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EDITORIAL

Promoting results and benefits arising from ACIAR's investment in international forestry research

Since 1982, when the Australian Centre for International Agricultural Research (ACIAR) was established, many Australian forestry scientists have had the opportunity to work with scientists in developing countries to implement more than 150 projects in 29 countries. The research activities in each of these projects have been conducted to address a specific research priority identified by the partner country. In aggregate, the ACIAR forestry program has covered ten themes and a wide range of specific research topics (Bartlett 2016). The current ACIAR forestry research program operates in 14 countries and has an annual budget of approximately $10 million.

Over the past 30 years, Australian forestry aid projects, including the research projects funded by ACIAR, have generated significant local and international impacts (Midgley 2013). About half of ACIAR's completed forestry projects have been subject to impact assessments (Bartlett 2016), providing evidence of the economic, social and environmental impacts from ACIAR's investments. However, in general, these impact assessments have provided only limited assessment of the scientific and capacity building impacts, which nevertheless are very important aspects of a research and development program. Substantial forestry scientific capacity has been built through ACIAR's John Allwright Fellowship scheme, with 33 male and 12 female scientists from 12 countries completing 24 PhDs and 21 Masters degrees (Bartlett 2016), with many of these scientists becoming research leaders in their countries.

ACIAR is a part of the Australian development assistance program and it has a legislative mandate to communicate the results of its research to institutions and communities. Research findings and technologies are promoted through a variety of means, including publishing final reports from each project as well as publishing technical reports, monographs and proceedings. Publishing peer-reviewed articles in relevant journals enables wide dissemination of research results, thereby enhancing the prospects of achieving scientific impact from the research and development investments.

Over the years, individuals and teams of Australian scientists who have worked on ACIAR forestry projects have published many articles in international journals, but relatively few in *Australian Forestry*. The publication of the Special Open Access Issue of *Australian Forestry*, focusing on some of the findings from current and recent ACIAR projects, provides an additional mechanism for ACIAR-funded researchers to publish in the scientific literature. In doing so, it will help to inform the Australian forestry community of the breadth of this international research and the relative importance of the ACIAR forestry program for maintaining forestry research capability in Australia.

The articles in this Special Issue demonstrate the geographic spread and technical breadth of research topics covered by ACIAR's forest science investments. Half of the papers relate to research in Asia and the other half to research in the Pacific, with most papers including authors from the partner countries. The papers cover four broad themes of research: four papers cover aspects of the improvement, management and growth of important commercial species; one paper focuses on social aspects of agroforestry development; three papers cover aspects of enhancing value chains for timber and non-timber products; and two papers relate to forest policy.

Page et al. (pp. 121–126) report the promising early results from growth and form measurements in a second-generation progeny trial for *Endospermum medullosum* (whitewood) in Vanuatu. This fast-growing native species tolerates cyclones, produces high-value timber and is being used as a primary species in agroforestry systems in Vanuatu. Mendham et al. (pp. 127–134) report the response to the application of phosphorus fertiliser in Indonesian *Acacia mangium* plantations grown for pulpwood production, highlighting the importance of managing genetic material, nutrients and weed control to maximise plantation productivity. Vigulu et al. (pp. 135–142) report the results from research into competition for nitrogen between *Tectona* (teak) and *Flueggia* (poumuli) trees grown in a mixed agroforestry system in the Solomon Islands. They found minimal competition for nitrogen between the species at age 4, which corresponds with the age that farmers would begin cutting the poumuli, leaving the teak to grow at the desired final stocking. Nuberg et al. (pp. 143–152) report encouraging results from trials of short-rotation coppice agroforestry systems aimed at the production of fuelwood or charcoal in Papua New Guinea, where per capita use of firewood is six times greater than in most Asian countries. Cedamon et al. (pp. 153–160) report results of socio-economic research in the mid-hills of Nepal that can be used to better target appropriate agroforestry interventions for resource-rich as well as poorer household groups.

