

Conserving teak for future generations

An ex-post evaluation has found that an ITTO-supported project in Myanmar helped the conservation of high-quality teak genetic materials but would have benefited from more attention to social and policy aspects

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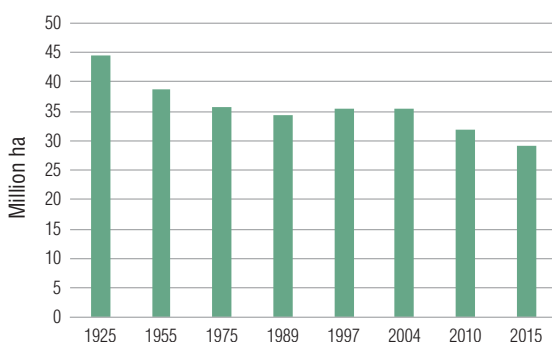
Review: A project officer and a district forest officer discuss “lessons learned” in a village-managed seed production area. Photo: R. Glauner

This article presents the results of an ex-post evaluation of an ITTO-supported project implemented in Myanmar to encourage the sustainable management of the country’s teak resources. ITTO commissioned the ex-post evaluation in 2016 from a consortium composed of scientists and experts from the International Union of Forest Research Organizations, the Food and Agriculture Organization of the United Nations, and TEAKNET.

Sustainability of teak resources under threat

Myanmar is home to one of the world’s most valuable commercial timber species, teak (*Tectona grandis* L.F.). The harvesting and processing of teak has contributed significantly to Myanmar’s economic development, but the country’s forest cover is declining: it is now at 43% of the total land area (29 million hectares), down from 66% (45 million hectares) about 90 years ago (Figure 1). The reasons for the decline are well known and include unsustainable logging, illegal

Figure 1: Myanmar’s forest area, 1925–2015



Source: FAO (2015) and REDD Readiness Roadmap.

harvesting, and the expansion of agricultural activities among local communities.

In the mid 1800s, the community use of teak forests in the country’s Pegu area led Sir Dietrich Brandis—a German forester who was then the area’s superintendent of forests—to conclude that the Karen communities could do better by applying the taungya system¹, a temporary agroforestry approach still widely practised today. This proved a major leap forward in the establishment of planted forests in the tropics under the concept of community forestry (as it is called today).

Despite a trend towards greater community involvement, however, reforestation has been unable to keep pace with deforestation, and valuable teak forest resources remain under threat. To address this issue, the Myanmar Forest Department implemented ITTO project PD 270/04 Rev.2 (F): “*Ex-situ* and *in-situ* conservation of teak (*Tectona grandis* L.F.) to support sustainable forest management” from 2006 to 2009. ITTO’s financial contribution amounted to US\$475 000, and the Government of Myanmar contributed 50 million Myanmar kyat in in-kind support.

Today, the Myanmar Forest Department is fully aware of the need for tree improvement and the systematic collection of quality seeds for the establishment of teak plantations. Despite a (time-limited) logging ban, Myanmar aims to maintain its market for high-quality teak wood and downstream products. It has embarked on a serious effort to control harvesting and ensure the legality of timber, and it has commenced a timber certification initiative.

¹ Taungya is a Myanmar word for “hill cultivation”; it describes the establishment of forest trees (here, teak) with agricultural crops such as upland rice and maize. Farmers maintain the areas until canopy closure and receive income from the agricultural crops or use them for subsistence. The government may also provide cash payments for maintaining the teak resource.



Re-covering: This landscape in Myanmar is to be reforested using taungya community forestry concepts. *Photo: R. Glauner*

Assessing project impacts

The ITTO teak conservation project operated throughout the country, implementing various activities in ten townships—Pyinmana, Paukkaung, Nattalin, Myan Aung, Saw, Kyauktaga, Pyay, Mawbe, Oktwin and Kantbalu. The project was intended as a precursor for a more sophisticated tree improvement programme; it involved the identification of plus-trees, the collection of seeds and clones for provenance trials, the establishment of hedge gardens, and the provision of support for tissue-culture laboratory facilities and operations to increase the production of superior plantlets. The project also encouraged the participation of local communities through village development, awareness-raising and capacity building—including workshops and study tours. It was expected that, after completion of the project, large quantities of high-quality seeds would be available from seed production areas (SPAs), and local communities would continue to benefit from the collection and sale of seeds.

The project had a two-fold development objective:

1) to promote the production of high-quality teak through genetic improvement in order to support sustainable forest management; and 2) to enhance national economic development through the sustainable production and export of high-quality teak using good-quality seeds for planting. Before the project, reforestation activities were carried out using seeds obtained mainly from unspecified seed sources; the project was expected, therefore, to address the country's extreme shortage of high-quality seeds for reforestation programmes.

