

Teaknet Bulletin

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Editorial

For the past couple of years, TEAKNET was engaged in a frequent dialogue with international organisations like IUFRO and FAO for initiating a global teak support programme to conserve the fast depleting teak genetic resource. As part of an ITTO support project, the consortium of IUFRO-TEAKNET-FAO is going ahead with an ex-post Teak Evaluation Mission to Myanmar this month.

Even though commercial teak plantation area has been on the increase globally, the relevance of smallholder agroforestry systems practiced by farmers contribute

substantial volume of timber to the local market, of which teak is a main tree crop in many parts of the world. Farm-grown teak from these production systems faces many impediments for profitable marketing of teak logs and products. A case study from Indonesia is reported in this bulletin. The conclusions and recommendations drawn are relevant to smallholder teak and tree-farming that could be adapted to local conditions.

A similar study report from Lao PDR is included as new publication in the bulletin, besides our regular column on prices of plantation teak imported to India. Price changes and new arrivals of teak is noticeable in the current Market Intelligence Report of International Tropical Timber Organisation, Japan.

We solicit your valuable suggestions and contributions of news items of interest to teak growers/traders and researchers through our e-Newsletter.

P.K. Thulasidas
TEAKNET Coordinator



Teak Evaluation Mission to Myanmar 19-30 July 2016

A consortium of IUFRO-TEAKNET-FAO has been entrusted by the International Tropical Timber Organization (ITTO) to implement an evaluation mission of the ITTO-funded project “*ex-situ* and *in-situ* conservation of teak (*Tectona grandis*) to support sustainable forest management in Myanmar”. The evaluation team made up of international and local forest scientists is scheduled to work in Myanmar from 19-30 July, 2016. The evaluation is part of a broader global assessment of conservation and sustainable management of teak resources currently underway by a group of IUFRO scientists from around the world. The global evaluation of teak management will also address best practices and lessons learnt, particularly on the conservation of teak genetic resources and sustainable management of natural and planted teak forests in different countries in Africa, Asia and Latin America. The results of this study are intended to help in the design of a Global Teak Support Program for enhancing teak resources management and governance.

Smallholder Teak Production in Indonesia

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A brief history of teak in Indonesia

Indonesia is the second-largest producer of teak (*Tectona grandis*) behind India from where the species was introduced to Indonesia as early as the second century AD. Commercial production of teak has a long history in Java, Indonesia. Plantations to support ship building are believed to have been established during the 13th century. Before AD 1600, the Javanese sultans claimed the teak and other forests, officially denying access to communities, but practiced limited control. During its supremacy, 1619–1796, the Dutch East India Company (Vereenigde Oost-Indische Compagnie, VOC) was primarily interested in teak for ship building to maintain the global dominance of its navy. Initially, the company contracted the local nobility for supply of the resource. Gradually, the company gained strong control over teak resources, forcing sultans and communities to deliver larger quantities of teak on terms favorable to the company. Local access was forbidden and strictly enforced. During the brief English period (1811–1815) forest control was liberalised and the use of teak for other purposes was expanded. In 1816, the Dutch government assumed direct control over Java. Teak was heavily felled to construct factories, warehouse, sheds, housing and railroads for the agricultural commodity sector (sugar, coffee, tobacco etc). Ship building remained important. Unauthorized harvesting was illegal, yet common. The agrarian law of 1870 reasserted the central authority of the VOC period, declaring all unclaimed and forest lands as the domain of the state. Subsequent forest laws were passed in 1913, 1927, 1928, 1931 and 1934, respectively. Teak forests were defined as land or land parcels on which teak was grown or partially grown. Forest land on Java and Madura was declared a state domain to which other parties have no right. Some centralization remains even today. While individuals and parties own the teak produced on their land, government permits are required to transport and trade timber.

The current situation

The center of the Indonesian teak industry is central Java, where the industrial demand for the timber is 1.5 to 2.2 million m³ per year. Perum Perhutani, the state-owned forestry enterprise, is the largest manager of teak plantations, with 2.4 million ha. It produced 477,000 m³ of teak in 2008, most of which was sold to the commercial teak industry. Short falls in supply are reportedly sourced from smallholder and community producers on Java, other teak-growing regions, imports from overseas and illegal harvests from Perhutani plantations.

