

Trees as loan collateral: Valuation methodology for smallholder teak plantations

Working paper



Overview

- Smallholders engaged in forestry-based livelihoods are faced with increasing competition for land and often unclear land tenure. These challenges demand that they diversify their income sources and attain productive values for their existing assets;
- The acceptance of standing timber as a collateral asset by banks and creditors can build a foundation for smallholders in the form of a forestry-based approach to microcredit, especially in situations where economic and political structures for microcredit are limited; and
- A valuation methodology implemented by ForInfo for teak trees which estimates true commercial value at the roadside discounted for harvesting costs based on market values can reduce the risks involved in using trees as collateral for loans.

Introduction

Given that smallholders engaged in forestry-based livelihoods face increasing competition for land and forest degradation, it is necessary to find strategies to better attain productive values from existing assets. There is increasing recognition that trees and standing timber can serve as collateral assets, providing credit opportunities for previously excluded groups such as farmers with smallholdings. In a situation where government regulation of credit institutions and processes is still undergoing capacity and institutional development, it is necessary to build a foundation that espouses community forestry principles and aims to improve livelihoods and capabilities that are adaptable to existing social and economic pressures, because loans carry inherent risks not only for borrowers but banks as well.

This brief reviews a **teak tree valuation methodology** that attempts to ameliorate these risks. The valuation method was created in tandem with the implementation of a smallholder forestry project in Bokeo, Lao PDR. The project was implemented by RECOFTC in conjunction with the Lao Provincial Organisation for Forestry and Agriculture (PAFO) and the Lao Department of Agriculture and Forestry. ForInfo is working to improve community livelihoods, based on sustainable forest management principles, for teak cultivation by smallholders (RECOFTC 2013). One of the core strategies for maximizing the benefits from teak plantations was to introduce smallholder plantation certificates that indicate the market value of individual stands. The valuation methodology was carefully developed, keeping in mind the social and economic climate of risk involved in timber harvesting and the procurement of credit.

This brief details the methodology and discusses the choices made. It is hoped that the discussion will benefit community forestry and rural development practitioners, microfinance planners and financial institutions operating within the circles of developing countries. Expansion of the landscape for smallholder financing and microcredit will also be applicable to new instruments for collateral. When designed with care and combined with government and technical support, forestry assets can serve as foundations for the extension of credit, and become a catalyst for enterprise initiatives emanating from previously underserved communities.

Teak smallholdings in Bokeo and the tendency to harvest below potential

Lao PDR has the highest ratio of forest land per capita in the region. There has been an expansion of smallholder teak plantations due to the influx of government-initiated teak promotion projects since 1975, as well as favourable land allocation policies in the 1990s. Land is largely held communally with smallholders organized as labour units. Land that is unused for more than three years is returned to the village committee and redistributed; hence, farmers have taken to planting teak on these lands to retain tenure over them.

With high demand for teak wood in the global market, there is potential for high returns from teak growing, especially in relation to present household incomes (Newby et al. 2010:1). Teak prices increased 8.5 percent *per annum* between 1997 and 2007 (ITTO, cited in Bianchi et al. 2013b). Considering declining supplies from natural teak forests, the long-term prospects for plantation-grown teak appear promising and demand is likely to increase (FAO 2010, cited in Bianchi et al. 2013b). In Bokeo, returns from teak can account for 25 to 55 percent (Figure 1) of a smallholder's income (Bianchi et al. 2013b).

