



## Submission to Ministry of Research Science and Technology Review on Forestry

by W.R.J. Sutton

Had New Zealand not had the foresight this century to establish and manage fast-growing plantations of introduced species, especially of radiata pine, New Zealand now would have little natural forest left. It would also be a major importer of wood products (to the tune of about \$1.5 billion/year) and of course New Zealand would not have an export industry which currently earns around \$1 billion/year in overseas exchange. Forestry will be an increasing contributor to our overseas earnings in the next two to three decades. With realistic expansion levels, plantation forestry has the potential to be New Zealand's major export earner by the middle of next century and to make a major contribution to the sustainable development of the world.

Before assessing that potential it is important to review why plantation forestry has been so successful in New Zealand. A strategic evaluation suggests that a number of factors are all essential to forestry progress:

- Large areas (because economies of scale are significant) of reasonably fertile land.
- Climate favourable to tree growth, viz: warm average temperatures (and, for radiata pine, cool nights), and short or minimal winters plus a high, and evenly distributed, rainfall.
- Suitable tree species that not only makes the most of the country's soil and climate but also is of a quality suitable for a wide range of end uses.
- Existence of a proven management technology that ensures a fair degree of certainty about the quantity and quality of wood that will be produced. Without this certainty, significant investments in plantations are most unlikely.

Research, while not very sophisticated, played a key role during the first planting boom of the late 1920s and early 1930s. Although it solved all kinds of minor forest management problems – e.g. soil – research in the main was in the area of wood usage. Early research had shown that radiata was suitable for a wide range of end uses (e.g. butter boxes

and cheese crates) and that it could be pulped.

In the period from the end of the depression through to the end of the 1950s New Zealand concentrated on agricultural production – most of our exports going to Britain. During this period forestry was not perceived, even by foresters, as a competitive land use.

In the 1960s New Zealand's world began to change. Most important was Britain's move to enter the European Economic Community. That greatly reduced the prospects for much of New Zealand's traditional agriculture products.

A major and innovative research programme in forestry which began in the early 1960s demonstrated that, despite the long time between planting and harvesting, new plantation practices could be economically competitive with traditional sheep and cattle farming.

It is rarely appreciated that New Zealand is only now just beginning to harvest trees managed under those new regimes (i.e. those which include the advances in tree improvement, site preparation, wider spacing, early thinning and pruning, and improved and appropriate harvesting practices). While it cannot be claimed that research initiated all, or even most, of the new developments, there is little doubt that research played a key role in both quantifying the gains from innovation and effectively advocating their use to the wider forestry audience. Without a major research effort in evaluating alternatives successfully quantifying the gains New Zealand forestry would never have adopted, on a large and almost universal scale, new and essentially unproven management practices.

That research underpinned Government, Treasury, Industry and the public faith in forestry investment from the late 1960s to the present. It was unparalleled in any other country of the world and it has given New Zealand plantation forestry a competitive lead over the rest of the world. Because that research also provides an understanding of plantation

### From the President

principles, New Zealand has a major insight into the options for the forestry potential of other countries.

The benefits of that increase in plantation creation have yet to be fully realised in the New Zealand economy. As the harvest increases from plantations planted since 1960 New Zealand's export earnings from forestry will increase dramatically. The extent will depend on the efficiency of downstream processing. If New Zealand industry approaches Swedish efficiency (Sweden has no ban on log exports, has some of the highest wages and social costs in the world, pays some of the highest log prices in the world and yet processes its own logs to a greater extent than almost anyone else in the world) in manufacturing and marketing then we shall achieve the maximum benefits to New Zealand. Overseas earnings from New Zealand's plantations could be \$3.5 billion by the year 2000, \$5.5 billion by the year 2010 and that is without any increase in the plantation estate. If we continued to process at existing levels then export earnings could be \$2.5 and \$3.5 billion by the year 2000 and 2010 respectively.

If New Zealand stopped all new future planting and only replanted the existing plantations then the research effort for tree growing and harvesting could be quite different from a scenario with a major expansion of the planting effort. The level of funding, and the source of funding, could also be different.

New Zealand's major advance in plantation forestry was largely underpinned by a major and innovative research effort. With the advantage of hindsight could industry have been expected to fund a large proportion of that research effort?

For a whole series of reasons the answer is that industry would probably have been most unlikely to fund much of that research effort. Without major Government support that research

would not have been done and forestry would most likely not have been a growth industry.

