Jaden Tongun Emilio Wani, Undersecretary for Forestry, Ministry of Environment and Forestry, RSS/Juba Mr. Ian Paterson, ETC/GETC Managing Director, Western Equatorial State
10	Sudan	Mr. Mohamed Ali Elhadi Ali, General Director, Forests National Corporation, Ministry of Environment, Forests and Physical Development Mr. Ibrahim Hanady
11	Uganda	Mr. Tom Okello Obong, Executive Director, National Forstry Authority (NFA); Mr. Stuart Maniraguha, Director Plantations Development; Mr. John Diisi, Coordinator GIS and Mapping and Mr. Obed Tugumisirize, Coordinator Private Forestry Development, National Forestry Authority (NFA);
12	United Rep. of Tanzania	Mr. Irvine Kanyemba – CEO, Kilombero Valley Teak Company (KVTC) Ms. Ellyneema S. Mwasalanga, Longuza Plantation Forest Conservator Mr. Abdala Mchomvu, Mtibwa Forest Plantation Conservator Prof. Dos Santos A. Silayo, Chief Executive, Tanzania Forest Services (TFS) Agency, Ministry of Natural Resources and Tourism, Mr. Noel Maeda, Principal Conservator, Tanzania Forest Services Agency
13	Zambia	Prof. Felix Kanungwe Kalaba, Associate Professor of Environment and Development, Copperbelt University Mr. Victor Chiiba, Director of Forestry, Ministry of Green Economy and Environment, Forestry Department HQ, Lusaka
14	Zimbabwe	Mr. Stephen Zingwena, Acting Head of Forestry Comission
Western and Central Africa		
15	Benin	Dr Kouchade Adéyèmi Clément, Laboratoire de Sciences de Matériaux et Modélisation, FAST, UAC.

16	Burkina Faso	Ms. Sia Coulibaly, Chargé des statistiques sur les forêts, Service Aménagement Forestière.
17	Burundi	Mr. Ndorere Venerand, Enseignant de l'Université du Burundi affecté à l'Institut Supérieur de Formation Agricole
18	Cameroon	Prof. Tonjock Rosemary Kinge, Associate professor and Chair of the Department of Plant Sciences, University of Bamenda
19	Cape Verde	Sra. Eng. Eneida Rodrigues, Diretor Geral da Agricultura, Silvicultura e Pecuária
20	Central African Republic	Jean Archange Gonda-Batty and Gorgon Igor Touckia, enseignants chercheurs, Université de Bangui.
21	Congo (Brazzaville)	Joel Loumeto and Gael Bouka, enseignants chercheurs
22	Côte d'Ivoire (Ivory Coast)	Col-Major Kouassi Lucien, Directeur Général des Forêts et de la Faune
23	Dem. Rep. of the Congo (DRC)	Mr. Gerard Imani, enseignant chercheur
24	Equatorial Guinea	No contact could be established
25	Gabon	Ms. Solange Avomo and Ms. Flo Minko, Département des Eaux et Forêts, DGA des industries de Bois du Gabon
26	Gambia	Lamin Bojang, Deputy Director and Muhammed Jaiteh, Forestry Officer, Forestry Department
27	Ghana	Mr. Kwame Agyei, Regional Manager, Plantations Department, Forest Services Division of the Forestry Commission of Ghana
28	Guinea (Conakry)	Mr. Alhassane Camara, Chef, Division Forestière Rurale. Direction Nationale des Eaux et Forêts
29	Guinea-Bissau	Ms. Seiti Cassamá, Direction Générale des Forêts
30	Liberia	Mr. Sampson S. Nyema, Administrative Assistant to the Office of the FDA's Deputy Managing Director for Operations & ITTO Focal Point for Liberia
31	Mali	Fatoumata Kone, Inspectrice Générale and ali Abdoulaye Poudiougo, Ingénieur des Eaux et Forêts, Point Focal CDB
32	Nigeria	Prof. Ladode Popoola, University of Ibadan
33	Rwanda	Frédéric Munyansanga, Professionnel Chargé de l'agroforesterie et Reboisement, Direction Général de Forêts
34	São Tomé e Príncipe	Sr. Adilson da Mata, Direção das Florestas e da Biodiversidade
35	Senegal	Prof. Mathieu Gueye, Sécretariat Général du Ministre des Forêts, FAO, responsable laboratoire botanique IFAN, Université Cheick Anta Diop (UCAD), Dakar
36	Sierra Leone	Patrick Carpenter, Kenema Forestry and Tree Crops Research Center, Sierra Leone Agricultural Research Institute
37	Togo	Dr Alaba Pyoabalo, Directeur Général de L'ODEF
East Asia		
38	China (Hainan)	Prof. Guihua Huang, Team Leader, Research Institute of Tropical Forestry (RITF)-CAF, Guanzhou.