The ex-post evaluation took place seven years after project completion and concentrated on the following aspects, which were the project's main focus:

- teak SPAs—established for seed collection and demonstration;
- a tissue-culture laboratory—for the production of high-quality tissue-cultured plantlets;
- hedge gardens, a nursery, and provenance trial plots—established for the production of quality plantlets and for the further establishment of seed orchards;
- the capacity of local communities—to enable their full participation in tending operations and the protection of SPAs; and
- the capacity of the staff of the Forest Department and Forest Research Institute—especially in handling, tree improvement and community development.

Findings and lessons learned

With the aim of establishing a solid foundation of information for the ex-post evaluation, the expert team conducted a large number of on-site inspections and held discussions with many project target groups, mainly local communities. The team visited six project sites (Pyinmana, Paukkaung, Saw, Mawbe, Oktwin and Kantbalu) and interviewed communities involved in seed collection operations in the SPAs. The team also met with the Myanmar Forest Certification Committee and timber companies and visited community forestry projects, where it held discussions with their representatives.

Sustainability of project sites

The team found that, seven years after project completion, all pilot sites established under the project still exist, and they are being maintained. These pilot sites are:

- SPAs in Kantbelu, Pyinmana, Saw, Paukkaung, Myan Aung and Nattalin (Figure 2);
- hedge gardens at the Forest Research Institute in Yezin in Pyinmana Township (0.04 hectares, 131 ramets with 22 clones) and at Letpankn, in Oaktwin (1.09 hectares, 932 ramets with 89 clones);
- provenance trials in the Ngalaik Reserve, Pyinmana Township (1.13 hectares, eight provenances) and in the Yenwe Reserve, Kyauktaga Township (1.29 hectares, nine provenances); and
- nurseries at the Forest Research Institute in Yezin and at the Central Forestry Development Training Centre in Hmawbi.

Silvicultural management of project sites

All plots underwent silvicultural treatment and maintenance. The team found, however, that clear objectives for treatments had sometimes been lacking. The project completion document, which reported on the final project findings (Forest Research Institute 2008), contains two good-quality technical chapters on how best to manage SPAs. The measurement component of these prescriptions was implemented, but subsequent analytical work has been weak, and information on mean or current increment, basal area and other parameters is unavailable. This weakness in analytical data-processing led to unfocused plot management.

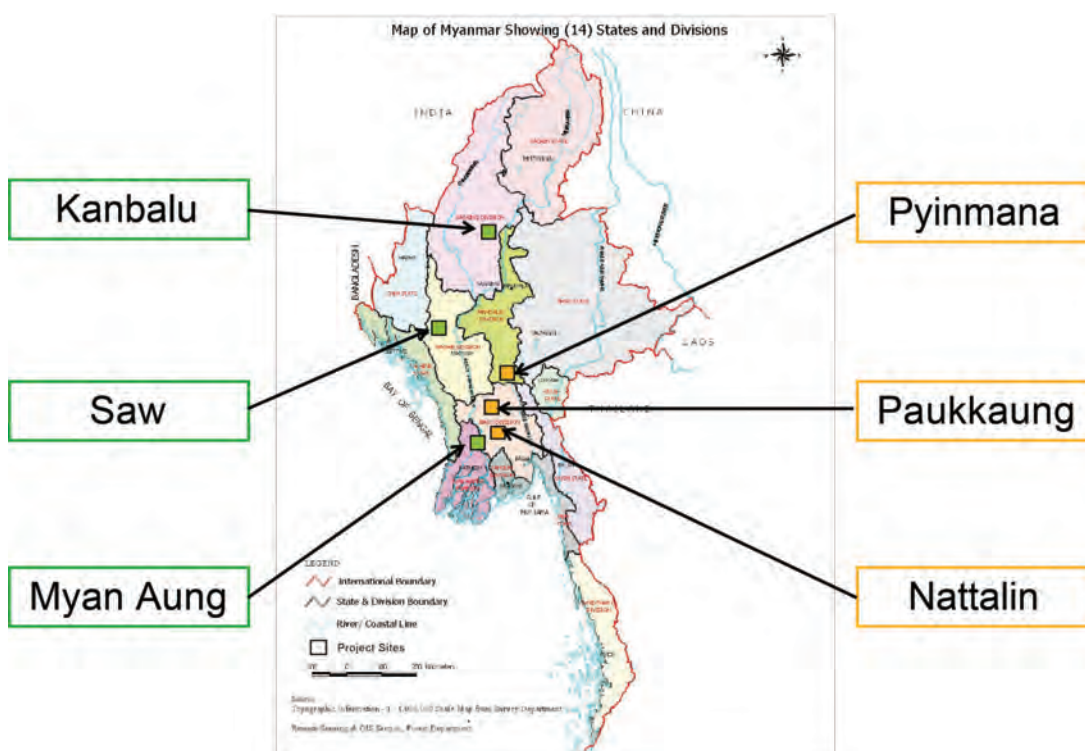
The team observed that plus-trees were perfectly shaped but had lower diameter growth compared with surrounding trees. Moreover, tree health and pests were not subject to field assessment, even though these are playing an increasing role in the management of teak forests. In particular, infestations of mistletoe fig pose a serious problem to tree vitality in some areas, and middle-aged stands appear to show very high mortality rates after infestation.