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There are approximately 1.5 million smallholder farmers on Java managing 444,000 ha of tree-based agroforestry systems where teak is the dominant tree crop. In other parts of Indonesia, there is an additional 800,000 ha of smallholder agroforestry where teak is one component of multispecies, tree-based systems. Smallholder teak plantations became common in Java in the 1960s. By 1980s, teak production was seen as an attractive alternative source of livelihood. The national government's rehabilitation and re-greening program supported farmers' interests in developing tree-farming systems. Over time, smallholder teak production has become an important source of raw material for the Javanese furniture industry and income for rural families. Recent studies indicate that up to 80% of the teak used by small-to-medium producers (comprising 90% of the Jepara, East Java furniture industry) are small diameter logs supplied by smallholder farmers.

Smallholder teak systems on Java

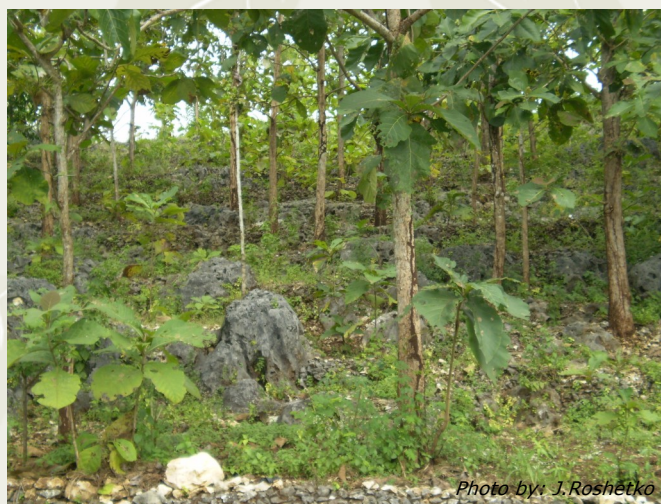
In central Java, smallholders cultivate teak in four systems: *Kitren*, *Tegalan*, *Pekarangan*, and as line plantings. Teak is the main tree component of these systems, accounting for 56% of all trees. Other timber species comprise an additional 21% of the tree component. *Kitren* are woodlots primarily dedicated to producing teak timber for market sales but are also utilized for annual crop production. *Tegalan* and *Pekarangan*



Kitren lowlands

Tumpangsari, intercropping, is a farming strategy to diversify farm production, reduce farm risk, produce food and increase farm income. With *Tumpangsari*, intercropping is not limited to the tree establishment phase but is practiced with trees of all ages. Because of competition for light, nutrients and moisture, systems with lower tree density (e.g., *Tegalan* and *Pekarangan*) are more favorable to intercropping.

Annually, over half of *Tegalan* and one-third of *Pekarangan* are intercropped. Eighty-two percent (82%) of farmers manage their teak production systems for both short-term annual crop production and medium-to-long-term timber production. Besides the food produced for household consumption, these systems provide 40% of overall household income (25% from agricultural production, 12% from teak and 3% from other timber).



Kitren uplands

In Gunungkidul District (West Java), decisions regarding what and when to intercrop were based on prevailing market prices for agricultural crops, available household labor, and household capital. Intercropping costs were justified by anticipated yields from annual crops. The positive impacts of intercropping on tree growth were a

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Photo: Gerhard Sabastian

Tegalan narrow rows

welcome benefit, but were not considered in decisions to cultivate annual crops. If costs were judged to be too high, farmers pursued off-farm opportunities where returns to labor were perceived to be higher. Proximity to urban employment opportunities in central and east Java facilitate temporary migration to those areas and the extensification of tree farming (particularly timber) as living savings accounts. Under these conditions, tree farming is seen not only as a means to diversify farm production, reduce risk, and build family assets, but also as an effective way of reallocating labor to lucrative off-farm employment opportunities.

Timber is not the only teak product that generated income for farmers. Collecting teak germplasm is also profitable. Farmers earn money by collecting and processing tree seeds of all species, with teak accounting for 20% of the overall tree seed collected and sold. Income from seed collection and processing can equal 33–66% of household cash incomes during the 3-month tree seed season. Approximately 22,500 farmers are involved in the tree seed sector. Other uses of teak include dyes from the leaves and buds and leaves are also used to wrap meals to facilitate transport. Caterpillars (*Hyblae puera*), common on teak, are cooked or sold as a delicacy. Branches can be an important source of domestic fuel.

Studies show that intercropped systems are more viable than monocultural systems. Key to the success of these systems are market access, food crop production (food security), and diversified production to provide short-term and long-term returns. The development of teak systems in Gunungkidul fits the hypothesis that smallholders adopt agroforestry systems that diversify production, reduce farm risk, provide food security and yield economic returns. In adopting such systems, smallholders seek to optimize the use of land, trees, household labor, and capital, while minimizing constraints.



