

## THE CONSEQUENCES OF THE PAST PLANTING PROGRAMME

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Before we examine the consequences of the new planting programme it is appropriate to look backwards, briefly, to review some of the issues which led to us having the type of resource we have today. What, if any, was the rationale for the plantings, what type of target was adopted, were the primary aims achieved, and what have we learnt from our experience?

One of the basic tenets of forestry is the normal forest with its "normal" distribution of age classes. A glance at our age class distribution for radiata pine shows that it departs radically from this idealised concept. You might expect that this happened haphazardly, but it didn't — it was planned; targets were set, and the task accomplished. If our predecessors erred at all, they erred on the positive side by exceeding the target ahead of time.

There have been five significant planning steps that have largely shaped the nature and age class distribution of our exotic forest resource. At each one there was either a slight change in the ultimate goal or, for short-term gain, a change in pace. If we begin with the present "old crop" radiata pine, the first significant planning exercise was the 1925 "First Quinquennial Review of the Operation of National Policy", by MacIntosh Ellis, the first Director of Forestry. Resource surveys had indicated that the indigenous forests would be severely depleted by 1965, so he recommended a crash planting programme by the state of 120 000 ha within 10 years, to provide for self-sufficiency in most of our wood requirements from the 1960s onwards. Radiata pine was the only species which could meet the criteria within the time horizon set.

Ellis's recommendations were accepted and vigorously put into effect, aided by the unemployment relief scheme during the 1928-35 depression. By 1927 he was so enthused with radiata pine and the apparent success of the planting programme that he advocated increasing the afforestation target to 2 000 000 ha to be established within 25 years. At that point he departed from New Zealand, perhaps because his recommendation was not adopted. One wonders what the consequences would have been had it been accepted.

The target of 120 000 ha of new state planting was achieved by 1931, and as an equivalent area had been planted by the private sector, the self-sufficiency goal had been accomplished.

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At this point there was a subtle change in goal. Having established a large, relatively even-aged resource of one species, predominantly in one region, it was perhaps not unreasonable that caution and conservation started to prevail, and the aim of continued planting by the state became diversification of species to safeguard against any unforeseen disaster. Because the self-sufficiency target had been exceeded, the goal was extended in 1932 to planning for an exportable surplus of 1 400 000 m<sup>3</sup> in the form of sawn timber, pulp and newsprint, primarily with the Australian market in view.

Confidence in the whole exotic forest afforestation policy reached its lowest point in 1935, when it was concluded that state exotic planting on a large scale should cease because "further extension of exotic forests for the export of timber and other products cannot be justified on economic grounds". It seems that apart from Australia, Europe was considered to be the most likely market, and that New Zealand would be unable to compete there because of its higher freight costs, dearer electricity, higher capital investment, higher wages, and more costly engineering and chemical supplies. Our comparative position for some of these factors is still the same, so it is an interesting contrast that we now confidently plan for a large exportable surplus. Presumably we now believe we can compete on overseas markets without the large domestic base we have had so far to cushion the vagaries of the international market.

The next 25 years, from 1936 to 1960, was spent in developing and establishing markets for the resource that had been established. New planting lagged and the diversification philosophy still prevailed. In terms of stocked area, the net gain amounted to only 45 000 ha, equivalent to one year's planting during the 1928-31 boom period. The export target remained at 1 400 000 m<sup>3</sup>, directed at Australia. Towards the end of the 1950s, export markets for sawn timber, logs, newsprint and kraft pulp and paper had been established and the attainment of the export target was in sight. Utilisation of the forests had been deferred by the war, they were largely untended, and they were maturing; so the stage was set for a change in goal. It occurred in 1960, following an extensive policy review in 1959. The plan to increase the annual rate of new planting (state and private) to between 8 000 and 12 000 ha was announced with a flourish by the then Minister of Forests, Eruera Tirikatene, in a prologue to the 1959 New Zealand Forest Service (NZFS) Annual Report. He claimed that "during 1959-1960, forestry in New Zealand will make history by this very decision". Considering what has happened since, it seems he was right.

The new policy that was accepted by the Government in 1960 had three targets:

- (a) The export target was increased from 1 400 000 to 4 250 00 m<sup>3</sup>, a threefold increase.
- (b) Exotic forest estate targets of 800 000 ha by the year 2000 and 1 200 000 ha by 2025 were set.
- (c) The national annual planting rate was increased to 8 000 to 12 000 ha in order that the higher export target could be achieved.