Practical application of seed production results

The long-term success of newly introduced technologies and forest management approaches requires—in addition to technical capacity—appropriate forest policy support. The ex-post evaluation found that, in this project, the objectives and anticipated outputs focused exclusively on technology. Links to forest policy were not envisaged; in hindsight, this is a major shortcoming of the project design, and it means that SPAs and gene conservation areas are not integrated into a wider reforestation or sustainable forest management approach. Because tree improvement was not embedded in the forest policy framework, important project findings and results have not received the attention they require, with the following results:

- In teak plantation establishment, no distinction is made between seeds/seedlings from SPAs or clonal propagation, compared with natural origin.
- Growth performance indicators are lacking in SPAs and at sites established with seeds of natural origin.
- Cloned or vegetatively propagated material is not systematically tested in plantation areas.

Figure 2: Pilot sites for seed production sites developed under the project





Fine specimens: Teak plus-trees in a seed production area in Myanmar.
Photo: R. Glauner

- The criteria for SPAs and plus-tree selection are not re-evaluated periodically.
- Some key results at project sites—such as provenance trials—are unavailable, and therefore the anticipated scaling up of seed production has not taken place.

Long-term project impact

By design, the project was intended to produce, through short-term measures, primarily long-term impacts in the *ex situ* and *in situ* genetic conservation of teak. Project measures were implemented successfully; all established plots still exist and are subject to regular maintenance. Despite these successes, however, the achievement of the project's long-term objectives is not guaranteed. There will only be a lasting and measurable impact if high-quality seeds (e.g. from the project's SPAs) are used in teak planting projects. Making the use of high-quality teak tree seedlings mandatory through Myanmar Forestry Department regulations is essential for ensuring the project's long-term impact. The evaluators consider that the forest policy currently being drafted could provide a valuable avenue towards this end.

The impact of the project on local communities participating in the project and those adopting project-tested approaches has been mixed. Some communities have selected and marketed seeds successfully and are protecting their SPAs very well. Other communities have abandoned their silvicultural maintenance entirely because of a lack of seed production from their SPAs. One community visited by the evaluation team in Kin Mon Taung Reserved Forest, Taungdwingyi, adopted the concept, even though it was not a target community under the project. There, seed production and marketing contributes considerably to community income; the community even employs a guard to secure the area. The community is somewhat reluctant to implement the planned silvicultural treatments, however, for fear that this will reduce income.

Conclusion

Tree improvement and the genetic conservation of *Tectona grandis*, one of the world's most valuable tropical timber species, is a long-term goal of tremendous importance, especially because natural forests are dwindling at alarming rates and reforestation is not keeping pace with degradation. Providing support for technical-oriented approaches is an excellent way to advance forestry and build up knowledge and capacity, both of which are indispensable in Myanmar for managing the transition from forest exploitation to sustainable forest management for and by communities and society. Sustainable management cannot be achieved by technical guidelines alone, however: the integration of all forest users, and greater political awareness of the need for change, are equally necessary.

ITTO project PD 270/04 Rev.2 (F) was an excellent example of the success that can be achieved with good planning and dedicated implementation. To evaluate the long-term impacts of this technical project on the target communities and policy development, however, the inclusion of measurable social and policy indicators would have been beneficial; greater attention to these aspects would have helped advance the development of a strong seed-supply system for high-quality teak planting material in Myanmar.

Publications produced by the project can be found by inserting the project code (PD270/04 Rev.2 (F)) into the ITTO project search function at www.itto.int/project_search.

References

- FAO 2015. *Global forest resources assessment 2015: desk reference*. Rome.
- Forest Research Institute 2008. *Proceeding on teak seed production area management and tree improvement*. Project completion report. Myanmar Forest Department and ITTO.