Photo: Gerhard Sabastian

Tegalan Teak intercropping with corn

Besides enhancing rural livelihoods, the development of smallholder agroforestry systems has had a huge impact on environmental conditions and the supply of timber to the local industry. In the 1950s, severe poverty and land degradation were widespread in central Java and Yogyakarta. Many areas were nearly treeless, soil erosion was critical and agricultural production failing. Drought-induced famines occurred. The development of smallholder teak systems rehabilitated farms reversed soil erosion, diversified production and improved food security. From a nearly treeless state, Gunungkidul now has tree cover of 28.1% (41,773 ha) and smallholder agroforestry systems account for 68% of the total. As the industrial demand for teak timber continues to

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increase, the supply of timber from Perhutani plantations has declined. In response, smallholder teak farmers have increased production and become an important source of raw material for the furniture industry in Java.

Despite smallholders' existing role and potential to supply the timber industry, there are significant impediments to profitable smallholder teak plantations. Key among those are poor silvicultural management, limited market awareness and policy disincentives. The stocking of smallholder teak systems in Gunungkidul was very dense: 2.5x2.5 to 3x3 m. Those are appropriate planting densities for teak plantations, but thinning should follow five-year cycles to reduce densities as trees grow. However, effective thinning is uncommon in smallholder systems. As practiced by smallholders, thinning usually removes the biggest or better quality trees before the trees reach economic maturity. Similarly, pruning is not conducted to improve tree quality, but to harvest fuel-wood. Farmers usually leave 10–15 cm branch stubs, which reduce timber quality if not removed. When planting teak, most smallholders used wildings or other local germplasm because improved planting material is expensive and not readily accessible. Farmers do not weed or fertilize their teak systems in the absence of annual crops. Smallholders' standard management practices limited the productivity of their systems, resulting in smallholder teak systems being characterized as overstocked, slow growing and of sub-optimal quality and productivity.

In Gunungkidul, the lack of awareness regarding proper silvicultural management and limited technical capacity fostered farmers' indifference to adopting the practices. To build farmers' understanding, silvicultural trials were carried out by researchers and farmer-landowners. The trials focused on farmers' interests and demonstrated that silvicultural management was effective under smallholder conditions. Thinning and pruning treatment increased incremental diameter at breast height (dbh) by 60% and incremental tree height by 124%. The singling treatment increased incremental dbh by 45% compared to control treatments.

Based on trial results and other work, researchers and farmers collaborated to write a farmers' teak silvicultural manual. The trials and the manual were effective methods to build farmers' tree management capacity. An assessment conducted by doctoral students from Bogor Agricultural University found that 70% of the farmers in the project area have increased their knowledge in silvicultural practices, 50% adopting silvicultural practices on their own farms and 30% disseminating management practices to other farmers. In areas neighboring the project, 30% of farmers increased their silvicultural knowledge as a result of project activities, with 20% adopting silvicultural practices and 15% sharing information with others.



Photo: J. Roshetko

Medium sized industry source 80% of their material from farmers

Other issues also affected smallholder decisions regarding teak management. Smallholders have limited capital and household labor. They allocate those resources to generate the best returns. Teak is not prioritized, nor do smallholders take loans to finance teak establishment or management. Farmers' minimal investment in teak management reflects limited market incentives and the long-term nature of the crops. Limited investment is reasonable, as teak and other timbers are not the main source of household income. Investment in teak production is not attractive to farmers partially due to limited market incentives and restrictive government policies.

Read more on page 6

It is also possible to argue that farmers' opportunistic management of teak, when other on-farm or off-farm alternatives are less attractive, provides good returns on their limited investment. This approach to teak management enables smallholders to minimize risk, diversify production, effectively use household resources and grow living saving accounts to meet significant cash needs under their *harvest for needs* strategy.

Both farmers and traders are motivated by higher prices for higher quality timber. However, farmers' incentives to produce higher quality timber are constrained by poor market links and lack of price incentives. Those links are restricted by limited access to market information, a weak negotiating position and the production of small quantities of undersized trees of uncertain quality. Market links could be improved by introducing smallholders to the log grading and pricing systems used by the timber industry. Training sessions led by industry experts could improve the knowledge of smallholders as well as local traders to whom they sell their logs. These interactions could be further expanded to become farmer-industry partnerships where farmers produce trees to meet market specifications. The development of a valuation system for on-farm standing trees could reduce the risk for both smallholders and traders. Improving their confidence in the price to be received could provide the incentive smallholders needed to produce better quality timber.