South- and Southeast Asia		
39	Bangladesh	Dr. Rafiqul Haider, Director, Bangladesh Forest Research Institute, Sholoshahar, Chattogram
40	Cambodia	Mr. Chheang Dany (and Ms Sopheap Lim), Deputy Director General, Forestry Administration
41	India	Natural teak: Forest Survey of India (FSI) Planted teak: Dr. Raman Nautiyal, Former Statistician, Forest Research Institute, Dehra Dun
42	Indonesia	Mr. Aris Sudomo. BRIN, Indonesia Mr. Wahyu Kuncoro, President Director of Perum Perhutani Ms. Suraida Meisari, Research Group Assistant, CIFOR-ICRAF, Bogor
43	Lao PDR (Laos)	Mr. Vongvilay Vongkhamsao, Director, National Agriculture and Forestry Research Institute (NAFRI), Ministry of Agriculture and Forestry, Vientiane Capital.
44	Malaysia	Peninsular Malaysia: Dr. Mohd Zaki Abdullah, Director Forestry Biotechnology Division, Forest Research Institute Malaysia (FRIM) Sabah: Dr. Doreen Goh, Managing Director, YSG Bioscape Sdn Bhd (subsidiary of the Sabah Foundation Group), Kota Kinabalu.
45	Myanmar	Dr. Moe Zaw, Dr. Zar Chi Hlaing, Mr. Thein Toe. Director, FRI Yezin & Asst Director, Director, Natural Forest and Plantation Division, FD and DDG, FD respectively.
46	Nepal	Mr. Shankar Adhikari, Forestry Department Mr. Bishnu Dhakal, Research and Training Centre, Forestry Department Ministry of Forests and Environment, Kathmandu
47	Philippines	Dr. Marlyin Combalicer, Associate Professor, University of the Philippines Los Baños (UPLB), College of Forestry and Natural Resources
48	Sri Lanka	Ms. Deepani Alawathugoda, Additional Conservator General of Forests, Dr. Bandara, Conservator General of Forests
49	Thailand	Prof. Dr. Yongyut Trisurat, College of Forestry, Kasetsart University, Bangkok, Thailand
50	Timor Leste	No contact could be established
51	Viet Nam	Dr. Tran Lam Dong, Vice Director of the Vietnamese Academy of Forest Sciences, Hanoi
Oceania		
52	Australia	Mr. David Lee, Associate Professor, University of Sunshine Coast, Queensland
53	Fiji	Ms. Sanjana Lal, Conservator of Forests, Ministry of Forestry, Suva, Republic of Fiji Mr. Roderic Evers, Future Forests (PVT investments)
54	Papua New Guinea	Mr. Alois Jenkihau, Manager, Policy & Aid Coordination Branch, Forest Policy & Planning Directorate, PNG Forestry Authority
55	Solomon Islands	Dr. Lex Thomson, Associate Professor, Australian Center for Pacific Islands Research, University of the Sunshine Coast,
Caribbean		
56	Bahamas	No contact could be established
57	Cuba	Arnaldo F. Alvarez Brito, Instituto Investig. Agroforestales
58	Dominican Republic	Mauricio Blanco, Silvalnvest
59	Haiti	Mauricio Blanco, Silvalnvest

60	Jamaica	No contact could be established
61	Puerto Rico	Mauricio Blanco, SilvaInvest
62	Trinidad and Tobago	Terri Raney, FAO, Port of Spain
Mexico and Central America		
63	Mexico	Mr. Jürgen Stock, Proteak; Mr. Víctor Hugo Fernández, Santa Genoveva; Mr. Alberto Escamilla, CONAFOR/Secretaría Medio Ambiente
64	Belize	No contact could be established
65	Costa Rica	Dr. Olman Murillo, Instituto Tecnológico de Costa Rica. School of Forest Engineering;
66	El Salvador	No contact could be established
67	Guatemala	Rony Albanes, Comercio Forestal, Instituto Nacional de Bosques.
68	Honduras	César Alvarado, ESNACIFOR (Escuela Nacional de Ciencias Forestales)
69	Nicaragua	Bernabé Caballero, Banco de Semillas Forestales, INAFOR; Ove Faurby, Norteak
70	Panama	Yarizel Chacón, ANARAP
South America		
71	Bolivia	Anko Stilma and Jorge Goitia, SICIREC Bolivia Ltda; Cámara Forestal de Bolivia
72	Brazil	Dra. Cristiane Aparecida Fioravante Reis, Engenheira Florestal Embrapa Florestas, Goiás.
73	Colombia	Jorge Guzmán, Silvotecnia; Fedemaderas
74	Ecuador	Edwin Jiménez, ESPOL (Escuela Politécnica del Litoral), Guayaquil
75	French Guiana	No contact could be established
76	Guyana	No contact could be established
77	Paraguay	No contact could be established
78	Peru	José Eloy Cuellar Bautista, Universidade Agraria La Molina
79	Suriname	Dr. R. F. (Rudi) van Kanten, Director Tropenbos Suriname
80	Venezuela	Dr. Mauricio Jerez and Osvaldo Encinas, Forest Science Faculty Universidad Los Andes, Mérida;

6.3 Questionnaire (English Version)

QUESTIONNAIRE ON TEAK *(TECTONA GRANDIS)* Year 2022

Introduction

This questionnaire on teak is intended to generate country level information on teak resources across the globe. It has been compiled by the Kerala Forest Research Institute (KFRI) in cooperation with TEAKNET, an international teak information network and the International Union of Forest Research Organizations (IUFRO), Vienna.

Response to the questionnaire is crucial to allow country, regional and global analyses of status and trends in teak forest development and to assist in improving formulation of policies, preparing outlook studies and undertaking planning, management, monitoring and reporting.

Previously, a study on teak resources and markets has been undertaken in 2010, but the data and information provided then are outdated. We understand the difficulties that forestry experts may find in providing such information, however in view of the lack of updated statistical data on teak, aggregated data and/or best professional estimates are also very much appreciated. In case there is no information available please put a note "n.a." (not available).

We thank you very much for your cooperation!