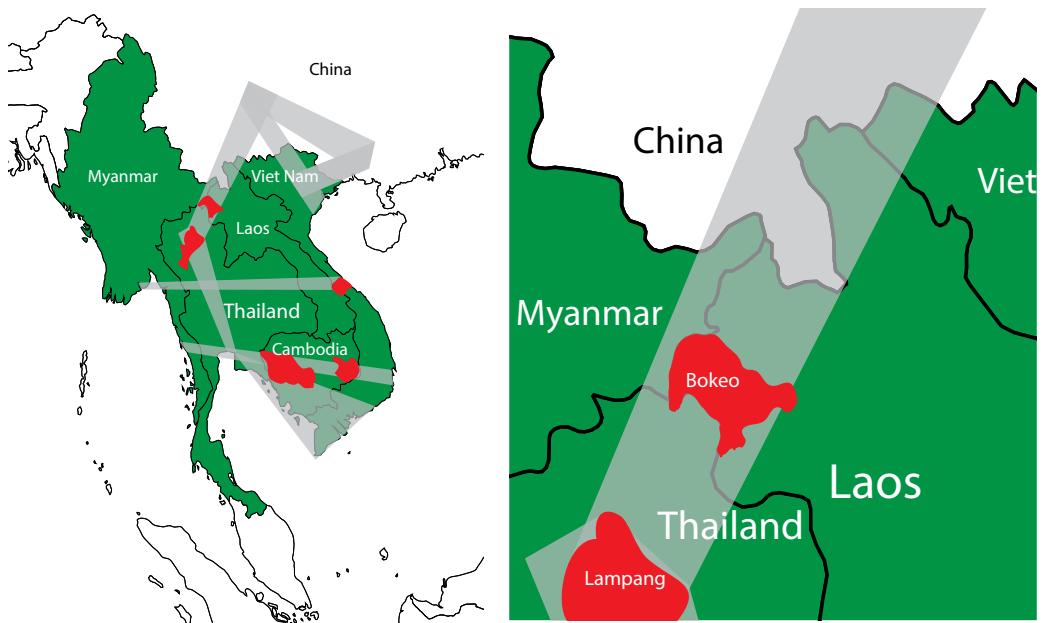


Figure 1. Location of the ForInfo teak project site in Bokeo Province, Lao PDR, superimposed on GMS economic corridors (Bianchi et al. 2013b).

While incomes from teak are attractive, smallholders do not invest much in improving the value of their teak plantations. Trees are often sold standing, often to intermediaries, rather than as logs that have already been harvested, graded and sorted. The lack of information on market prices, timber quality and volume, is also an obstacle to the farmers' ability to harvest at maturity and negotiate better prices for their teak. In addition, because of the absence of efficient harvesting techniques, teak is often planted on land close to rivers and roads – sites with high opportunity cost – for easy transport. In summary, the lack of information on individual plantations and trees is among the reasons why smallholders harvest trees at premature growth stages that command prices much lower than their potential value.

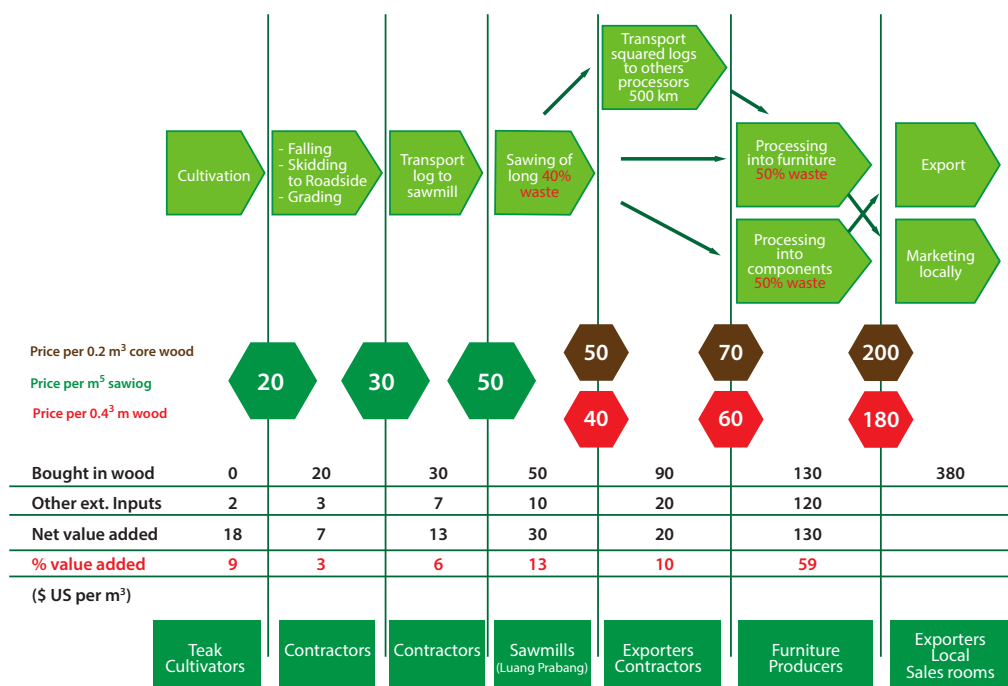


Figure 2. Teak timber value chain showing value added at different stages of the production process (Mohns 2007 2013b).

Teak tree certificates

ForInfo introduced tree ownership certificates as a mechanism for distributing information about teak values. Certificates contain both stand and financial valuation. Stand valuation includes site quality assessment according to age-height relationship, diameter and height distribution with subsequent commercial volume estimations. These benchmarks are used for financial valuation, which also takes into account harvesting costs in relation to distance to roads and the volume-per-piece ratio. The certificates consist of the following components:

- A description of the land user/owner and a land registration number if available;
- A location sketch map with cadastral or GPS coordinates, including details of the nearest road to assess harvesting distance to roadside (with an overlay of a Google Earth map added by ForInfo);
- Inventory of standing trees by diameter classes;
- Financial valuation of trees taking into account harvesting costs;
- Provision for updated inventory data after removal of trees; and
- A short descriptive section.