In the early stages of most innovative research there is little evidence to suggest success, and this is especially so if an increased risk is perceived (like increased cost, reduction in the production and quality of some products, the production of a new and largely untested product). New Zealand has little history of large-scale adoption of new processes without considerable proof of the market and economic advantages. In forestry the very long lag time between investment in seed collection and planting, and the final realisation in the market place means that proof of the advantages of one management practice (or tree type) over another is difficult to obtain. The capital market simply does not recognise future returns on the time scale existing in forestry. At best, replacement value is all that can be expected by way of return in the early years. If a capital market is unwilling to recognise the future gains then industry will be reluctant to fund research with a very long pay back period. For research into areas like harvesting and processing where the pay back period is so much shorter, some industry funding could, and should, be sought.

Another major obstacle in gaining financial support from industry is that few research findings in forestry can actually be identified as patentable or kept for the exclusive use of the funding organisation. Many of the major advances in forestry are little more than ideas. Advances costing millions of dollars in research and development can be taken up by others simply by hearing, or seeing, the results. In contrast, Forest Products research on, say, some chemical treatment can be protected and patented. It is a function of the nature of forestry that almost everything other than tree breeding material and software cannot be protected, and, even breeding material and software may not be protected for long.

On historical evidence it is therefore unrealistic to expect industry to fund much production forestry research, even though in the long run industry has and will benefit from that research.

Another aspect is that the New Zealand public is largely unaware of the contribution research, science and technology has made to society. Past contributions are simply taken for granted and few of the public seem to have any real realisation that almost all advances in society are underpinned by some research, science or technology. Future advantages, especially in our competitive position, can only come from ongoing research. Once accepted, the



Dr Wink Sutton, the Institute's President.

new advance soon becomes the norm and few remember or realise that very often research was its prime initiator.

#### Future Prospects

What are the future prospects for plantation forestry?

A strategic assessment of the future world wood markets is promising for plantation countries like New Zealand:

- The world uses a phenomenal amount of wood – on a weight basis similar to the production of all foods.
- Although more than half the world's wood is used as a fuel, industry uses are very important. Wood is a more versatile raw material than any other.
- Demand for all wood continues to increase (in line with population increases). The world wood harvest increases by an average of 85 million m<sup>3</sup> each year (i.e. more than eight times New Zealand's total current harvest).
- Substitutes for wood require more energy and capital, and often are not so suitable. New technologies seem, more often than not, to increase wood's competitive position rather than that of its competition, e.g. seasoning, preservation and finishing.
- The remaining unharvested natural forests are not only becoming more and more marginal sources of supply (and of lower quality) but also are under increasing environmental pressure (e.g. the tropical hardwood forests of Indonesia, Malaysia and the Amazon and the temperate coniferous forests of the Pacific Northwest

of USA, Northern Canada and Siberia).

- The plantation effort by the world to date has been either with slow-growing species (and hence harvesting will be well into the future) and/or concentrating on wood pulp production. Few countries have the prospect of increasing plantation yields of sawlogs in the next two to three decades.
- New Zealand is a very small player. New Zealand currently accounts for only 0.6% of the world's industrial wood supply. Even with an eight-fold increase our harvest would only equal the annual increase in the demand for wood world wide.

Few other countries have all the necessary requirements for an increased plantation effort (and doing it profitably):

- Large areas of fertile land with a tree-growing climate which are low cost and near to processing plants and/or ports, and are of relatively flat topography.
- A plantation species with a proven technology capable of fast growth and able to produce wood suitable for a wide range of end uses.

There is therefore enormous potential for plantation forestry in New Zealand. This is especially so for radiata. There is also potential, however, for one or two other species if only we can achieve agreement and commitment to establish large areas of the species in one or more regions. Without that effort the essential research on that species cannot be justified.

It could well be that New Zealand will have a major plantation in the future but it is quite likely that the forest industry has little to do with funding it. Now that it is unacceptable to fell indigenous vegetation for plantation establishment and as there are no large areas of underdeveloped land left in New Zealand there are often only small blocks of suitable forestry land available for purchase at any one time. Because there are major economies of scale in plantations, this poses real entry barriers for new companies into plantation forestry. The last two decades have seen the concentration of plantations into two major companies. Their now large holdings in plantation make it unlikely that they will be able to undertake major new planting efforts in the next decade or two (after completion of the sale of the state plantation asset). There could be some new, probably overseas, players but they are unlikely to establish major new areas.