I think it was a fitting climax for A. R. Entrican that he launched this new policy, taking us in a new direction, at the point of his retirement. The justification for the new policy was given in his 1960 NZFS Annual Report: "Its basic economic justification lies in the fact that the new planting proposals aim to increase the surplus of raw forest material for export in the form of timber, pulp and paper from 1 000 000 to 4 250 000 m<sup>3</sup> annually." As the total roundwood removed from exotic forests that year amounted to less than 3 000 000 m<sup>3</sup>, an export target of this magnitude must have seemed a bold step into the unknown. Some 20 years later we have only just arrived at that point.

It is interesting to note that a mean annual planting rate of 10 000 ha for 40 years would have attained the goal of a further 400 000 ha planted by the year 2000, giving a total exotic forest estate of 800 000 ha. Having had to deal with the aftermath of the first planting boom for most of his career, it seems that Entrican felt that we should not repeat it. To quote again from his 1960 Annual Report: "New Zealand is still going through one devastating experience of compressing a 50-year period of exotic establishment into 10 years."

We have not heeded that concern: we have in fact deliberately repeated the pattern of planting, so presumably we are confident we know how to prevent it from becoming a "devastating experience". No doubt we shall hear some of the means for dealing with it during this meeting.

Why did we depart from the time-hallowed dogma of even gradation of age classes this second time around?

The main reason underlying the three increases in the national annual planting target (to 23 000 ha in 1969, 28 000 in 1972, and the unattained limit of 55 000 ha of 1975) was in the interests of expanding exports to the target of 4 250 000 m<sup>3</sup> as rapidly as possible, thereby increasing forestry's contribution to total export earnings. Increasing the wood supply from our "stock" of old growth stands would have created deficiencies in the late 1980s and early 1990s had the rate of new plant-

ing not been increased. It is envisaged that an even wood flow to sustain the industry over this period can be achieved by modifying the silvicultural regime and adopting shorter rotations for at least a portion of the additional new planting.

At the first Forestry Development Conference in 1969, attention was focused on the decade immediately ahead. The export target remained at 4 250 000 m<sup>3</sup> as hitherto; it was simply brought forward and the rate of new planting increased until 1985 to compensate. No ultimate area target was prescribed and no long-term wood supply target set as in 1960; the planning model clearly showed there would be a large surge in supply available for export after the year 2000. The form that these exports might take was not defined other than that it was foreseen that an increasing proportion of the total supply would be required for pulp production. With this factor in mind, it was strongly advocated that priority must be given to concentrating most of the new planting in large management units. The importance of proximity to export ports was also stressed.

The terms of reference for the working parties set up for the 1969 conference posed most of the pertinent questions one can think of in respect of the consequences of increasing planting, intensifying management, expanding production and increasing exports. Analysis of their recommendations reveals that they predominantly relate to short-term matters. Although there was a Marketing Working Party, there are no specific recommendations on marketing in the FDC final report. Recommendations related to transport (3), labour and manpower (2) and the physical environment (5) are fairly generalised and refer to short-term concerns rather than long-term issues.

The working parties set up for the Second Forestry Development Conference in 1974-5 were also charged with looking specifically at forestry development in the next decade (1975-85), but those for forest industries development and afforestation did endeavour to look beyond 1985. From their assessment of the demand projections, proposed increases in productive capacity, and marketing opportunities, the Industries Working Party considered we should be able to market all the wood available for export, provided we produced quality products at competitive prices. Although the forecasted increase in wood supply for export sounds large to us, and is large relative to our domestic consumption, it is small relative to the large world trade in forest products. The essential factor will be our ability to compete; to do so we must be efficient not only in growing but also in harvesting, transport and processing for the range of products we wish to export. We must

keep efficiency in mind at all times, and we must carefully analyse our comparative advantages so that we can exploit them to the full.

One factor we must appreciate with respect to exports of sawn timber is that we must apply international grading rules and standards. Our own grading rules for radiata pine were written to suit the timber being produced from untended old growth stands. By world standards developed for other softwood species, all of our visual knotty radiata pine grades would fall within the lower bracket; our clear, clear-one-face and best factory material, however, would rate amongst the top grades. Our poor performance in exporting sawn timber cut from untended stands reflects the prejudice that exists internationally against large knots and wide-ringed wood, almost irrespective of the adequacy of the material for the purpose.