In addition, the ownership certificates offer an opportunity to secure timber as a collateral asset for microloans. Examples around the world suggest that treating trees as collateral assets could decelerate deforestation because the trees' growth periods are lengthened; also, they serve as an incentive for farmers to engage in plantation maintenance such as thinning and increase farmers' investments in productivity enhancement by enabling them to procure tools, machinery and vehicles (FAO 2005; Cerdas 2005).

Regulatory regimes have largely excluded trees as collateral (FAO 2005). This is due to the long maturity period of trees compared to other sources of capital, the lack of documentation and certification, absence of rights to land, absence of guaranteed buyers and the lack of security over market price, as well as the lack of understanding and capacity of governmental agencies to facilitate intervention. Credit opportunities pose substantial risks for both borrowers and banks. Borrowers must demonstrate creditworthiness, which is especially challenging for asset-poor communities deficient in savings or income-generating activities, including communities engaged in subsistence farming. The extension of credit to such communities has been limited due to the lack of assets – such as property, land and even agricultural produce – that were conventionally considered as collateral for loans. Together with the absence of laws to protect credit institutions and borrowers, institutions are reluctant to extend their services to the rural poor.

At present, PAFO/DAFO teams have issued 95 plantation certificates that display the values for commercial volume and market value in Paktha and Huay Xai districts. In Huay Xai District, rapid assessments were carried out in another 26 plantations and the corresponding certificates have been released, although without information on volumes or market values. In Paktha District, 79 plantation certificates have been issued to 59 farmers since 2012, covering a total area of 23.4 hectares. The total commercial volume of trees is estimated at 632 cubic metres or an average of 27 cubic metres per hectare. The potential market value of all standing trees is approximately US\$50 000, with an average of about US\$2 200 per hectare. The average age of plantations is 15 years and the average area is 3 000 square metres. The average market value per plantation is approximately US\$660.

Regulations and policies governing credit institutions and borrowers remain a critical need. In the meantime, the ForInfo teak certification project has attempted to ameliorate some of the issues by producing accurate estimates of tree volumes and market values. These estimates are more essential than government regulation of financial instruments because they must reflect a level of risk borne by both households and institutions as they operate in a resource-poor environment. The following section details the methodology and rationale for estimating timber volume and value with the goal of using teak trees as collateral for credit.

Key elements of the ForInfo teak ownership certification scheme

Volume estimation

Preliminary studies began in August 2012 to determine practices in measuring, valuing and trading teak (Bianchi 2014). These included:

- Collecting market information by interviewing five sawmill operators in Huay Xai and Paktha districts between August and October 2012 (updated in 2013);
- Commercial timber volume overbark was estimated based on the average of the **diameter at breast height** (DBH) and the top of the commercial trunk (15 cm), and length equal to commercial height. Although this method underestimates the total volume, it gives conservative estimates of both volume and market value, and more realistically approximates the less-than-average quality of trees in Bokeo Province; and
- Comparisons were made with volume estimations made in other studies conducted in neighbouring Luang Prabang Province (by the Australian Centre for International Agricultural Research) and in northern Thailand. The volume estimated by the ForInfo methodology corresponds to 70 percent of the volume calculated in other studies (Bianchi 2014).



Height measurement of the 10-cm diameter small end of the potential logged tree for the financial valuation

Market value estimation

The choice of the financial valuation method to be used will depend on the purpose of the valuation, the availability of data and various socio-economic conditions that influence the risk profiles of households and credit institutions alike. The two most common values used in commercial forestry are **stumpage value** and **predicted value**.

Stumpage value, also known as stand value (*Abtriebswert*), estimates the value of a stand by multiplying the volume of timber by today's market price for the particular species of timber being grown. Also known as 'immediate harvest value', stumpage value is often used for timber slated for immediate cutting. Stumpage values are estimated using timber market reports and site inventories for timber volumes. Harvesting costs are excluded from the valuation except when standing trees are sold.