When the farming world begins to comprehend the magnitude of the opportunity of plantation forestry (long-term sustainable markets, product diversity, capital appreciation of their asset,

shelter and the growth advantages of planting plantations on farmland, without, but preferably with, grazing), then we could see an explosion of new planting. There would be major advantages to the country, especially in the regions, in increased employment, increased environmental protection, risk spreading and increased future prospects.

Since the plantation expansions will be most likely to be done by farmers rather than the larger companies it would be unreasonable to expect industry to fund that research, or to be very involved in a setting of research priorities for that expansion.

Given:

- New Zealand's relative smallness as a wood producer,
- the pressures on other forest resources,
- the vast volumes of wood used by the world,
- the unlikelihood of massive substitution,
- the small proportion of the world's wood that comes from plantations,

it is reasonable to assume that markets will not be a limiting factor for plantations being harvested next century.

If New Zealand land owners had confidence in the future of forestry and if conditions were favourable to tree crop establishment, New Zealand could establish a further three million hectares of plantations over the next 30 years (i.e. at a rate of 100,000 hectares of new planting per year). That represents just over 20% of New Zealand farmland. Agricultural production could be expected to decline but by only about 10% as young and middle age stands could be grazed. With management the loss of agriculture production may be even lower.

While those forests are being established and tended there will be major employment opportunities in the regions. There would also be positive environmental benefits in soil stability, CO<sub>2</sub> reduction, etc.

The major benefit, however, would be long term when these forests are harvested. From around 2020 onwards New Zealand's exports could have increased to a level of around 80 million m<sup>3</sup> annually. That would make us a large producer, but we would still be only producing less than half what Canada does now and only about 20% of the USA's current production.

Exports of 80 million m<sup>3</sup> per year offer New Zealand a major source of overseas earnings. In 1990 dollars, if that volume were exported as logs and chips then they would earn around \$6.5 billion per year.

If our exports remain in a similar proportion of logs, sawn timber and pulp and paper as they were in 1990 then 80 million m<sup>3</sup> could earn New Zealand around \$17 billion (or more than all exports from New Zealand in 1990).

If New Zealand attained processing levels currently achieved by advanced countries like Sweden then the earning potential of 80 million m<sup>3</sup> (about one-third of which could be in pruned logs) could be in excess of \$30 billion or double our current export earnings. And that would be achieved from using only 16% of New Zealand's land area (4.3 million hectares out of a total of 26.9). Farm production through the loss of land to forestry would be down less than 10% (i.e. equivalent to around \$1 billion in overseas earnings).

Only Chile has the potential to match this performance in the same time period. Even if she followed New Zealand's lead the market would not be significantly affected.

A target of 100,000 hectares per year for 30 years is realistic. But just as in the 1960s, research is needed to seed the opportunity and to underpin its progress.

That research expenditure, as it was in the 1960s through to the 1980s, will be repaid hundreds, if not thousands, of times over. Because the results of research cannot be patented and because most, if not all, additional planting will be done by small land owners and not by industry, Government must play a key role in research funding. Some benefits will be immediate in increasing investment and jobs (all of which will be in regions). But the long-term benefits offer the potential to change and strengthen the New Zealand economy more than probably any other industry. For such a potential to be realised requires a major rethink of forestry research funding and its direction.

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## ANZIF Conference, Christchurch 30 September – 4 October, 1991

Hugh Stevenson

The third combined conference is now less than a year away – almost a modern forestry career!

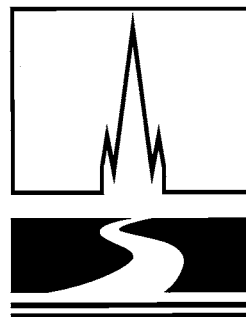
The Christchurch based committee is working hard to organise a technical and social programme worthy of a joint conference in THE CITY THAT SHINES.

By the time this goes to print, the Committee hope to have the abstracts for papers in their hands. Those to hand already indicate a stimulating discussion

on the chosen theme, "New directions in forestry: THE COSTS AND BENEFITS OF CHANGE", concentrating on the impact of Government driven restructuring on the New Zealand economy.

The main themes and session titles are:

- a) Marketing Australian and New Zealand forest products



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