

GUEST EDITORIAL

Earlier this year the Institute's Vice-President, Dr W. R. J. Sutton, was honoured with an invitation to give the H. R. McMillan Lecture in Forestry at the University of British Columbia, Vancouver. Dr Sutton, who is Research Field leader of Exotic Forest Management at the Forest Research Institute, gave his lecture on New Zealand's experience with radiata pine.

Dr Sutton has been invited to write a guest editorial on 'Making the most of New Zealand's lead in plantation technology. There is little doubt that New Zealand has few equals in many aspects of plantation management.

Our forest management staff are eagerly sought for overseas aid projects. Many of our researchers have been invited to assist overseas and to give major presentations at overseas institutions and international meetings. Our research efforts in such areas as soils, tissue culture, tree breeding, nursery, establishment, silviculture and agroforestry are among the best in the world.

For forestry to make the maximum contribution to the New Zealand economy it is important that we make the most of our lead in plantation technology. Above all we need to ensure that:

- the technology we have is implemented to best advantage
- our lead in technology is maintained if not increased
- we "export" our technology in the most advantageous form.

In this guest editorial comment I offer some personal views on how we can make the most of our technology lead. I make no apology for the bias towards those areas of research with which I am associated.

Implementation for Best Advantage

It is now 16 years since Dr Fenton and I proposed a silvicultural regime for radiata pine aimed at thinning stands as early as possible to a low final crop stocking of pruned trees.*

Subsequent research, which culminated in the Radiata Pine Task Force's stand simulation model SILMOD, has demonstrated the economic and wood quality advantage of such practices.

Sufficient examples of maturing stands now exist to validate the model projections and to provide visual "proof" of these treatments.

*See Volume 13 (2), pages 220-8.

Intensive use of SILMOD has demonstrated that the most profitable radiata pine forests are those which are on the most productive sites, are not steep, are close to processing plants, and which have been pruned early and thinned to low final crop stocking (financially optimum final crop stocking may be near to 100 stems per hectare). Low final crop stockings result in lower total volume yields per hectare but often enhanced yields of the best grades of sawn timber. Gross returns may be similar for a wide range of final crop stocking but as processing, harvesting and growing costs are always higher with the higher stockings, overall profitability is lower.

New Zealand's domestic sawn timber prices have, relative to North American and European price scales, small differentials for quality. Even with these low premiums for quality, pruning is almost always profitable (at 10% compound interest and assuming the pruning is on time). If North American prices are used, the early thinned and pruned stands to low final crop stockings (around 100 stems per hectare) become very profitable. Profitability is enhanced even further if long internode second and third logs can be achieved without negative impact on the butt log.

In the early 1970s, agroforestry (the combination of trees, grass and grazing sheep or cattle) was an attractive solution to the objection that heavy early thinning to low final crop stocking would reduce overall yields and encourage weed growth. Today, agroforestry is the most attractive of all forestry options. The advantages are more than just the obvious increased economic returns resulting from combining high returns from the low stocking tended tree crop with the substantial grazing returns. Trees on agroforestry sites grow faster in diameter than they would if the site had no grass and grazing animals. Agroforestry offers a spreading of risk. Agroforestry offers us the best opportunities for forest expansion. It is an ideal solution to the age-old land use conflict between agriculture and forestry.

Although more work is required, agroforestry offers a revolution in forestry and in land use. There must be possibilities for agroforestry in reverse — that is, the introduction of intensive grazing into conventional forests. Research into this option has begun.

There are many other areas of technology (e.g. the nursery and associated outplanting system) which we must strive to implement better if New Zealand is to make the most of her technology lead.

Maintenance of the Technology Lead

Before we can decide how we should proceed we must understand why we have achieved the lead we have. I believe the reasons

for our technology lead result from a unique combination of circumstances, especially the relative over-abundance of exotic wood for the last 30 years and a large and continuing commitment to innovative research and development. The surplus of wood in New Zealand allowed research and management to seriously consider silvicultural schedules which did not maximise volume production (probably still a unique situation in the world, for plantations have been generally established for strategic — because of foreseen wood shortages — rather than economic reasons.

Forestry research since the early 1960s has been well supported by government. That research, while management orientated, has been very largely independent of management. That independence has allowed researchers to look at options well beyond anything considered practical at the time. It may not be now realised that many of the silvicultural options now considered optimal (or even conservative) were rejected as totally impractical when trials to test them were first established in the 1960s. Agroforestry had very little support in its beginnings.

Another important aspect of the forest research effort was the recognition of the need for evaluations to go beyond the forest gate to at least the end of primary conversion process (the sawmill in most cases). Without such a basis for comparison it would be difficult to compare silvicultural options.

With the exception of the next 5 to 8 years when we will have some constraints on wood supply in the central North Island region, there will be few constraints on forest managers wanting to adopt financial optimum regimes. Such constraints should not apply to any younger stands as they will not be harvested until after the turn of the century when New Zealand will have a large wood surplus.

Maintenance of our technology lead will be important to the increasing forest estate. That lead can only be maintained by continuing to support a vigorous and responsible research effort which, while not divorced from management responsibility, is independent enough both to explore extremes well beyond current management and to try alternatives that may fail. That research effort will need to be more integrated because major gains in the future may well come from combinations of technologies — *e.g.*, breeding of trees with specific characteristics (long internodes for clear cutting, low density for dimensionally stable joinery timber, etc.) combined with tissue culture of cross-pollinated seed and a specific silviculture to achieve maximum returns. Integration of

forestry and wood processing will be at least as important in the future as it was in the past.

A commitment to such a research effort should ensure we maintain our technology lead. Hopefully we can even improve on that lead.

"Export" our Technology to Best Advantage

The number of visitors we get in New Zealand and the requests made for New Zealanders to go overseas provide some indication of international "demand" for our technology. This "demand" is certain to intensify as other wood-producing countries come to the realisation that ultimately *all* forests will have to be managed in much the same way as we manage our radiata pine.

I have no doubts that overseas countries wanting access to our technology will be able to buy it. They could, for example, use the New Zealand consultants, or they could offer attractive positions to key people. In my opinion it would be foolish to attempt to block completely the sale of our technology. We would simply lose many of our key people. On the other hand, it is not in New Zealand's best interests to simply give the technology away. Ideally we need a system that permits us to "export" our technology to the advantage of both New Zealand and the recipient country (or company).

What mechanisms would best achieve this is something we should give very serious considerations too — and soon.