Predicted value (also expected value or *Bestandeserwartungswert*) calculates the expected future financial return from harvesting a mature stand at today's value, corrected for expected inflation. The primary purpose of the predicted value method is to compare forestry investments to other investments in terms of the opportunity cost of planting trees for timber. To obtain the expected or predicted value one must calculate the expected future financial return in today's US dollars. This calculation takes into consideration the length of the growing period as well as a 'discount rate'. To conduct a valuation of a tree expected to be harvested after ten or 30 years, one considers the price at which one would expect to sell the tree in those ten or 30 years, minus the discount rate or a rate of interest (Beuter 1971). The key value is rotation age. Once a rotation age is chosen, the expected value of standing timber cut and sold at that age is then applied to a discount rate for each year until harvest.

The most important criterion in choosing a value estimate is the decision-maker's use of the estimate (Beuter 1971). Foresters select a valuation method depending on whether the timber is being slated for immediate or future harvest. Predicted value is meaningful for practitioners trying to determine whether the rate of return from continuing the investment in the trees is more than the rate of return that will be received if that money or land is invested in other opportunities. An important characteristic of predicted value is that, compared to stumpage value, it tends to project much higher prices for teak at every age. At a point where a tree is viewed as reaching its peak DBH (around 40 years of age), both stumpage and predicted values plateau out. Although this has considerable significance for growers who need to account for the opportunity costs of tree planting versus other uses for the land, estimating with higher values can lead to difficulties for growers for whom the opportunity cost of land is not a consideration. This involves special risks for growers for whom tree valuation is being employed as a means of assessing the size of a mortgage or collateral.

When applying for loans, mortgages reflecting higher values can be extremely risky for mortgage applicants operating in cash-poor economies. These applicants have fewer opportunities for livelihood diversification and are therefore at higher risk of defaulting on loans. In these cases, stumpage value provides a more accurate assessment of the amount a grower receives at a particular growth stage, should a decision be made to liquidate the tree assets. The financial risk of applying stumpage value is lower than applying predicted value because the latter method assumes trees are always felled at the expected DBH and maturity.



The social context for the choice of valuation method

Other conditions in teak growing in the Bokeo area that influence decisions on volume and market estimates are summarized below:

A higher tendency to harvest before maturity.

Given the inclination to harvest prematurely, there are significant differences in the quality of a teak tree currently growing on a smallholder's plot and projecting forward to its potential value at the age of 40, which can result in an error-prone assessment of the present value of the tree. When stumpage values are used, this risk is reduced and loan defaults occurring before the tree reaches 15 cm DBH leave the householder with a lower repayment obligation, a better scenario than if she/he had to repay a loan the equivalent of the timber's net present value. This is also reflected in the fact that before the minimum harvest age, stumpage value is negative because tree volume is too low to be harvested.



Plantation inventory for the financial valuation

Poor thinning and pruning practices leading to high-potential trees being felled and stands with low potential being left behind.

Collaterals on smaller-sized, growth-suppressed trees do not increase in value because their growth remains suppressed. Such trees are proposed targets for the first round of thinning and can be harvested earlier. Valuing these trees using stumpage value avoids the tendency to overestimate their value. ForInfo is attempting to increase the marketability of these growth-suppressed stands slated for first thinning by exploring innovative processing methods. One example is to process growth-suppressed timber for finger joints made out of interlocking two pieces of wood with complementary rectangular cuts. Initial studies show that collateral value for first stage thinning materials can range from US\$1 000 for low-quality sites far from roads (up to a distance of 2 km) to US\$2 500 for high-quality sites close to roads (Bianchi et al. 2013a).

Lower price of growers selling to intermediaries compared to potential earnings higher up in the timber value chain.

Current timber sales in Bokeo have disproportionate benefits for smallholders compared to areas with better regulations. Many growers sell their timber through an intermediary who visits their plantations and makes an agreement with them on a price for individual trees. This intermediary often provides felling and transportation services, therefore reducing the price paid to the grower for her/his timber. Moreover, the prices for tree harvesting and transportation are set in an arbitrary fashion through negotiation with individual smallholders. Surveys of prices paid for timber at different points in the value chain show a large jump in market value of logs cut and those transported to roadsides, as opposed to standing timber. There is also a disadvantage in selling small-sized trees because taxation does not account for diameter classes and is applied at a uniform rate of 15 percent for teak logs.

The need to account for the relatively high cost of harvesting. ForInfo has adjusted its stumpage values to account for harvesting costs. This is necessary due to the high cost of harvesting. Improved harvesting technologies are currently being tested to improve efficiency and further reduce harvesting costs. Preliminary results indicate that improved harvesting efficiency will be crucial in increasing collateral value, particularly for smaller trees. Initial findings show that if the cost of harvesting and transportation to the roadside is included in stand valuation, the extraction of smaller-sized thinning material (below 12 cm DBH) is not economical in smaller-diameter classes (Bianchi et al. 2013a). ForInfo also attempted to improve the consistency and accuracy in estimating harvesting costs by ensuring that certificates bear information on how far plantations are from the road.

