Sustainable bamboo utilization in Thailand

Long term improvements result from an ITTO project

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Hand up: Villagers pass bamboo seedlings for planting at Ban Mae Mae Community Forest.
Photo: F. Soriano

FOREST-dependent communities in Thailand became increasingly dependent on the harvesting and trading of non-wood forest products (NWFPs) such as bamboo and rattan, gums and resins, edible plants including mushrooms, medicinal plants and spices, edible insects, tannins and other crops, as a result of the total ban on logging in the country that started in 1989. ITTO pre-project PPD 4/98 Rev.1 (I) 'Promotion of Tropical Non-Wood Forest Products in Thailand' identified the problem of rapidly declining bamboo resources due to excessive harvesting, including illegal harvesting of bamboo stands in the forests. Appropriate propagation and plantation management techniques for shoot and pole production were generally not widely known by farmers. Similarly, rural-based bamboo-using enterprises had limited access to information and technologies on the efficient use of bamboo; hence no opportunities to improve traditional products, let alone produce higher value ones.

ITTO PD 56/99 Rev.1 (I) 'Promotion of the Utilization of Bamboo from Sustainable Sources in Thailand' arose from PPD 4/98 and was implemented by the Royal Forest Department (RFD) of Thailand from October 2000 to September 2004 to promote sustainable bamboo plantation management and utilization as a means of generating livelihoods and income for rural communities engaged in collecting, processing, storage and sale of bamboo products. Plantation management techniques were disseminated to farmers and other villagers by establishing experimental plots planted with five selected commercially important bamboo species either for shoot or pole production in two

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Sustainability and wider applicability of project outcomes

Since its initiation in 1999, this project has carried out many activities which today constitute assets and bases for the continuation of the principal objective of biodiversity conservation while taking into account the needs of local communities. The tools for biodiversity conservation and a methodology for reduced impact logging have been developed. This project is therefore a well-suited model for replication in other FMUs. However, replication entails some preconditions.

A consistent political and institutional will to promote and advance the sustainable management of forest resources is essential. While the national forest policy aims towards sustainable reduced impact logging, this policy does not seem to be consistently and effectively imposed on all operators in Congo. Industrial companies which make substantial efforts in forest management and biodiversity conservation are often penalized rather than remunerated for their efforts. They invest at the social and environmental levels, and assume the responsibility for functions of the State, but are taxed at the same rate as operators who undertake no such investments/responsibilities. To promote an equitable policy of good management in all FMUs, the Government must apply a 'motivation—sanction' approach to encourage operators, e.g. by granting tax advantages and, at the same time, exerting pressure on those companies which do not fulfill their obligations, e.g. by withdrawing their concessions.

In addition to the ITTO funding, the project partners have committed themselves to financially supporting the project in its current phase. However, the experience of the last several years has highlighted a lack of adequate financing. While seeking the contribution of other donors, innovative and sustainable finance sources, for example the use of part of the taxes paid by the forest industries, should be explored.

In the long term there must be a synergy between conservation on the one hand and the well-being of the local populations on the other. More intensive support for economic development with regard to the sustainable use of natural resources by the local populations is necessary, at the same time as intensified efforts to raise public awareness and education. Indeed, these two aspects must be combined to show how sustainable natural resource management leads to activities which produce income and preserve the resources at the same time.

The full evaluation report and more details on the Congo projects are available from rfm@itto.or.jp.

demonstration sites. One site was at the Ban Mae Mae Community Forest in Chiang Mai Province and the other at the RFD Forest Products Research Center (FPRC) in Nakhon Ratchasima Province. The project implemented research and development studies with the view to establishing community-based enterprises on the processing and packaging of bamboo shoots, utilization of bamboo for furniture/furniture parts and charcoal production. The project also disseminated techniques and information gathered from international training workshop and conference such as the INBAR-organized 'International Training Workshop on Bamboo Handicraft Techniques and Its Tools and Small Machines' held in October 2001 in Zhejiang and Sichuan, China; the short–term training course on the utilization of bamboo charcoal in November 2001 at Kyoto University and the World Bamboo Conference in India in March 2004.

Ex-post evaluation of the project was carried out in February 2007, 29 months after the project's completion. The primary purposes of this evaluation were to provide a concise diagnosis to pinpoint the successful and unsuccessful outcomes, the reasons for the successes and failures, the project's contribution towards the achievement of ITTO's Objective 2000, and to draw lessons that could be used to improve future similar projects. This evaluation was done simultaneously with the evaluation of a related project, PD 24/2000 Rev.1 (I) titled 'Promotion of Sustainable Utilization of Rattan from Plantation in Thailand', also implemented by the RFD.

