

FOREST IMPROVEMENTS – INCREASING THE VALUE OF FORESTRY IN NEW ZEALAND

A Scion Impact Study 2010

The application of Scion's science in forest management practices, genetic improvements and the production of new high value wood products has increased the value of forestry to New Zealand by \$6.2 billion dollars since 1980.



New Zealand has some 1.568 million hectares of commercial radiata pine forest estates¹. These forests underpin the sector's contribution to New Zealand's exports of about \$3.7 billion per annum.

The value of these forests has been substantially increased through genetic improvement and understanding the impacts of site and silvicultural practice upon yield and wood quality. These factors have been a focus of research, technology transfer and implementation by Scion in partnership with the New Zealand forest industry for many decades.

This study is focussed on general management and breeding practices for

radiata pine forestry over the past 30 years.

Increased wood production

Wood yield expressed as Mean Annual Increment (MAI) has been constantly improving as a consequence of better silvicultural practice and improved genetic stock. For forests planted up until the 1960s MAI was typically some 20m³/ha/annum, during the 1960 to 1980 period there was a 10% improvement to some 22m³/ha/annum. This increased to some 25m³/ha/annum for forests planted after 1980.

Studies on the impact of genetic stock² have indicated that, after accounting for other management practices, and by comparison with an unimproved seedlot (GF2³), the yields were higher by 10% for GF14, 15% higher for GF22 and 17% higher for GF30. GF20 material and higher was planted from the early 1990s.

Katz⁴ compared the overall increases in yields and this showed that the enhanced MAI was greater than could be assigned to genetic improvement alone and the yields must be a consequence of both better genetic improvement and improvement in management practices. Improvements of up to 25% for post 1990s plantings⁵ have been observed. Goulding⁶ has noted two large companies with improvements of 20% for 1980s plantings,

¹ Facts and Figures 2009/10. New Zealand Forest Owners Association.

² Van der Colff, Kimberley and Lee (2006) title to add.

³ GF refers to Growth and form – an index of improved seed quality.

⁴ Andries Katz, Alphametrik 2010. A study on the impact of research on New Zealand's forests. A report commissioned by Scion.

⁵ Richard Woollons formerly NZFP and CHH forestry - Communication to Katz.

⁶ Chris Goulding, Principal Scientist, Scion.

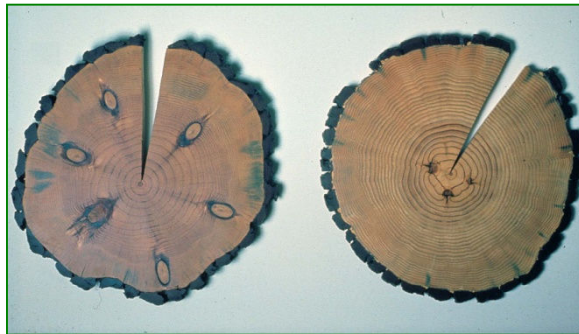
25% for 1990s plantings and 30% for post 1999 plantings when compared to growth of unimproved stands. Nevertheless it should not be assumed that all areas will respond in this way. On lesser sites, additional productivity can be a lot less.

Katz used the national yield tables from the National Exotic Forest Description⁷ (NEFD) tables from 1991. These tables provide yield data from national surveys representing forest managers' operational experiences with stock planted many decades earlier. The national MAI was 17m³/ha/annum. Extrapolating the gains indicated above would represent a reduction in the typical 29 year rotation of some 7 years.

Katz estimated the capitalised value of these improvements at \$4.294 billion for the whole estate equivalent to an annual value (annuity) of \$344 million.

Improved wood quality

In the 1980s Scion, led by then Production Forestry Director, Harry Bunn, embarked on extensive work to explore the opportunity to develop clearwood (or clear sawn wood) from New Zealand's extensive radiata pine forests. Clearwood is essentially long lengths of timber without defects such as knots. Such material would open up the opportunity to export into high value uses such as mouldings and other applications where visual appearance is essential. This was a substantial move away from the then more typical



application of radiata pine into structural applications and also recognised the reduction in other high value wood products from New Zealand's then declining indigenous forests such as Rimu and Tawa. Such outcomes were achieved through the then radical implementation of pruning of forest trees. Based on NEFD data currently some 60% of the radiata pine forests in New Zealand are now pruned.

Since the establishment of these 'clearwood' forests, New Zealand has developed a number of companies that specialise in producing high quality (and high value) products such as mouldings and internal fit out products. For example Tenon, one of New Zealand's largest mills is exclusively based on clearwood material for their international exports to the USA and other territories. According to Wayne Miller, Tenon's technical manager, "the pruned/clearwood approach has enabled the development of a globally competitive industry. Without this New Zealand exports would be dominated even more by log exports, and low grade arising lumber with some niche activities".

Currently the USA is one of the most important markets for clearwood, taking 195,000 m³ in 2009.

Katz also undertook an economic impact of the value of clearwood to New Zealand. Clearwood produces a total annual value of some \$150 million in gross margins on wood costs. The capitalised value of clearwood processing based on current production rates was valued at some \$1.874 billion, discounted at 8%.

Research is continuing in improving yield, wood quality, genetic improvement and understanding the impacts of site and silvicultural practice upon yield and wood quality. These are areas where even small gains translate to very substantial benefits to New Zealand.

⁷ Refer Ministry of Agriculture and Forestry.

The step change improvements in wood yields and new opportunities captured in New Zealand's forests could only happen because of the close working relationship between Scion and the New Zealand forest industry. These benefits have been delivered through the various research and implementation co-operatives that have existed in various forms since the late 1980s.