Contacts

For queries in completing this questionnaire please contact one of the following persons:

Overall coordination: Dr. S. Sandeep, Kerala Forest Research Institute, India. TEAKNET Coordinator, Email: coordinator@teaknet.org

Technical Adviser: Dr. Walter Kollert, WaKa Forest Investment Services, Portugal, Email : w.kollert@waka-fis.ch

Regional Coordinators

1. **Eastern, Northern and Southern Africa**
   Ms. Nelly Grace Bedijo, Kampala, Uganda, FAO Programme Associate, Email: nbedijo@hotmail.com
2. **Western and Central Africa**
   Dr. Adzo Kokutse Kokou, Lomé, Togo, University of Lomé, Email: mimidam@hotmail.com
3. **Asia and Oceania**
   Dr. PK Thulasidas, Kerala, India, Scientist, thulasidas.teak@gmail.com
4. **Caribe e América Central**
   Dr. Olman Murillo Gamboa, Costa Rica, Director of GENFORES, Email: olmuga@yahoo.es
5. **South America**
   Dra. Cristiane Reis, Sto. Antônio de Goiás, Brazil, Forest Engineer, EMBRAPA, Email: cristiane.reis@embrapa.br

Definitions: Teak Forest Categories and Forest Functions	
Natural Teak Forest	Forest of native/indigenous species with a share of teak of 30 percent or more in its growing stock
Planted Teak Forest	Forest of teak established through planting or seeding for the production of wood or non-wood products and/or for the provision of environmental services. The share of teak in the growing stock is above 30 percent.
Productive function	Forests serving primarily for the production of various commodities, e.g. roundwood, firewood, fibre and non-wood forest products. Production forests bear no legal, economic or technical restrictions on wood production.
Protective function	Forests providing a wide range of environmental services, e.g. the protection of soil and water resources, conservation of biological diversity, protection from wind, coastal protection, protection of natural/cultural features including national parks and nature reserves.
Other function	Forests serving any other than productive or protective function

Question 1: Area of Teak Forest 2022, Forest Function and Age-Class Distribution

In the following Table 1, please indicate the area (1000 ha) of teak forests in your country, the share of teak in these forests and the forest function for year 2022.

Table 1

Forest categories	Area 1000 ha	Share of teak by species composition (%)	Forest function		
			Productive (1000 ha)	Protective (1000 ha)	Other (1000 ha)
Natural teak forest					
Planted teak forest					
Total					

In Table 2 please provide information on the age-class distribution of natural and planted teak forests with production function. The area of planted teak forests with production function should be the same as in Table 1. Please note that the **horizontal total by age classes should tally to 100%.**

Table 2

Forest categories	Production area from table 1 (1000 ha)	Age classes					
		young (%)		middle-aged (%)		old (%)	
		0-20 yrs (%)	21-40 yrs (%)	41-60 yrs (%)	61-80 yrs (%)	81-100 yrs (%)	> 100 yrs (%)
Planted teak forest							
Comments (if any):							

Question 2: In which year was planted teak introduced in your country?

Year : _____

Question 3: Ownership of Teak Forests 2022

Definitions	
Public ownership:	**Trees** are owned by the State (national, state and regional governments) or government-owned institutions or other public bodies including cities, municipalities and villages
Private ownership (corporate):	**Trees** are owned or legally used by private companies, co-operatives, corporations, industries, private religious and educational institutions, pension or investment funds (generally large-scale). The land may or may not be owned by a public body.
Private ownership (smallholders):	**Trees** are owned by individuals or families generally on small scale. The land may or may not be owned by a public body.
Other ownership:	**Trees** not classified as publicly or privately owned. Ownership of trees may not be defined or is unknown (e.g. customary land use rights).

According to the above definition, list in Table 3 for year 2022 the area of teak as percentage of the total area reported in Table 1 by ownership categories and forest function (production, protection, other). For natural teak forests only "public ownership" applies. Please note that **horizontal totals by ownership categories should tally to 100%.**

Table 3

Forest categories	Public ownership			Private corporate ownership			Private smallholder ownership			Other ownership		
	Prod %	Prot %	Other %	Prod %	Prot %	Other %	Prod %	Prot %	Other %	Prod. %	Prot. %	Other %
Natural teak forest												
Planted teak forest												

Comments (if any):

Question 4: Production of Teakwood 2022

In Table 4 please indicate for natural and planted teak forest the minimum and maximum values for the mean annual increment (MAI) and the rotation period in your country as well as the removals of teakwood in 2022.

Table 4

Forest categories	Mean Annual Increment (m^3/ha/yr)		Rotation period/age of harvest (years)		Removals of teak logs 2022 (m^3/yr)
	Min	Max	Min	Max	
Natural teak forest with production function					
Planted teak forest with production function					
Total					

Comments (if any):

Question 5: Price of Teakwood 2022

Please indicate in Table 5 an average teakwood price for the year 2022 by forest categories. If possible, differentiate between prices for the domestic and export market.

Definition of log dimensions	
Big logs	are logs above 48 cm diameter at midpoint over bark,
Medium logs	are logs from 24 to 48 cm diameter at midpoint over bark
Small logs	are logs below 24 cm diameter at midpoint over bark

Table 5

Forest categories	Domestic market prices			Export market prices		
	big logs	medium logs	small logs	big logs	medium logs	small logs
	USD/m³	USD/m³	USD/m³	USD/m³	USD/m³	USD/m³
Logs from natural teak forests						
Logs from planted teak forests						
Comments (if any):						

Finally, please kindly provide your contact details in case we may have any queries:

Contact Details	
Country	
Name and position of contact person	
Email	
Telephone	

Please also note the IUFRO Citation Policy: The data reported in this questionnaire will be published by the International Union of Forest Research Organizations (IUFRO) in one of its publication series. The published data will be aggregated at national level and it will not be possible to trace them back to any public or private entity within the country. Formal (e.g. published government reports) and/or informal data sources (e.g. verbal communication) will be properly cited in the publication.

By sending back this questionnaire I declare my consent to this approach.

Thank you very much for your cooperation!

