A tradition of including trees within traditional farming systems is being given a modern twist in Papua New Guinea by the inclusion of commercially valuable species that also provide in-country opportunities to further develop timber processing ventures.

Everywhere in Papua New Guinea (PNG), trees and their management are incorporated into both traditional and modern farming systems. Given this natural tendency to combine agricultural and forestry production systems—a farming technique called agroforestry—ACIAR saw an opportunity to improve farmer livelihoods by supporting the cultivation and processing of commercially valuable tree species.

In a now completed project, ACIAR determined that where a critical mass of resources can be established, commercial tree species appear a good prospect for landowners with otherwise limited income-generation alternatives.

ACIAR also identified suitable tree species, production systems, candidate regions and partners for commercial timber production. Farmers learned how to grow and plant high-value trees such as teak and Eucalyptus pellita. Within a few years farmers were able to sell *E. pellita* poles for house construction and teak trees should provide substantial incomes for farmers in 20-30 years’ time.

Now, ACIAR is building on those foundations by encouraging the adoption of commercial-scale, high-value tree growing by communities in two regions of PNG. These ventures are being fostered through relationships between landowners and selected business partners and non-government organisations, with scientists providing technical support.

As a result, more diverse, sustainable and profitable production systems are slowly appearing in PNG as agroforestry with a commercial twist is adopted by farmers.
Beads of sweat slowly roll down the face of farmer Lukus Namai as he squats over a small teak tree, gently pushing down the earth around it. The farmer taps into his 10 years of experience as he explains that he is planting teak trees now so that in years to come his village will have timber for building houses.

Lukus Namai points to the mountains that surround his small village of Marawasa in PNG’s Morobe Province; most of the lower slopes have been converted to grasslands over many years. “If we need timber now, we have to travel a long way to buy it, then carry it back to the village.”

Overseeing the teak planting on Lukus Namai’s small plot of land is agroforestry project officer David Adzab. He explains that teak trees are an ideal investment for villages in PNG wishing to develop a ‘green portfolio’, while the eucalyptus trees offer a good opportunity for short-term returns as housing materials.

“Teak is a fast-growing species that is in demand around the world,” he says. “And these trees are ideally suited for PNG conditions.”

Teak trees are noteworthy for their capacity to withstand changes in the weather and seasons. The trees’ resilience while in the ground is matched in their timber, which is noted for its remarkable strength, durability and dimensional stability. The end product is a highly sought-after commodity with a global market.

These properties are not lost on New Britain Palm Oil (Ramu AgriIndustries) landscape and biodiversity officer Gorethy Dispen. At a small-scale tree nursery surrounded by sugarcane fields, she tends to small teak seedlings with a motherly touch.
“Teak is very important, it is a high-value timber and it’s good to plant teak for commercial timber production in the future,” she says. “The ACIAR project has helped broaden the availability of high quality teak seed, which is now being grown for distribution to the farmers.”

Wielding a large pair of pruning cutters, forestry technician Peter Konia is tending an ACIAR teak trial site, where seedlings from different locations are being compared in terms of their growth characteristics. It is surrounded by the mountains of Morobe Province where one can see large areas of grasslands with distant forest-clad ridges and fields of green, with the occasional small patch of land cleared for gardens and villages. He points to another trial site 100 metres away.

“Those teak trees are from Laos. See how well they are growing?” he says. “These ones are from Thailand. They don’t grow as fast. This week and next I will prune the teak trees to improve the form of the trees and the value of the timber. They are a part of our lives now.”

**BALSA**

With an established balsa growing and wood processing industry in East New Britain Province, ACIAR is providing the expertise needed to enhance this industry’s value, sustainability and its accessibility to smallholders. It is an especially significant project since income from cocoa production has been suffering due to predation by the moth pest—the cocoa pod borer.

Balsa (or *Ochroma pyramidale*) cultivation is an attractive land-use option for both PNG smallholders and larger landowners. This fast-growing tree can reach 30 metres in height in 5 years and is the source of balsawood—a valuable lightweight material with an expanding market. There are few barriers to its adoption by smallholders, although to be sustainable there needs to be growth of markets along with expansion in the area of trees.