Project design, outputs and attainment of objectives

An examination of the research-to-impact pathway in the project design showed that within the time and resources available, the design focused more on outputs rather than socio-economic outcomes. The rationale of the vertical logic was appropriate; however, some outputs such as technologies on bamboo shoot processing and packaging, charcoal producing, and furniture making had only short-term effects. The link between the project outputs with the higher order objectives could be improved by integrating a sustainability plan addressing, among others, uncertainties brought about by external factors.

The project had accomplished several activities without additional cost to ITTO, namely: a) a bamboo products design contest was held for university students; b) a traditional bamboo demonstration house was built at the Ban Mae Mae Community Forest; and c) research and development studies on bamboo-cement boards and laminated bamboo flooring. These activities added value to the overall project outputs.

Impact and relevance of the project

Project activities promoting the trade of bamboo propagation materials, fresh edible shoots and poles were the most widely accepted and adopted by the rural communities in Nakon Ratchasima and Chiang Mai. Aside from the species introduced in this project, private plantation owners have also acquired plantation materials from other countries/regions such as China, Taiwan, Indonesia and East Timor, although usually through unregulated means (i.e. without phytosanitary or seed analysis certificates as safeguards against introducing bio-invasive species and related problems that threaten the local bamboo industry).

At the time of the evaluation, a limited annual supply of plantation materials from local commercially important bamboo species was being distributed for free by the FPRCs, but could also be bought from private plantations for Bt 50–200/seedling depending on the species' commercial importance. Locally propagated plantation materials from imported species were available from private plantations for Bt 200/seedling, but some for as much as Bt 3000/seedling.

The project activities at Ban Mae Mae drew attention and generated the local government's support for the community after the project's completion. In 2006, the community received funds for the construction of some 50 traditional bamboo houses resembling the model house put up during the project; these are currently rented out to tourists at Bt 500 for an overnight stay.

Overall post-project situation

The project achieved the intended outcomes at the project sites, albeit to a limited extent. It is noteworthy that promotion of sustainable bamboo production and utilization technologies has been integrated in the RFD's in-place program on NWFPs. After the project's completion in 2004, demonstration plots and equipment such as the charcoaling kiln designed and built by the project have been replicated using RFD funds and installed at the newly relocated FPRC in Chiang Mai. These facilities are utilized in regularly conducted training courses that have served as further catalysts for establishing more bamboo plantations in Chiang Mai and creating new livelihood opportunities such as the sale of planting materials from commercially important species such as those studied in this project. Using RFD funds, a model house showcasing construction applications of bamboo was also put up at the Nakon Ratchasima FPRC campus.

Both FPRCs at Nakon Ratchasima and Chiang Mai continue to receive and respond to numerous requests for planting materials for high shoot-yielding species and those with quality poles. Good quality bamboo poles from managed plantations sell for Bt 75–240/piece compared to Bt 20–25/piece from unmanaged plantations. For bamboo shoots grown using appropriate plantation techniques, farmers claim an overall increase in income of over 100% or so owing to increased harvest of up to 50 kg/rai (about 300 kg/ha) in one day. Dry shoots sell for Bt 5–10/kg and steamed shoots for Bt 14/kg, but this can rise to Bt 35/kg during the dry season. On average, a farmer earns Bt 16 000/rai per month from shoots and as high as Bt 30 000 depending on the species and quality.

Traditional bamboo furniture is generally not appealing even to local buyers as it is perceived as poor man's furniture. However, through the application of more advanced techniques and processing technologies and innovative designs, small- and medium-size enterprises produce export quality middle to high-end bamboo furniture for France, Germany and the Middle East. Furniture makers who participated in project activities on plantation management and furniture design have upgraded their capabilities by acquiring power tools and imported electric dryers to meet bulk orders from the Middle East. Local bamboo handicrafts and furniture makers are generally aware of the government's One Tambon-One Product (OTOP)[1] Program and strive to acquire OTOP product certificates as a means to improve marketability and sales in competitive export markets. However, the local bamboo furniture industry still has to take advantage of the availability of Thailand's Furniture Testing Center as a means of upgrading and adding value to their products, and expanding their markets.