The need to maximize the benefits accrued to existing plantations and conditions, rather than future/planned plantations. While teak plantations proliferated in the 1980s and 1990s owing to strong encouragement by Lao government policies, not much new teak is being planted currently. There are also concerns that many teak smallholdings are currently converted into banana plantations, particularly if they are located along all-weather roads and on land with irrigation potential. Predicted value helps planners compare the opportunity cost of using land for timber cultivation with other potential uses. In the case of northern Lao PDR and other areas where such planning is absent, using stumpage value over predicted value deals with the more immediate concerns of maximizing the benefits accrued to maturing teak plantations. Teak cultivation also takes place in the absence of security mechanisms, such as insurance policies against agricultural failures, thus emphasizing the need for more conservative valuation measures.

Towards an enabling environment for smallholder finance

The rationale for reflecting prices of stumpage on collateral certificates is to provide local growers with greater incentives to postpone harvesting, as well as to harvest their own teak. In addition, with the help of collateral certificates and improved harvesting and transportation methods, growers could be encouraged to plant on steeper land further away from the road, utilizing land that has lower opportunity cost for teak planting. Even though predicted value gives a higher valuation of a given stand, stumpage value is more conservative, one that reduces the risks for smallholders and banks alike.

When implemented with care and combined with sound government policy, regulatory systems and technical assistance, the extension of credit can be beneficial not just to smallholding borrowers, but also to build a foundation for enterprise initiatives and the delivery of financial services to previously underserved communities. There is evidence to suggest that an increased injection of cash not only encourages investment in more efficient harvesting and transportation methods, but also helps smoothen consumption without depleting savings needed to tide growers over long periods without income, especially given the increasing competition for land and other resources.

References

Beuter, J.H., 1971. *Timber value – a matter of choice: A study of how end use assumptions affect timber values*. Portland, OR: USDA Forest Service Research Paper PNW-118, United States Department of Agriculture.

Bianchi, S., Mohns, B. and Noeske, F., 2013a. *Assessing harvesting costs improves the quality of valuation of smallholder Teak plantations in Lao PDR*. In: *World teak conference*. Bangkok, Thailand, 25-30 March 2014. Bangkok: RECOFTC.

Bianchi, S., Mohns, B. and Noeske, F., 2013b. *Smallholders teak plantation certificate in Bokeo Province, Laos*. Powerpoint presentation. Presented at the Workshop on Collective Forest Tenure Reform and Community Forestry, Fuzhou, China, 3-8 December 2013.

Bianchi, S., 2014. *Report on the smallholder teak certification system in Bokeo Province, Lao PDR*. Bangkok: RECOFTC.

Cerdas, P., 2005. *Mechanisms for creating liquidity in a rural setting: A description of existing banking and financial regulations in Guatemala, Nicaragua, and El Salvador for using cattle and trees as loan collateral*.

Food and Agriculture Organization of the United Nations, 2005. *Microfinance and forest-based small-scale enterprises*. FAO Forestry Paper 146. Available at: <<http://www.fao.org/docrep/008/a0226e/a0226e00.htm>> [Accessed: 12 March 2015].

Newby, J.C., Cramb, R.A. and McNamara, S., 2010. Smallholder teak and agrarian change in northern Laos. In: *International conference on revisiting agrarian transformations in Southeast Asia: Empirical, theoretical and applied perspectives*. Chiang Mai University, Thailand, 13-15 May 2010. Bangkok: Research Centre for Sustainable Development.

RECOFTC-ForInfo, 2013. *Teak smallholder plantations*. [Lao PDR Factsheet] November 2013. Bangkok: RECOFTC.



Teak logs from land clearing for banana plantation



RECOFTC's mission is to enhance capacities for stronger rights, improved governance and fairer benefits for local people in sustainable forested landscapes in the Asia and the Pacific region.

RECOFTC holds a unique and important place in the world of forestry. It is the only international not-for-profit organization that specializes in capacity development for community forestry.

RECOFTC engages in strategic networks and effective partnerships with governments, nongovernmental organizations, civil society, the private sector, local people and research and educational institutes throughout the Asia-Pacific region and beyond. With over 25 years of international experience and a dynamic approach to capacity development – involving research and analysis, demonstration sites and training products – RECOFTC delivers innovative solutions for people and forests.

RECOFTC – The Center for People and Forests
P.O. Box 1111
Kasetsart Post Office
Bangkok 10903, Thailand
Tel (66-2) 940-5700
Fax (66-2) 561-4880
info@recoftc.org



Printed on recycled paper