Traders justify paying low prices for farm-grown teak because of the time required to identify individual farmers who want to sell their trees and that each farmer sells small quantities of small diameter logs. This process results in high transaction costs, which benefits neither smallholders nor traders. The development of group marketing to coordinate the sale of large quantities of logs per transaction would create an economy of scale and enhance the negotiating power of groups of farmers. The farmer marketing group could also institute a diameter limit that would assure each tree sold yielded higher volumes of merchantable quality timber. The efficiencies of dealing with groups of farmers and purchasing large volumes of better quality timber would enable traders to pay higher prices. This is a potential win-win situation to improve the inefficiencies of smallholder teak marketing systems.

The adoption of more intensive silvicultural practices would produce larger, higher quality timber. To maximize the production of merchantable teak timber, heavy early thinning of plantations has been recommended. Based on initial findings from the local trials, a similar prescription would be appropriate for smallholders in Yogyakarta. An obstacle to early heavy thinning is farmers' reluctance to cut trees that could not be sold. Most farmers viewed thinning as a loss of future income rather than improving the quality and value of the remnant stand.

One option to make early heavy thinning more acceptable is to establish teak in mixed plantations with short-rotation species such as *Gmelina arborea* or *Paraserianthes falcataria*. Harvesting the short-rotation species after 5 years would constitute early heavy thinning with economic return. Selection of short-rotation species should be based on local market demand. Computer simulation has shown that net present value and return to labor for smallholder teak systems is enhanced when farmers practice silviculture management, with benefits generated from both agriculture and timber crops.



Tegalan system in homegarden

Recommendations include adding smallholder teak to the certificate-of-origin scheme (*Surat Keterangan Asal Usul*), which validates the transport, possession or ownership of timber from forest or community land; or excluding smallholder teak from requiring a certificate of legal logs (*Surat Keterangan Sahnya Kayu Bulat*) or a certificate of legal forest product (*Surat Keterangan Sahnya Hasil Hutan*), which are intended to regulate timber production in natural forests and control illegal logging. Simpler, more relevant regulations for the smallholder timber trade would provide smallholders with incentives to invest in teak silviculture. Additionally, project results found that the development of affordable micro-credit programs to help farmers cover short-term and unexpected expenses could enable those farmers to refrain from harvesting undersized teak trees of low market value, retaining them until they reached merchantable size and higher value.

Conclusion and recommendations

Smallholder teak systems in Gunungkidul are a low-input alternative strategy for enhancement of livelihoods. The systems diversify farm production, reduce risk, support food security, generate income, and offer the opportunity to reallocate family labor to off-farm employment. Teak is the most common species in the systems, comprising 56% of the tree component. *Tumpangsari* is an important aspect of the systems, enabling farmers to respond to market opportunities for annual crops, facilitating the production of short-term to long-term returns. Besides food products for home consumption, smallholder teak systems generate 40% of overall household income from agriculture and timber products. The collection and processing of teak seed can also provide significant income for farm families. Smallholder teak systems have become an important source of raw material for the furniture industry in central Java and contributed to environmental rehabilitation. While the current role and potential for smallholder teak systems is good, there are some significant impediments. Principal among these are poor silvicultural management, limited market links, and policy disincentives. To strengthen the contribution of smallholder teak systems to enhancement of livelihoods, farmers could adopt the following recommendations:

- Thinning should be conducted when trees are 5–6 years-old to reduce tree density to 625 per ha.
- In the case of initial spacing of 3x3 m or 2.5x2.5 m, that would mean a thinning of 40% and 60%, respectively.
- Pruning to 60% of total tree height should be conducted when trees are 5–6 years-old. Branches should be pruned near the bole without leaving branch stubs. If trees originate from coppice, multiple stems should be thinned to the single healthiest stem.
- When planting, farmers should use the best germplasm available. Adopting these silvicultural practices would enable farmers to produce bigger, better quality teak more quickly than current practices.
- Farmers could also improve their marketing practices by accessing information, learning market specifications, engaging in group marketing and instituting minimum diameter standards for harvesting. Government, support agencies and industry all have roles to play in facilitating smallholders' adoption of better silvicultural and marketing practices.
- Government and support agencies can provide silvicultural training and extension services. Both government agencies and industry can provide access to log grading and pricing systems used in the timber industry. Industry could work with farmer marketing groups to reward the production of better quality timber and reduce transaction costs for the benefit of farmers, traders, and themselves.
- Third parties such as non-governmental organizations would have a role in capacity building and mentoring to help transform farmer marketing groups into competent, independent organizations.
- Finally, government agencies could work to remove policy disincentives that inhibit smallholders' motivation to improve the management of their teak systems.

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These conclusions and recommendations are relevant to smallholder teak and tree-farming systems across Indonesia and the tropics, and could be adapted to local conditions.

