Rebuilding Vietnam's war-torn forests

Vietnam was once a land of dense forest. But nearly two-thirds of its tree cover was destroyed by war, overharvesting and clearing for agriculture. Today, trees are on the way back with the Vietnamese Government committed to planting five million hectares of trees on denuded land. Australian species and forestry expertise have played an important role. **Niall Byrne** reports.

Clearing for agriculture has severely reduced Vietnam's forest cover, but now agroforestry is seeing increasing take-up across rural areas for the benefits it brings communities. Rob Broek, iStockphoto

In the 1940s, 60 per cent of Vietnam was forested. But conflict (and the infamous Agent Orange), overexploitation, and slash-and-burn cultivation have all taken their toll, reducing forest coverage to just 23 per cent.

The loss of forests came at a high cost for the environment and especially for villagers dependent on forest products for income. It also led to a national shortage of wood for industry.

The Vietnamese Government, however, has reacted to these problems with a series of programs to protect natural forests and establish tree plantations for watershed protection and for industrial wood production. The current target is a massive five million hectares of conservation and production plantations on denuded lands by 2010. The new industrial plantations will supply sawn timber, mine poles, fuel wood, wood for the pulp and paper industries, and contribute to environmental conservation and the rehabilitation of eroded land.

Already, a vibrant forestry industry is generating billions of dollars in exports, and giving rural communities new opportunities to generate income and stay on the land. Fast-growing tree plantations now provide industrial wood and greatly reduce the harvesting pressure on natural forests. It's been a remarkable achievement by the Vietnamese people.

Successfully establishing large areas of fast-growing plantations in a poor country recovering from war provided many challenges to overcome. So, Australian forestry scientists were asked to help. Several eucalypt and acacia species and two decades of scientific collaboration have been contributing to the re-greening.

Through projects supported by AusAID and ACIAR, Australian researchers rose to the challenge.

'Twenty years ago I made my first visit to Vietnam,' says Stephen Midgley, a former CSIRO forestry scientist. 'I was impressed with the commitment and vision of the Vietnamese foresters. But they'd had little contact with their international peers for decades, and there was a national shortage of wood.'

There was also a problem with the

Roadside sales of *Casuarina equisetifolia* for fuel-wood in Vietnam help with income generation. Stephen Midgley

Local timber factories add value to sawn logs while providing vital employment. Stephen Midgley

quality of the (Australian) tree species being grown.

'Australian trees have been used in Vietnam for a century or more,' says Chris Harwood, of CSIRO Sustainable Ecosystems. 'In addition to their use in formal plantations, eucalypts and other Australian species are planted widely on farms, around homesteads, and along canals and roadsides,' he says.

'Australian species are favoured for their adaptability and rapid growth, even on seasonally dry, infertile and degraded sites,' says Harwood. 'But, in many locations unsuitable species and provenances (local varieties) were being used. In addition, over successive generations, local seed sources had become inbred – reducing the growth of plantations raised from them. This is a particular problem for smallholding growers who do not have access to tree breeding programs and tend to use the cheapest locally available seed sources.

The impact of inbreeding can be dramatic. A tree with 'good' genetics can produce two to five times more timber than inbred trees.

'One of our first steps was to identify trees that were suitable for plantation forestry in Vietnam,' says Midgley. 'So we looked to Australia's tropical forests for fast-growing, well-understood trees; trees which had demonstrated potential in other sites in South-East Asia,' he says.

There were many candidates.

A tree finds fame

Over the past 20 years *Acacia crassicarpa* has gone from a virtually unknown tree in the wilds of north Queensland and Papua New Guinea to a major commercial plantation species in Vietnam.

It grows vigorously on poorly drained, acidic sites in the humid tropics.

The other important Australian trees chosen for fast-growing wood production in Vietnam include:

- *Acacia auriculiformis*
- *Acacia mangium*
- *Eucalyptus urophylla*
- *Eucalyptus camaldulensis*
- *Eucalyptus tereticornis*
- *Eucalyptus pellita*

Australasia has 1000 species of *Acacia* and over 600 species of *Eucalyptus*. Dozens of prospective plantation species went through a rigorous selection process involving seed collections from remote areas in northern Australia and Papua New Guinea, climate matching, and a series of short- and long-term field trials.

'We focussed on three acacia and four eucalypt species that would grow on degraded land and produce valuable wood products,' Midgley says.

