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The theme of this November 2019 issue is the potential of New Zealand's bioeconomy. It also contains the report on the 2019 ANZIF (the Institute of Foresters of Australia and the New Zealand Institute of Forestry) conference held in Christchurch in August, along with Peter Clark's keynote paper and Julie Collins' paper from her Women in Forestry talk. The 'Last word' is from Phil Taylor, Chairman of the Conference Committee, with what he considers the most important messages of the conference.

Elsbeth MacRae and Michelle Harnett provide the lead paper on New Zealand's bioeconomy. Tree biomass can replace petroleum products and provide the materials required for high-value products. A low/neutral carbon footprint will enable New Zealand to retain overseas market access with increasingly strict environmental import regulations. Coal is responsible for emitting 50 times more carbon dioxide (CO₂) emissions per unit of energy than sustainably grown wood. Scion has produced a Biofuels Roadmap, identifying the need for biofuel for difficult to electrify marine, aviation and heavy transport, and a 'Wood Energy Industrial Symbiosis' report, investigating how energy efficiency and wood supply could be improved when processing industries utilising wood residues are clustered together in regional centres.

Bernard Dawson describes the use of supercritical CO₂ to remove water from timber. Supercritical CO₂ can remove water from radiata pine timber down to about 40%, reducing the energy requirements for kiln drying and optionally improving the ability to add chemicals for increased stiffness or decay resistance. Diego Elustondo et al. discuss how the measurement of the change in colour of the timber following thermally modified wood treatment can be used to provide quality assurance that the modified wood meets the required specifications. Thermally modified wood is more stable and durable than untreated wood and is chemical free.

A comprehensive review of the opportunities to use woody biomass for biofuels and biochemicals is provided by Shusheng Pang. There are technical challenges to commercialise new developments in thermochemical and biotechnology processes due to the complex nature of woody biomass and the high quality required of the target products. In New Zealand, three million tonnes of forest and wood processing residues currently used as hog fuel or left behind in the forest could be used in new biorefineries. Further development is required on integrated processes for full utilisation of the feedstock and to simplify multi-product processes.

Mark Bloomberg et al. offer alternatives to a single-age, clearfell regime in order to avoid its adverse characteristics on erosion-susceptible land. There is

a 'window of vulnerability' following harvesting for up to six years before the roots of the replanted trees cover the site sufficiently to avoid erosion during high-intensity rainfalls. The alternatives could be logging in small-sized coupes, with adjacency constraints (e.g. a maximum area of 50 ha), and less than 20% of a catchment area or continuous cover forestry (CCF). The latter are regimes where the forest canopy cover is always maintained by small group or single-tree selective harvesting. Group sizes are less than two tree heights in width. The regimes examined all had profitable harvests, but during a transition period from a clearfelling regime would have significantly lower net present values (NPVs) than the clearfell regime (e.g. with reductions ranging from 11% to 22% under a target diameter regime). Once the forest is managed with CCF or small-coupe restrictions, profitability could well be the same in areas of high erosion risk. There is a key need for research into suitable harvesting equipment.

The paper by Peter Clark is based on his keynote presentation at the 2019 ANZIF conference. Acknowledging that forecasting is difficult, especially of the future, he emphasises that New Zealand plantation forestry has a bright future. While some rural commentators are dismayed at the increased planting of pines, some sheep and beef farmers are delighted at being able to sell land for afforestation. Regardless of climate change and water quality, production forestry is a more profitable land use in many cases, with internal rates of return approaching 6% on average, compared to a range of 0.3% to 4.1% for sheep and beef.

Clark predicts that the key drivers of change will be climate change, declining freshwater quality, sediment and debris flows, fire, pruned log prices and technology. His mention of the increased risk of fire reminded me of the story the late Peter Olsen told about his opportunities flowing from that risk. As Fire Prevention Officer at Kaingaroa in the early days of his career, he inadvertently allowed the fire tender to be caught and burnt when attending a fire. This drew senior management's attention to him over the many other new foresters and he never looked back.

November 2019 will be the last issue for which I will be the Editor of the *New Zealand Journal of Forestry*. After six years and 24 issues, it is time for new blood. It has been a privilege to be Editor. I would like to thank Helen Greatrex, Assistant Editor, and Jenny Palmer, Designer, for their outstanding help. Our printer Glen Owens, The Print Room, was always efficient and reliable, as was Don Campbell managing the Journal's website where individual papers from back issues can be found. Jay Matthes and Natalie Smith, NZIF Administration, were a delight to work with.



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