[1] *In Thailand, the One Tambon-One Product (OTOP) Five-Star Certification is given to enterprises with excellent quality products (processing methods and packaging), which are 100% made of local indigenous materials.*

There is little motivation for rural communities to engage in bamboo charcoal production because of widespread confusion over a prohibition on charcoal production and trade. In Thailand, charcoal manufacturing concessions were cancelled in 2006. Most villagers are not aware, though, that such cancellation is meant to arrest the rapid destruction of mangrove forests (largely attributed to charcoal production). At present, it appears that the regulation makes no distinction between charcoal from mangrove forests and that from sustainable sources such as bamboo plantations. Hence, there is a need to review and clarify policies and regulations on the trade of materials and products from plantations. Further development of bamboo charcoal vinegar or light distillate into higher value products for medicinal, fungicidal and other industrial applications should also be looked into.

Unexpected effects and impacts

During this evaluation, a farmer-participant from Chiang Dao District, Chiang Mai province expressed his serious concern regarding the gregarious flowering of his *Dendrocalamus sericeus* plantations. Most bamboo species die after flowering. A widespread gregarious flowering of *Dendrocalamus asper* in natural forests and plantations all over Thailand more than 10 years ago led to significant losses for the bamboo farmers. This flowering phenomenon is by far the most challenging threat to the promotion of bamboo plantation management and sustainability in Thailand, and anywhere in the world. There is no definite prescription on how to handle such a phenomenon. INBAR maintains a web page specifically on this topic and provides information on the number of years it takes for some species to flower.

The factors that influence bamboo's demise after flowering have not been established. The pattern of flowering in bamboo varies with species and the physiology of flowering remains unclear. Clear cutting does not appear to halt stand mortality, although some clumps may be induced to develop new shoots before finally dying altogether. Some species have been observed to recover after flowering[2].

Recommendations

Project design and outcomes. In projects involving community-based enterprise development as a strategy for conservation and sustainability, the duration, scope and pilot sites should be carefully selected to ensure direct and more straightforward links between enterprise and conservation to exist. Multi-stakeholder participation is critical during project formulation; equally important is expertise on socio-economic aspects, business development and marketing.

Enterprise-oriented NWFP-based communities. Future projects on non-wood forest products should ensure that aside from technological support, entrepreneurship and business skills development are vital components in enabling subsistence-oriented communities (such as most forest communities) to progress into enterprise-oriented entities.

Follow-up actions. The RFD, through its FPRCs, should immediately pursue an information and education campaign and coordinate with the appropriate regulatory bodies to place safeguards on importing bamboo propagation materials.

Likewise, the RFD must promote awareness of mitigating measures to the apparent gregarious flowering of bamboo plantations. In the medium term, RFD could establish a bamboo gene bank, and update its bamboo identification manual and bamboo resource database as these tools enable both the government and industries to make more accurate decisions.

The RFD, in collaboration with other government programs and private industry partners, should embark on the further development and commercialization of value-added products from bamboo such as high-grade charcoal and its distillate, and the engineered bamboo products developed in this study (bamboo-cement boards and laminated bamboo flooring). Regulations should be reviewed to ensure that such products are not adversely affected by legislation intended to protect other resources (e.g. mangroves). In the short term, the RFD and its collaborators should pilot the production of vacuum-fried bamboo chips (to be marketed as a rich source of dietary fiber) as the project had illustrated the technical and financial viability of this product.

The RFD, in partnership with the Ministry of Industry, should look into how the local bamboo furniture industry can benefit from the services of the Furniture Testing Center as a means of upgrading furniture designs and workmanship, encouraging innovations and expanding its export market. In its techno-transfer activities, the RFD should target wider diffusion of information and technologies by partnering with industry associations such as the Thai Furniture Industry Club and the Thai Furniture Industries Association.

The RFD should develop the Ban Mae Mae Community Forest into an economically viable ecotourism zone owing to its rich wood and NWFP resources and biodiversity, its strategic location (considering that Chiang Mai has a vibrant tourism industry), and the presence of the community's management committee that spearheads the conservation and protection activities in consultation with RFD. The management plan for such a zone should integrate the lessons learned in this project.

Conclusion

ITTO should continue to promote and support research and development studies on NWFPs with a view to improving forest management, as well as increasing the capacity of forest-dependent communities to conserve and enhance forest values. This project has confirmed that bamboo is one of many sustainable non-wood resources that can generate income for a large forest-dependent rural population, and that Thailand needs to take further steps to realize its full potential.

The complete report of the ex-post evaluation is available from the ITTO Secretariat (fi@itto.or.jp).

[2] *Tewari, D.N. 1992.* A monograph of bamboo. *International Book Distributors, Dehra Dun, India. 498p.*