The low density and high strength of balsawood makes it a popular material for building light, stiff structures from model bridges to full-sized light aeroplanes. It is also used as a core material in composites—for example, in the blades of wind turbines—and in laminates with glass-reinforced plastic (fibreglass), aluminium and carbon fibre that find uses in the defence, energy, marine and aerospace industries.
Ecuador is the world’s largest balsawood supplier. The South American tree was introduced to PNG in the 1930s and is now the basis of a commercial industry in East New Britain Province. With an 8% market share by volume and 6% by value, PNG is the world’s second largest balsa supplier.

An earlier ACIAR scoping study found that 500 smallholder growers and two larger commercial interests cultivate about 5,000 hectares on 5-year rotations. Exports of processed wood from these plantings were valued at about K11.2 million (A$5.4 million) in 2008, with the dominant markets being China (43%) and India (20%).

To bolster growth in this promising industry, ACIAR is helping smallholders take advantage of the opportunities to use balsa to boost incomes, with research subjects that span the supply chain, including:

1. analysis of smallholder livelihoods, decision processes and farming systems;
2. identification and facilitation of smallholder organisation and communication strategies and structures;
3. optimising value recovery in balsa processing, including wood delivery logistics and primary and secondary processing;
4. optimising supply of improved germplasm and crop management for smallholders; and
5. development of enabling systems for the certification of PNG smallholder balsa.

Working on this project are Sylvester Kulanz, Jaupo Miniunu and Daniel Weady—technical officers at the PNG University of Natural Resources and Environment in Vudal, in East New Britain Province, under the guidance of Neville Howcroft. One of the activities undertaken locally involves growing a variety of balsa seedlings in the university greenhouse to help understand the best management regime for balsa.

“I would like to think that in years to come, some good will come from the research I have done on balsa trees,” Jaupo Miniunu says.

For that to happen, Daniel Weady says R&D into the development of practices that allow smallholders to grow high-quality balsa sustainably and productively in managed plantations must continue. That information would provide the essential foundation for the entire industry.

At the other end of the supply chain there are the balsa processing mills, such as the one at Kokopo. Visiting the mill as it operates in full swing is a local plantation manager, John Ohana.

“The industry has become quite sophisticated and the quality of the balsawood being grown needs to be maintained and improved,” John says. “This is important, given that processed balsa is used in a number of specialised engineered products such as wind turbine blades and boats, where lightness and strength are required.”

The growing sophistication of the Papua New Guinean balsa industry

BY EMILY FLOWERS

The Papua New Guinea Forest Authority aims to build a forestry sector that is sustainable and highly profitable, while recognising the importance of promoting community forestry activities to empower rural communities and alleviate poverty.

The established balsa industry in East New Britain Province is the best example nationally of a successful value-adding forest industry involving smallholder tree-growing.

Smallholders engage in balsa growing both individually and, increasingly in the past decade, as groups working collaboratively. About 75% of the planted area is smallholder plantation and almost all of this is managed as blocks of less than 20 hectares by landowners who have pooled their resources to maximise their returns.

Balsa is an alternative to cocoa because of the impact of cocoa pod borer (CPB). The CPB infestation is leading to a reduction in the area planted to cocoa, a principal smallholder crop, and to an increase in smallholder interest in alternative crops. Balsa could offer an attractive alternative.

The ACIAR project that supports these smallholder agroforestry ventures was launched in September 2011. Improving the Papua New Guinea balsa value chain to enhance smallholder livelihoods (FST/2009/016) aims to enhance the value, value recovery and international competitiveness of the PNG balsa industry as a way of optimising benefits for smallholder growers. It achieves this by addressing issues, constraints and opportunities along the entire balsa value chain, from smallholder decision-making and organisation through to improving germplasm and management of balsa crops and on to transport, processing, marketing and product development.

Research has helped to identify the key issues along this chain:

■ For smallholders: the optimal incorporation of balsa-growing into their farming system, the availability of adequate labour, plantation management capacity and the nature of supply arrangements with processing industries.

■ In management of balsa plantations: optimising germplasm and silviculture, and realising management standards adequate for forest certification.

■ For processors: optimising value-recovery strategies from the forest through to the wharf, including improved sawing and drying practices.

■ In marketing and product development: enhancing market analysis, developing innovative product development opportunities and synchronising log production with processing capacity and market demands.

As such, the project is expected to deliver economic, environmental and social benefits to the entire PNG economy.