Acknowledgements

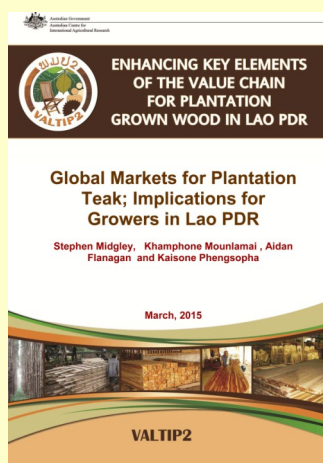
The authors acknowledge support from the Australian Centre for International Agricultural Research (ACIAR) through the *Improving economic outcomes for smallholders growing teak in agroforestry systems in Indonesia* (FST/2005/177) and *Development of timber and non-timber forest products' production and market strategies for improvement of smallholders' livelihoods in Indonesia* (FST/2012/039) projects. The opinions expressed here are those of the authors and do not necessarily reflect the views of ACIAR.

Recommended Reading

- Roshetko JM, D Rohadi, A Perdana, G Sabastian, N Nuryartono, AA Pramono, N Widyani, P Manalu, MA Fauzi, P Sumardamto, N Kusumowardhani. 2013. Teak agroforestry systems for livelihood enhancement, industrial timber production, and environmental rehabilitation. *Forests, Trees, and Livelihoods* 22 (4): 241-256 DOI: 10.1080/14728028.2013.855150
- Sabastian G, P Kanowski, D Race, E Williams, and JM Roshetko. 2014. Household and farm attributes affecting adoption of smallholder timber management practices by tree growers in Gunungkidul region, Indonesia. *Agroforestry Systems* 88:257-268. DOI: 10.1007/s10457-014-9673-x
- Perdana A, JM Roshetko, and I Kurniawan. 2012. Forces of competition: smallholding teak producers in Indonesia. *International Forestry Review*: 14 (2): 238-248.
- Khasanah N, A Perdana, A Rahmanullah, G Manurung, JM Roshetko, M van Noordwijk. 2015. Intercropping teak (*Tectona grandis*) and maize (*Zea mays*): bioeconomic trade-off analysis of agroforestry management practices in Gunungkidul, West Java. *Agroforestry Systems* DOI:10.1007/s10457-015-9832-8

New Release

Enhancing Key Elements of the Value Chain for Plantation Grown Wood in Lao PDR



In Lao PDR, teak is one of the country's most valuable timber species. Recognising the value of teak and the limitations of supply from Lao native forests, government authorities began to establish teak plantations in Lao PDR in 1942. A large proportion of the current teak plantation estate was established and is being managed by many private, small-scale owners. Harvesting of teak generally begins 12 years after planting with trees reaching a merchantable size of 15 cm dbh. Most growers harvest teak for household financial needs and very few market their own teak. Without knowledge of market drivers, prices and trends, policy makers, managers and smallholder growers are at a disadvantage. Conclusions are reached regarding the nature of the existing and potential demands of the wider global market place and specifically from China, Vietnam and Thailand. The likely influences of these demands upon the maturing resource of teak grown in Lao PDR are addressed in this publication.

To Download Please visit www.teaknet.org

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Prices of Plantation Teak Imported to India

There have been changes in some prices reflecting the girth and length of recently arrived logs. Honduras, China, Myanmar and Taiwan are now shipping significant volumes of teak logs and these countries are now included in this table. Analysts report a sizeable quantity of logs (reportedly plantation logs) is now arriving from Myanmar.

Country of Origin Logs	US\$ per cu.m C & F
Angola	459-574
Belize	350-400
Benin	290-714
Brazil	321-665
Cameroon	405-616
Colombia	357-775
Congo D. R.	450-761
Costa Rica	286-780
Côte d'Ivoire	289-756
El-Salvador	399-732
Ghana	276-434
Guatemala	360-451
Guyana	300-450
Honduras	471-539
Kenya	515-876
Laos	300-605
Liberia	265-460
Malaysia	225-516

Myanmar	756-884
Mexico	289-808
Nicaragua	402-505
Panama	335-475
PNG	443-575
Sudan	488-857
Taiwan	1036-2126
Thailand	511-700
Togo	354-590
Trinidad and Tobago	603-753
Uganda	407-890

Sawn wood / Squares	
Brazil squares	370-556
Ecuador squares	254-564
Nigeria squares	321-405
Benin sawn	530-872
China sawn	855-1118
Myanmar sawn	1486-2749
Tanzania teak, sawn	307-613

Price range influenced by length and cross section

Courtesy: ITTO TTM Report 20(11): 1-15 June 2016

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