– END OF QUESTIONNAIRE –

6.4 Data Reported by Country

Legend for all tables:

no	no response, country did not report
n.i.a.	teak is reported to grow in this country, but no detailed information is available
–	not available or no teak *(Tectona grandis)* is reported to grow in this country
red figures	data taken from sources other than TRMA 2023 to calculate regional totals

Area of planted teak forests (1000 ha) by function (Question 1, Table 1)

	Country	Year of introduction of planted teak	Production	Protection	Total	Share of teak in total (%)
1	Angola	n. i. a	n. i. a	n. i. a	n. i. a	n. i. a
2	Botswana	no	no	no	no	no
3	Eswatini (Swaziland)	no	no	no	no	no
4	Kenya	n. i. a	n. i. a	n. i. a	n. i. a	n. i. a
5	Lesotho	no	no	no	no	no
6	Madagascar	no	no	no	no	no
7	Malawi	n. i. a	n. i. a	n. i. a	n. i. a	n. i. a
8	Mozambique	n. i. a	n. i. a	n. i. a	n. i. a	n. i. a
9	South Sudan	1919	35.000	16.000	51.000	>30%
10	Sudan (Midgley et al., 2015)	n. i. a.	25.000	–	25.000	
11	Uganda	n. i. a.	1.695	–	1.695	70%
12	United Republic of Tanzania	1906	13.531	–	13.531	98%
13	Zambia	–	–	–	–	–
14	Zimbabwe	–	–	–	–	–
Total eastern and southern Africa			**75.226**	**16.000**	**91.226**	
15	Benin	1916	35.000	15.000	50.000	70%
16	Burkina Fasso (TRMA 2010)	n.i.a.	1.000	–	1.000	--
17	Burundi	–	–	–	–	--
18	Cameroon	1980	8.000	0.200	8.200	100%
19	Cape Verde	–	–	–	–	–
20	Central African Republic	no	no	no	no	no
21	Congo (Brazzaville)	no	no	no	no	no
22	Côte d´Ivoire (Ivory Coast) (ITTO, 2009)	n.i.a.	66.000	–	66.000	n.i.a.
23	Democratic Republic of the Congo (DRC)	no	no	no	no	no
24	Equatorial Guinea	–	–	–	–	–
25	Gabon	–	–	–	–	–
26	Gambia	no	no	no	no	no
27	Ghana	1900	199.500	10.500	210.000	95%
28	Guinea (Conakry)	1945	3.892	–	3.892	85%
29	Guinea-Bissau	no	no	no	no	no
30	Liberia	1972	0.913	–	0.913	–
31	Mali	1978	0.650	0.030	0.680	100%
32	Nigeria (TRMA 2010)	n.i.a.	146.000	–	146.000	n.i.a.
33	Rwanda	–	–	–	–	–

34	São Tomé e Príncipe	--	--	--	--	--
35	Senegal (TRMA 2010)	n.i.a.	2.000	--	2.000	n.i.a.
36	Sierra Leone	1923	10.000	5.000	15.000	n.i.a.
37	Togo	1905	30.680	--	30.680	n.i.a.
Total western and central Africa			**502.635**	**30.730**	**534.365**	
Total Africa			**577.861**	**46.73**	**625.591**	
38	China	1820	23.000	7.000	35.000	85%
Total East Asia			**23.000**	**7.000**	**35.000**	
39	Bangladesh (TRMA, 2010)	n.i.a.	72.900	--	72.900	n.i.a.
40	Cambodia	1936	6.000	--	6.000	100%
41	India	1841	1,693.094	--	1,693.094	100%
42	Indonesia (TRMA, 2010)	14th to 16th century	1,269.000	--	1,269.000	n.i.a.
43	Lao PDR (Laos)	1980	50.000	--	50.000	100%
44	Malaysia	1926/1950	4.663	--	4.663	n.i.a.
45	Myanmar	1981	476.831	--	476.831	100%
46	Nepal (TRMA, 2010)	n.i.a.	2.000	--	2.000	n.i.a.
47	Philippines	--	--	--	--	--
48	Sri Lanka	1680	20.765	2.982	23.747	n.i.a.
49	Thailand	1903	216.600	--	216.600	100%
50	Timor Leste	--	--	--	--	--
51	Vietnam	1889	7.650	--	7.650	100%
Total East, South- and Southeast Asia			**3,819.500**	**2.982**	**3,822.490**	
52	Australia	2000	1.200	--	1.200	100%
53	Fiji (TRMA, 2010)	n.i.a.	0.100	--	0.100	n.i.a
54	Papua New Guinea (TRMA, 2010)	n.i.a	2.160	--	2.160	n.i.a
55	Solomon Islands (Midgley et al., 2015)	n.i.a	6.000	--	6.000	n.i.a
Total Oceania			**9.460**		**9.460**	
Total Asia and Oceania			**3,851.96**	**9.98**	**3,866.95**	
56	Bahamas	--	--	--	--	--
57	Cuba	1927	6.550	--	6.550	100%
58	Dominican Republic	n.i.a.	0.400	--	0.400	100%
59	Haiti	n.i.a.	n.i.a	n.i.a	n.i.a	n.i.a
60	Jamaica (TRMA, 2010)	n.i.a.	0.030	0.010	0.040	n.i.a.
61	Puerto Rico	n.i.a.	0.800	--	0.800	100%
62	Trinidad and Tobago (FAO, 2020)	n.i.a.	16.308	--	16.308	100%
Total Caribbean			**24.098**	**0.010**	**24.098**	
63	Mexico	n.i.a.	12.900	--	12.900	100%
64	Belize (Murillo, 2023)	n.i.a.	1.300	--	1.300	100%
65	Costa Rica	1926	49.000	--	49.000	100%
66	El Salvador (Murillo, 2023)	n.i.a.	0.500	2.000	2.500	100%
67	Guatemala	n.i.a.	33.000	--	33.000	100%
68	Honduras	n.i.a.	0.115	--	0.115	100%
69	Nicaragua	n.i.a.	10.000	--	10.000	100%
70	Panama	n.i.a.	49.000	--	49.000	100%