'We trained Vietnamese foresters in the best ways to create and sustain forestry plantations – dealing with pests and diseases, and creating high value timber.

'Vietnamese scientists have a strong scholarly tradition – and they took quickly to the challenges of breeding up and releasing the trees in Vietnam. Our aim was to establish the tree breeds and seed orchards and broaden the genetic base of Vietnam's eucalypt and acacia plantations. Eucalypt and acacia germplasm developed by Vietnamese scientists is now being adopted in Laos, Malaysia, China and Thailand, and back in Australia.

'Then we worked with the timber mills to help them make the best use of the wood. That's created market pull – with the industry preferring the new timbers. And that's when it stopped being an aid program and started bringing real benefits.

'Now Vietnam has 850 000 hectares of acacia and eucalypt plantations and they're

CSIRO's Chris Beadle discusses the layout of a thinning trial in a hybrid acacia plantation with Vietnamese colleagues. Chris Harwood, CSIRO

exporting furniture to Australia and many other countries. By comparison, Australia has just 700 000 hectares of eucalypt plantation.'

Eucalypts and acacias are also providing raw material for a thriving wood chip export market worth about US$185 million annually.

'It's immensely satisfying to meet the villagers we've helped,' says Harwood. 'One man in Dong Ha, Central Vietnam, told me that the income from processing logs of Australian species in his small sawmill has helped him send his son through school and now to Hue University, where he's studying physics.'

What's more, Australian consumers can support this sustainable forestry effort if they wish. 'When you're buying outdoor furniture, if you can't find Australian-made stock, then look for solid acacia. There's a good chance that it's made in Vietnam. Our work with the Vietnamese ensures that it's a sustainable harvest,' says Midgley.

Vietnam's wood products have grown dramatically over the last decade. It currently exports AU$2.6 billion of wood products each year. But Vietnam still has a wood shortage and imports AU$900 million of wood to make the products. The timber is coming from many countries including West Africa, South America and Malaysia. That's changing too.

'In the future we anticipate that more of the wood will come from Vietnamese plantations growing Australian species. And half of that will be grown by smallholders – enabling villagers to stay on the land,' says Harwood.

'Increasingly, the Vietnamese forest researchers are becoming self-sufficient. Their younger scientists are doing post-graduate training and collaborating with us on advanced projects. We're working with them to ensure that the industry is sustainable – managing the sites, the soil resources and the off-site impacts so that plantations can yield repeated harvests over centuries to come.'

It's not just about Australian trees. 'We've also been working with Vietnamese foresters on projects to protect and domesticate some of their own tree species,' Harwood says.

Stephen Midgley highlights the broader benefits. 'The previously barren hills of Central Vietnam are now largely covered by acacias, and the shifting coastal sands by casuarinas. Without these plantations, the demands on the remnant native forests would be such that they would soon disappear.

'And acacias are playing an important role in acting as a nurse crop for native forest regeneration.'

Vietnam's land area is just over 325 000 square kilometres and its population exceeds 85 million.

By the 1990s more than half its forest cover had been lost and Vietnam had just 75 000 square kilometres of forest.

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The ACIAR report is available at http://www.aciar.gov.au/node/2677

The Vietnam projects: a $280-million benefit and growing

Australia's contribution to Vietnam's greening has included over 20 projects involving a range of Australian research organisations.

The *Seeds of Australian Trees* and *Domestication of Australian Trees* projects were a major component. About $1.4 million was spent supporting Vietnam as part of a larger $20-million project across Asia.

An independent assessment of these two projects alone has identified a benefit of $129 million to Vietnam, according to ACIAR Director Peter Core. 'The assessment found that the returns to the Vietnamese forestry were 79 times the cost of the project,' he says.

The assessment was conducted by the Australian Centre for International Economics. Their study was limited to Vietnam, and to the direct economic impacts of the improved seeds produced from seed production areas and the seed orchards.

'Very high levels of adoption were found, assisted by new Government of Vietnam licensing of nurseries and certification regulations for seed,' said Core.

The authors of the study, Hayden Fisher and Jenny Gordon, reported that '… research into improving the productivity of forestry can provide a high return on investment, despite the often long lags between doing the research and the benefits flowing to developing countries.'

They also concluded that the projects are '… likely to make some contribution to increasing incomes and reducing poverty in rural communities.'

Another of the suite of projects was assessed by ACIAR in 2004. They found that the program to develop and introduce acacia hybrids in Vietnam had brought benefits of $152 million.