Forestry and the greenhouse effect

The greenhouse effect may be a reality; the composition of the atmosphere is undoubtedly changing, and increasing numbers of researchers accept that this is likely to lead to significant changes in our climate.

How would climate changes affect the forest industry, one of our leading foreign exchange earners?

As part of New Zealand's Climate Change Programme, run under the auspices of the Ministry for the Environment, Dr Patrick Aldwell and Dr David Hollinger, of the Forest Research Institute, have conducted surveys among scientists and leading industrial figures. The objectives were to discover the likely effects of an increase in average temperatures of either 1.5°C or 3.0° by the year 2050, firstly on trees themselves, and secondly on the industry.

The answers make interesting, if seemingly contradictory, reading.

There is clearly a plus side:

- growth rates may increase by up to 20%, largely as a result of increased levels of carbon dioxide in the atmosphere;
- warmer temperatures may improve growing conditions for radiata pine in southern areas of the country, and at higher elevations;
- rotations may be shorter, simply because trees would grow more quickly; if not complicated by other factors, this could increase profitability significantly;
- radiata pine grown in the warmer parts of the country tends to have greater density, stiffness and strength; these properties should all improve as average temperatures rise;
- increased volumes of wood could create up to 3000 new jobs by the year 2050.

But there is also a down side:

- the increase in carbon dioxide levels would also encourage the growth of other plants, which would intensify weed problems.
- warmer, wetter weather could encourage new insects to invade the forests, with attendant control problems;
- some diseases, such as *Diplodia pinea,* which causes malformation in pine trees, could become more severe;
- some areas are likely to become too warm, or too dry, for radiata pine;
- there would be increased danger of wind damage from severe storms like Cyclone Bola.

It seems likely that if the climate does change as postulated, there will be major implications for forestry, but what the net effect of all these positives and negatives would be is still unknown.

Some of the issues facing forest managers are extremely complex. For example, it now seems clear that increased CO_2 levels will speed up growth, and higher temperatures may mean more dense, stronger wood; in simple terms, foresters may be able to grow better trees, faster.

But increased risk of disease and wind damage may persuade the manager to harvest his forest early, as soon as the trees reach a millable size. Then a new factor comes into play; radiata pine in its early years produces juvenile wood, softer, less dense and less strong than the mature wood it produces later. The younger the tree is at harvest, the greater the proportion of juvenile wood it contains, and the effect will be to cancel out the potential gains of enhanced growth.

The uncertainty will create problems for wood processors. Will growers allow the crop to grow on to larger sizes? Will there be a need for new processing plants to handle an increased volume of wood? Will the quality of the wood be such that they can continue to produce solid wood products, or should they turn to fibre-based products?

Aldwell says that if the climate does change as predicted, forest growers and processors are going to have to make some major decisions, and at the moment they do not have the information to do so. Research is needed to provide a basic understanding of the processes involved, and their likely outcomes.

Among other things, there is a need to:

- determine how the various tree species will respond to climatic change;
- genetically modify current species, or identify new ones suited to the predicted conditions;
- monitor and analyse the potential effects of weeds, pests and diseases;
- predict how climate is likely to change in different parts of New Zealand – this could have a major bearing on what species will grow where.

Aldwell points out that scientists do not yet know for sure the timing or extent of the greenhouse effect, but it is known that the implications for forestry are great if the change is near 3.0°C, and at least significant if it is closer to the 1.5°C level.

The forest industry must start looking for answers now. Douglas fir, for example, requires up to 50 years to mature; if it is not going to be a viable species by the year 2050, now is the time to make alternative plans.

Two rotations of radiata pine are possible by 2050, but even that does not leave much time. Forestry is a long-term business, and it may take one full rotation to find the answers to all the questions arising from the prospect of climatic change.

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Forestry sector training and education

General Changes in Education and Training

Most readers will be aware that some radical restructuring is currently underway in "post-compulsory" training and education in New Zealand. These changes are similar to those going on in Britain, Canada, Australia and parts of the United States. The implications of these changes need to be understood by those involved in the forestry sector, and links need to be established with the newly formed agencies.

Under the new structure there will be three main central agencies, viz. the Ministry of Education, the National Educational Qualifications Authority (NEQA), and the Education and Training Support Agency (ETSA).

The Ministry of Education has been set up primarily as a policy ministry rather than an operational department. It encompasses all aspects of education, non-formal education and training, on-the-job training, the apprenticeship scheme and Access training.

NEQA will act as a policy advisory body with operational responsibility for qualifications. It will provide an across-the-board approach to the validation of qualifications in schools, and in vocational and advanced academic areas.

With the setting up of the NEQA a number of existing examination bodies