Total Mexico & Central America			**155.815**	**2.000**	**157.815**	
71	Bolivia	n.i.a.	3.000	--	3.000	100%
72	Brazil	1970	63.780	0.139	63.919	93%
73	Colombia	ca. 1947	32.370	--	32.370	100%
74	Ecuador	n.i.a.	75.000	--	75.000	100%
75	French Guiana	--	--	--	--	--
76	Guyana	--	--	--	--	--
77	Paraguay	--	--	--	--	--
78	Peru (TRMA, 2010)	n.i.a.	0.15	--	0.15	n.i.a.
79	Suriname	--	--	--	--	--
80	Venezuela	1936	4.500	--	4.500	100%
Total South America			**178.800**	**0.139**	**178.939**	**100%**
Total Caribbean, Mexico, Central and South America			**358.713**	**2.139**	**360.852**	
World Total			**4,788.540**		**4,853.39**	

Age class distribution of production forest (%) (Question 1, Table 2)

	Country	0-20 yrs	21-40 yrs	41-60 yrs	61-80 yrs	81-100 yrs	> 100 yrs	TOTAL (1,000 ha)
1	Angola	–	–	–	–	–	–	–
2	Botswana	–	–	–	–	–	–	–
3	Eswatini (Swaziland)	–	–	–	–	–	–	–
4	Kenya	–	–	–	–	–	–	–
5	Lesotho	–	–	–	–	–	–	–
6	Madagascar	–	–	–	–	–	–	–
7	Malawi	–	–	–	–	–	–	–
8	Mozambique	–	–	–	–	–	–	–
9	South Sudan	60	29	8.8	2	0.2	0	35.000
10	Sudan	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	25.000
11	Uganda	100	0	0	0	0	0	1.695
12	United Republic of Tanzania	89.0	1.3	9.7	0	0	0	13.531
13	Zambia	–	–	–	–	–	–	–
14	Zimbabwe	–	–	–	–	–	–	–
Average/total eastern and southern Africa		**83.0**	**10.1**	**6.2**	**0.7**	**0.1**	**0**	**75.226**
15	Benin	77	22	1	0	0	0	35.000
16	Burkina Fasso	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	1.000
17	Burundi	–	–	–	–	–	–	–
18	Cameroon	42	58	0	0	0	0	8.000
19	Cape Verde	–	–	–	–	–	–	–
20	Central African Republic	–	–	–	–	–	–	–
21	Congo (Brazzaville)	–	–	–	–	–	–	–
22	Côte d´Ivoire (Ivory Coast)	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	66.000
23	Democratic Republic of the Congo (DRC)	–	–	–	–	–	–	–

24	Equatorial Guinea	–	–	–	–	–	–	–
25	Gabon	–	–	–	–	–	–	–
26	Gambia	–	–	–	–	–	–	–
27	Ghana	91	5	3	1	0	0	199.500
28	Guinea (Conakry)	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	3.892
19	Guinea-Bissau							
30	Liberia	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	0.913
31	Mali	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	0.650
32	Nigeria	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	146.000
33	Rwanda	–	–	–	–	–	–	–
34	São Tomé e Príncipe	–	–	–	–	–	–	–
35	Senegal	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	2.000
36	Sierra Leone	70	15	5	5	5	0	10.000
37	Togo	80	20	0	0	0	0	30.680
Average/total western and central Africa		**72.0**	**24.0**	**1.8**	**1.2**	**1.0**	**0**	**502.635**
Average/total Africa		**77.5**	**17.1**	**4.0**	**0.9**	**0.5**	**0**	**577.861**
38	China	48	36	11	3.5	1.5		23.000
Average/total East Asia		**48**	**36**	**11**	**3.5**	**1.5**		**23.000**
39	Bangladesh	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	72.900
40	Cambodia	95	5	0	0	0	0	6.000
41	India	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	1,693.094
42	Indonesia	75	25	0	0	0	0	1,269.000
43	Lao PDR (Laos)	65	35	0	0	0	0	50.000
44	Malaysia (Sabah)	21	79	0	0	0	0	4.663
45	Myanmar	46	50	4	0	0	0	476.831
46	Nepal	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	2.000
47	Philippines	–	–	–	–	–	–	–
48	Sri Lanka	–	33	33	4	0	0	20.765
49	Thailand	45	35	20	0	0	0	216.600
50	Timor Leste	–	–	–	–	–	–	–
51	Vietnam	72.5	24.1	0	3.3	0	0	7.650
Average/total South- and Southeast Asia		**56.3**	**35.8**	**7.1**	**0.9**	**0**	**0**	**3,819.500**
52	Australia	100	0	0	0	0	0	1.200
53	Fiji	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	0.100
54	Papua New Guinea	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	2.160
55	Solomon Islands	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	6.000
Average/total Oceania		**100**	**0**	**0**	**0**	**0**	**0**	**9.460**
Average/total Asia and Oceania		**78.1**	**17.9**	**3.6**	**0.4**	**0**	**0**	**3,851.96**
56	Bahamas	–	–	–	–	–	–	–
57	Cuba	90	10	0	0	0	0	6.550
58	Dominican Republic	95	5	0	0	0	0	0.400
59	Haiti	–	–	–	–	–	–	–
60	Jamaica	95	5	0	0	0	0	0.030