Nuberg et al. (pp. 143–152) describe the results of research undertaken in Papua New Guinea to develop small-scale charcoal production enterprises under two very different socio-cultural contexts. Cunningham et al. (pp. 161–177) describe the findings and lessons from research undertaken in Eastern Indonesia to support the development of viable small, medium and micro enterprises processing non-timber forest products and marketing them in domestic and export markets. Smith et al. (pp. 178–187) examine the interface between social factors and the effectiveness of plantation policies and regulations using smallholder teak plantations in northern Laos as a case study. They explore reasons for non-compliance with existing regulations and the importance of understanding social drivers within heterogeneous communities when designing interventions to promote enhanced livelihoods from participation in plantation teak value chains. Tacconi (pp. 188–194) reports on results and challenges from policy-related research on the design and implementation of Reduced Emissions from Deforestation and Forest Degradation (REDD+) in Indonesia during the

protracted period of global policy dialogue on this issue. He highlights the importance of building local capacity to conduct policy research along with challenges related to links between policy researchers and policy makers as well as their perceptions about the role of foreign researchers influencing national policy processes.

Australian taxpayers, who ultimately fund the ACIAR forestry program, have a legitimate right to ask, 'what are the benefits for Australia that arise from these investments?' In addition to the high-level commitments that Australia has made to assist countries to achieve the United Nations' Sustainable Development Goals, there are specific benefits flowing back to Australia from ACIAR's forestry program, some of which are yet to be fully realised.

Many past and current ACIAR projects have components that support Australian forestry research that returns direct benefit to Australia. A significant example of this comes from research undertaken in Australian and Indonesia, between 1987 and 1995, on the development of appropriate silvicultural regimes to enable Indian sandalwood to be grown in commercial plantations. This research led to the development of the Ord River sandalwood plantation industry in Western Australia, for which an ACIAR impact assessment calculated that it had generated $766 million in benefits to Australia (Lindner 2011). This very substantial return far exceeds ACIAR's total nominal investment of $98.93 million in the 101 forestry research projects completed over 30 years to 2014 (Bartlett 2016).

A significant proportion of the current investments under the ACIAR forestry program relate to developing high-value engineered wood products from small-diameter plantation-grown timbers, including *Eucalyptus* and *Acacia*. The Australian forest industries have shown only limited interest in the use of these new processing technologies to develop innovative products from planted Australian timbers. However, at least one company from northern New South Wales producing engineered flooring has recently reconfigured its production facilities to use spindle-less lathe technologies, on the basis of experience and advice from Australian wood-processing scientists developed through ACIAR projects in Vietnam and Laos (Dr Henri Bailleres, Queensland Department of Agriculture and Fisheries, pers. comm.). In my view, there is great potential for widespread application of these technologies in Australia, leading to the creation of a modern, innovative hardwood forest industry, which would obtain its resources from agroforestry and woodlot systems using high-quality Australian hardwoods. With a supportive policy environment and targeted planting programs in areas such as the Murray-Darling Basin and south-west Western Australia, there would be significant environmental benefits along with revitalisation of regional economies.

The ACIAR forestry program's investments play an increasingly important role in maintaining Australian capability in forestry research and development. There has been a dramatic decline in investment in forest industry research and development in Australia since the mid-2000s (Kile et al. 2014). This has precipitated a decline in the numbers of forestry-related researchers employed in Australia. The significance of ACIAR's investments can be seen from comparisons with investment by Forest and Wood Products Australia (FWPA) in particular research categories. In 2009–2010, FWPA invested $2.77 million in forestry research under its wood-processing and sustainability and resources programs (FWPA 2010). By 2015–2016 FWPA's investment in these two research programs had declined to $1.44 million (FWPA 2016). As a contrast, in 2009–2010 ACIAR invested $4.0 million in forestry research and by 2015–2016 this had increased to $9.4 million (Bartlett 2016). While not all of the funding provided through ACIAR's bilateral forestry projects is spent in Australia, analysis of the current projects indicates that, on average, 56% of the total funding is provided to the Australian partners for expenditure on salaries and research operating costs. ACIAR is therefore currently investing about $5.26 million a year in the Australian forestry research and development sector, which is more than three times FWPA's investment in comparable research categories.

This contribution to maintaining specific research capability within Australia is particularly noticeable in the themes of forest biosecurity, where FWPA is not investing, and wood processing, where FWPA had an investment of only $0.15 million in 2015–2016 (FWPA 2016). During the same period, ACIAR invested $0.74 million in forest biosecurity and $1.31 million in wood processing research. Clearly, without the ACIAR funding, Australia's research capability in these important forestry research themes would be seriously compromised.

ACIAR's forestry program continues to generate high-quality research results, as evidenced by the papers in this Special Issue. The full scientific impact from these research projects is yet to be realised, but clearly many of the findings have relevance both for the countries involved and more widely within the global forestry sector. In addition, there is very clear evidence that the ACIAR forestry program provides very significant economic and research capacity returns to the Australian forestry sector.

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