61	Puerto Rico	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	n.i.a.	0.800
62	Trinidad and Tobago	95	5					16.308
Average/total Caribbean		**93.8**	**6.2**	**0**	**0**	**0**	**0**	**24.088**
63	Mexico	95	5	0	0	0	0	12.900
64	Belize	95	5	0	0	0	0	1.300
65	Costa Rica	95	5	0	0	0	0	49.000
66	El Salvador	95	5	0	0	0	0	0.500
67	Guatemala	95	5	0	0	0	0	33.000
68	Honduras	95	5	0	0	0	0	0.115
69	Nicaragua	95	5	0	0	0	0	10.000
70	Panama	95	5	0	0	0	0	49.000
Average/total Mexico & Central America		**95**	**5**	**0**	**0**	**0**	**0**	**155.815**
71	Bolivia	95	5	0	0	0	0	3.000
72	Brazil	83.4	16.6	0	0	0	0	63.780
73	Colombia	95	5	0	0	0	0	32.370
74	Ecuador	95	5	0	0	0	0	75.000
75	French Guiana	–	–	–	–	–	–	–
76	Guyana*	–	–	–	–	–	–	–
77	Paraguay	–	–	–	–	–	–	–
78	Peru	95	5	0	0	0	0	0.15
79	Suriname	–	–	–	–	–	–	–
80	Venezuela	95	5	0	0	0	0	4.500
Average/total South America		**93.1**	**6.9**	**0**	**0**	**0**	**0**	**178.800**
Average/total Caribbean, Mexico, Central and South America		**93.9**	**6.1**	**0**	**0**	**0**	**0**	**358.713**
World Average/Total		**83.2**	**13.7**	**2.5**	**0.5**	**0.2**		**4,788.540**

Share of planted teak production forest by ownership (Question 3, Table 3)

	Country	Production Forest			
		Public ownership %	Private corporate ownership %	Private small-holder ownership %	Area 1000 ha
1	Angola	–	–	–	–
2	Botswana	–	–	–	–
3	Eswatini (Swaziland)	–	–	–	–
4	Kenya	–	–	–	–
5	Lesotho	–	–	–	–
6	Madagascar	–	–	–	–
7	Malawi	–	–	–	–
8	Mozambique	–	–	–	–
9	South Sudan	66	4	30	35.000
10	Sudan	–	–	–	25.000
11	Uganda	41	0	59	1.695

12	United Republic of Tanzania	33	59	8	13.531
13	Zambia	–	–	–	–
14	Zimbabwe	–	–	–	–
Average eastern and southern Africa		**46.7**	**21.0**	**32.3**	**75.226**
15	Benin	64	1	35	35.000
16	Burkina Fasso	–	–	–	1.000
17	Burundi	–	–	–	–
18	Cameroon	25	46	29	8.000
19	Cape Verde	–	–	–	–
20	Central African Republic	–	–	–	–
21	Congo (Brazzaville)	–	–	–	–
22	Côte d´Ivoire (Ivory Coast)	–	–	–	66.000
23	Democratic Republic of the Congo (DRC)	–	–	–	–
24	Equatorial Guinea	–	–	–	–
25	Gabon	–	–	–	–
26	Gambia	–	–	–	–
27	Ghana	70	23	7	199.500
28	Guinea (Conakry)	94	6	0	3.892
29	Guinea-Bissau	–	–	–	–
30	Liberia	100	0	0	0.913
31	Mali	100	0	0	0.650
32	Nigeria	–	–	–	146.000
33	Rwanda	–	–	–	–
34	São Tomé e Príncipe	–	–	–	–
35	Senegal	–	–	–	2.000
36	Sierra Leone	0	100	0	10.000
37	Togo	100	0	0	30.680
Average western and central Africa		**69.1**	**22.0**	**8.9**	**502.635**
Average Africa		**57.9**	**21.5**	**20.6**	**577.861**
38	China	29	40	31	23.000
Average East Asia		**29**	**40**	**31**	**23.000**
39	Bangladesh	–	–	–	72.900
40	Cambodia	3	94	3	6.000
41	India	100	0	0	1,693.094
42	Indonesia	–	–	–	1,269.000
43	Lao PDR (Laos)	10	13	77	50.000
44	Malaysia (Pen. Malaysia)	100	0	0	n.i.a.
	Malaysia (Sabah)		95	5	4.663
45	Myanmar	87	13	0	476.831
46	Nepal	–	–	–	2.000
47	Philippines	–	–	–	–
48	Sri Lanka	85	0	15	20.765
49	Thailand	0	70	30	216.600

50	Timor Leste	–	–	–	–
51	Vietnam	0	26	74	7.650
Average South- and Southeast Asia		**42.8**	**34.6**	**22.7**	**3,819.500**
52	Australia	0	100	0	1.200
53	Fiji	–	–	–	0.100
54	Papua New Guinea	–	–	–	2.160
55	Solomon Islands	–	–	–	6.000
Average Oceania		**0**	**100**	**0**	**9.460**
Average Asia and Oceania		**23.9**	**58.2**	**17.9**	**3,851.96**
56	Bahamas	0	100	0	–
57	Cuba	100	0	0	6.550
58	Dominican Republic	0	0	100	0.400
59	Haiti	–	–	–	–
60	Jamaica	0	100	0	0.030
61	Puerto Rico	0	0	100	0.800
62	Trinidad and Tobago	0	100	0	16.308
Average Caribbean		**16.7**	**50.0**	**33.3**	**24.088**
63	Mexico	0	90	10	12.900
64	Belize	0	0	100	1.300
65	Costa Rica	0	40	60	49.000
66	El Salvador	0	20	80	0.500
67	Guatemala	0	70	30	33.000
68	Honduras	0	0	100	0.115
69	Nicaragua	0	90	10	10.000
70	Panama	0	90	10	49.000
Average Mexico & Central America		**0**	**50**	**50**	**155.815**
71	Bolivia	0	80	20	3.000
72	Brazil	0	100	0	63.780
73	Colombia	0	70	30	32.370
74	Ecuador	0	90	10	75.000
75	French Guiana*	–	–	–	–
76	Guyana*	–	–	–	–
77	Paraguay	–	–	–	–
78	Peru	–	–	–	0.15
79	Suriname	–	–	–	–
80	Venezuela	0	30	70	4.500
Average South America		**0**	**74.0**	**26.0**	**178.800**
Average Caribbean, Mexico, Central and South America		**5.6**	**58.0**	**36.4**	**358.713**
World Average		**29.1**	**45.9**	**25.0**	**4,788.540**

Mean Annual Increment, rotation period, removals 2022 (Question 4, Table 4)

	Country	Planted - Production Function				
		Mean Annual Increment (m3/ha/yr)		Rotation period/age of harvest (years)		Removals of teak logs 2022 (m^3/yr)
		min	max	min	max	
1	Angola	–	–	–	–	–
2	Botswana	–	–	–	–	–
3	Eswatini (Swaziland)	–	–	–	–	–
4	Kenya	–	–	–	–	–
5	Lesotho	–	–	–	–	–
6	Madagascar	–	–	–	–	–
7	Malawi	–	–	–	–	–
8	Mozambique	–	–	–	–	–
9	South Sudan	5.0	9.5	30	35	2,000
10	Sudan	–	–	–	–	–
11	Uganda	–	–	25	30	–
12	United Republic of Tanzania	3.0	12.0	18	60	55,851
13	Zambia	–	–	–	–	–
14	Zimbabwe*	–	–	–	–	–
Total eastern and southern Africa		**3**	**12**	**18**	**60**	**57,851**
15	Benin	5.0	6.4	30	40	89,975
16	Burkina Fasso	–	–	–	–	–
17	Burundi	–	–	–	–	–
18	Cameroon	–	–	–	–	–
19	Cape Verde	–	–	–	–	–
20	Central African Republic	–	–	–	–	–
21	Congo (Brazzaville)	–	–	–	–	–
22	Côte d´Ivoire (Ivory Coast)	–	–	–	–	–
23	Democratic Republic of the Congo (DRC)	–	–	–	–	–
24	Equatorial Guinea	–	–	–	–	–
25	Gabon	–	–	–	–	–
26	Gambia	–	–	–	–	–
27	Ghana	4.0	8.0	10	30	235,863
28	Guinea (Conakry)	8.0	18.0	20	30	0
29	Guinea-Bissau	–	–	–	–	–
30	Liberia	–	–	–	–	4,100
31	Mali	–	–	3	10	–
32	Nigeria	–	–	–	–	–
33	Rwanda	–	–	–	–	–
34	São Tomé e Príncipe	–	–	–	–	–
35	Senegal	–	–	–	–	–
36	Sierra Leone	–	–	12	15	–
37	Togo	5.2	7.1	30	40	67,202
Total western and central Africa		**4**	**18**	**3**	**40**	**397,140**

Total Africa		**3**	**18**	**3**	**60**	**454,991**
38	China	0.40	28.6	20	50	3,500
Total East Asia		**0.40**	**28.6**	**20**	**50**	**3,500**
39	Bangladesh	–	–	–	–	–
40	Cambodia	4.2	11.6	20	35	–
41	India (planted teak)	–	–	50	80	50,000
42	Indonesia	–	10.0	20	30	639,234
43	Lao PDR (planted teak)	3.4	21.3	15	30	10,000
44	Malaysia	–	–	–	–	–
45	Myanmar (thinnings in planted teak only)	–	–	30	30	24,033
46	Nepal (TRMA 2010)	–	–	–	–	2,770
47	Philippines	–	–	–	–	–
48	Sri Lanka	–	–	40	60	19,385
49	Thailand (planted teak)	4.5	8.0	20	40	66,521
50	Timor Leste	–	–	–	–	–
51	Vietnam	5.0	12.0	15	30	20,000
Total South- and Southeast Asia		**3.4**	**21.3**	**15**	**80**	**831,943**
52	Australia	–	–	–	20	–
53	Fiji	–	–	–	–	–
54	Papua New Guinea	–	–	–	–	–
55	Solomon Islands	–	–	–	–	–
Total Oceania		–	–	–	20	–
Total Asia and Oceania		**0.4**	**28.6**	**15**	**80**	**835,443**
56	Bahamas	–	–	–	–	–
57	Cuba	–	–	10	–	–
58	Dominican Republic	–	–	20	–	–
59	Haiti	–	–	–	–	–
60	Jamaica	–	–	–	–	–
61	Puerto Rico	–	–	–	–	–
62	Trinidad and Tobago (TRMA 2010)	–	–	–	–	13,367
Total Caribbean		–	–	10	–	13,367
63	Mexico	–	–	20	22	–
64	Belize	–	–	20	–	–
65	Costa Rica	5.0	8.3	16	20	74,153
66	El Salvador	–	–	–	–	54,259
67	Guatemala	–	–	20	–	–
68	Honduras (TRMA 2010)	–	–	20	22	66
69	Nicaragua	4.2	8.3	16	22	–
70	Panama	5.0	6.3	20	22	–
Total Mexico & Central America		4.2	8.3	16	22	128,478
71	Bolivia	5.0	7.5	20	25	–
72	Brazil	7.65	19.0	5	40	286,054
73	Colombia	–	–	20	24	–

74	Ecuador (TRMA 2010)	6.3	8.3	18	20	73,630
75	French Guiana*	–	–	–	–	–
76	Guyana*	–	–	–	–	–
77	Paraguay	–	–	–	–	–
78	Peru	–	–	–	–	–
79	Suriname	–	–	–	–	–
80	Venezuela	5.0	7.5	–	–	—
Total South America		5.0	19.0	5	40	359,684
Total Caribbean, Mexico, Central and South America		**2.1**	**30**	**5**	**40**	**501,529**
World Total		**0.4**	**30**	**3**	**80**	**1,791.963**

Price of teakwood (Question 5, Table 5)

Definition of log dimensions	
Big logs	are logs above 48 cm diameter at midpoint over bark
Medium logs	are logs from 24 to 48 cm diameter at midpoint over bark
Small logs	are logs below 24 cm diameter at midpoint over bark

Indonesia	
Big logs	are logs above 30 cm at midpoint
Medium logs	are logs from 20 to 30 cm at midpoint
Small logs	are logs below 20 cm at midpoint

	Country	Logs from planted teak forests					
		Domestic market prices			Export market prices		
		big logs	medium logs	small logs	big logs	medium logs	small logs
		USD/m³	USD/m³	USD/m³	USD/m³	USD/m³	USD/m³
1	Angola	–	–	–	–	–	–
2	Botswana	–	–	–	–	–	–
3	Eswatini (Swaziland)	–	–	–	–	–	–
4	Kenya	–	–	–	–	–	–
5	Lesotho	–	–	–	–	–	–
6	Madagascar	–	–	–	–	–	–
7	Malawi	–	–	–	–	–	–
8	Mozambique	–	–	–	–	–	–
9	South Sudan	200	200	200	no log export		

10	Sudan	–	–	–	–	–	–
11	Uganda	–	–	133	–	–	–
12	United Republic of Tanzania	320	283	193	–	–	–
13	Zambia	–	–	–	–	–	–
14	Zimbabwe*	–	–	–	–	–	–
Average eastern and southern Africa		**260**	**242**	**175**	**–**	**–**	**–**
15	Benin	330	172	112	890	690	–
16	Burkina Fasso	–	–	–	–	–	–
17	Burundi	–	–	–	–	–	–
18	Cameroon	636	600	580	800	800	800
19	Cape Verde	–	–	–	–	–	–
20	Central African Republic	–	–	–	–	–	–
21	Congo (Brazzaville)	–	–	–	–	–	–
22	Côte d´Ivoire (Ivory Coast)	–	–	–	–	–	–
23	Democratic Republic of the Congo (DRC)	–	–	–	–	–	–
24	Equatorial Guinea	–	–	–	–	–	–
25	Gabon	–	–	–	–	–	–
26	Gambia	–	–	–	–	–	–
27	Ghana	91	55	41	400	350	300
28	Guinea (Conakry)	176	176	176	–	–	–
29	Guinea-Bissau	–	–	–	–	–	–
30	Liberia	–	–	–	–	–	–
31	Mali	17	13	8.50	–	–	–
32	Nigeria	–	–	–	–	–	–
33	Rwanda	–	–	–	–	–	–
34	São Tomé e Príncipe	–	–	–	–	–	–
35	Senegal	–	–	–	–	–	–
36	Sierra Leone	–	–	–	–	–	–
37	Togo	600	330	210	–	–	–
Average western and central Africa		**308**	**224**	**188**	**697**	**613**	**550**
Average Africa		**284**	**233**	**182**	**697**	**613**	**550**
38	China	2094	1070	363	–	–	–
Average East Asia		**2094**	**1070**	**363**	–	–	–
39	Bangladesh	–	–	–	–	–	–
40	Cambodia	n.a.	625	360	–	–	–
41	India	–	–	–		no log export	
42	Indonesia (2021 data)	464	165	62	–	–	–
43	Lao PDR (planted teak)	260	100		375	275	–
44	Malaysia	–	–	–	–	–	–
45	Myanmar (natural teak)	458	101	–	2,372	–	–
	Myanmar (planted teak)	313	78	–	1,365	–	–
46	Nepal	–	–	–	–	–	–
47	Philippines	–	–	–	–	–	–
48	Sri Lanka	288	180	74		no log export	
49	Thailand (planted teak)		840	200	–	750	–

50	Timor Leste	–	–	–	–	–	–
51	Vietnam	–	600	300	–	–	–
Average South- and Southeast Asia natural teak		**458**	**101**	**–**	**2,372**	**–**	**–**
Average South- and Southeast Asia planted teak		**331**	**370**	**199**	**870**	**513**	**–**
52	Australia	–	–	–	–	–	–
53	Fiji	–	–	–	–	–	–
54	Papua New Guinea	–	–	–	–	–	–
55	Solomon Islands	–	–	–	–	–	–
Average Oceania		**–**	**–**	**–**	**–**	**–**	**–**
Average Asia and Oceania (planted teak only)		**1213**	**720**	**281**	**870**	**513**	**–**
56	Bahamas	–	–	–	–	–	–
57	Cuba	–	–	–	–	–	–
58	Dominican Republic	–	–	–	–	–	–
59	Haiti	–	–	–	–	–	–
60	Jamaica	–	–	–	–	–	–
61	Puerto Rico	–	–	–	–	–	–
62	Trinidad and Tobago	–	–	–	–	–	–
Average Caribbean		**–**	**–**	**–**	**–**	**–**	**–**
63	Mexico	–	–	–	–	–	–
64	Belize	–	–	–	–	–	–
65	Costa Rica	100	75	40	400	250	100
66	El Salvador	–	–	–	–	–	–
67	Guatemala	130	100	–	400	–	200
68	Honduras	–	–	–	–	–	–
69	Nicaragua	–	100	16	400	300	200
70	Panama	–	–	–	–	–	–
Average Mexico & Central America		**115**	**92**	**28**	**400**	**275**	**167**
71	Bolivia	–	–	–	–	–	–
72	Brazil	195	100	58	850	389	218
73	Colombia	–	–	–	–	300	200
74	Ecuador	150	–	100	280	–	200
75	French Guiana*	–	–	–	–	–	–
76	Guyana*	–	–	–	–	–	–
77	Paraguay	–	–	–	–	–	–
78	Peru	–	–	–	–	–	–
79	Suriname	–	–	–	–	–	–
80	Venezuela	–	50	–	450	–	–
Average South America		**173**	**75**	**79**	**527**	**295**	**234**
Average Caribbean, Mexico, Central and South America		**144**	**83**	**54**	**463**	**285**	**203**
World Average		**547**	**345**	**172**	**677**	**470**	**377**

IUFRO Headquarters
Marxergasse 2
1030 Vienna, Austria
Tel: + 43-1-877-0151-0
Fax: +43-1-877-0151-50
Email: office@iufro.org
www.iufro.org