The Afforestation Working Party approached their task from the viewpoint of the country's urgent need to diversify its export earnings. They felt that forestry could make a substantial contribution, from a much smaller land base than pastoral farming. To be effective, the long-term wood supply target had to be much higher than any that had been proposed previously. Encouraged by the Industries Working Party's optimism in regard to the future export outlook for forest products, the Afforestation Working Party considered it was within the capacity of the forestry sector for forest products export earnings to match those obtained from meat. Achievement of this goal would require a threefold increase in the value of forest products exports, increasing forestry's share of total export earnings from its then 8% to 24% or higher. It was on those grounds that they recommended an ambitious and challenging wood-supply target of 35 000 000 m<sup>3</sup> by 2005, two-thirds of which would be available for export in some form, or as an energy raw material that could substitute in part for liquid fuel imports. Although they considered it was highly desirable to specify an ultimate exotic forest estate target, as had been done in 1960, there were insufficient data to allow this. They recommended that an estimate of the area of land potentially suitable for afforestation should be made, taking into consideration land capability and environmental impact criteria.

Previous planning exercises had placed a lot of emphasis on the planting target. This working party pointed out that manipulation of planting rate was only one means of several for regulating the wood flow and the future pattern of wood availability. Other means included shortening or lengthening the rotation, varying the extent of timing of thinning, modi-

fying the standard of utilisation in the forest or mill, changing acceptance standards, and so on. Planning models that present only one option based on one set of assumptions become hazardous when they are accepted without question rather than used as a tool for evaluating alternative options. They should be regarded as a "What if?" tool rather than as a blueprint for the future.

As a major objective of the Second Forestry Development Conference was to enable the development of industry to be brought forward and to provide for a modest growth in exports, the working party saw no reason why the rate of new planting should not be as high as resources of suitable land, capital and labour would permit. The Forest Service considered that for a short term an annual rate of 55 000 ha might be achieved within these constraints; so this figure was proposed. The working party felt that a target should be a limit that would stretch resources to the utmost, but probably prove too challenging to achieve. The area of new planting reached a record level of 48 000 ha in 1976 but has since declined; so it seems that the second planting boom may have reached its peak. Once again, having established a large new resource, one hears the counsel of caution and conservatism being advanced more and more, and the enthusiasts are starting to lose some of their sublime confidence.

The fact that the Institute of Foresters is having this meeting on this topic is, I am sure, designed to make us, as a profession, look well ahead, as we have to decide now what stand treatments we should apply. Those that most affect wood quality, stand stability, uniformity and health need to be done while the stands are young. The greater the uncertainty about the form of the end product, the greater the need to adopt management regimes that retain as much versatility and flexibility as possible, for as long as possible. This requires that we constantly look forward, evaluate our options, and revise them if necessary; it also requires a lot of applied science, know-how, and good management.

We claim that one of the great strengths and advantages of forestry is that there is such a wide range of options — we can produce this product or that, bring forward or defer, thin or clearfell. A consequence of the very uneven age-class distribution we have "planned" for a second time is that it is now incumbent upon us to do our forward planning well, assessing all the consequences as competently as possible, so that our stands are treated according to their merits.

What lessons can we learn from the unbalanced age-class structure of the first crop? One is that where there are no established conversion or processing plants, there is a great

deal of uncertainty about the age at which a given stand will be felled. For stands of the same site index planted on the same day but in different localities, there could be as much as 20 to 30 years' difference between their dates of final harvest. It is often not possible to define accurately what rotation age will eventuate and it may be quite different from that originally planned. Some guidelines we could adopt from our experience of the old crop are:

- (a) Do not allow stands to become overcrowded to the degree that they become unstable, thereby limiting options and allowing them to become susceptible to mortality through natural suppression, drought, disease or insect attack.
- (b) Aim for a uniform crop of relatively even tree size.
- (c) Upgrade timber quality by eliminating defects, to the degree that it is economically feasible to do so.
- (d) Defer unnecessary capital development on roads, landings and permanent assets until as late in the rotation as possible.
- (e) Don't plant for production on sites where it is obvious that the costs of harvesting and transport will ensure that production forestry is highly unprofitable and inefficient.
- (f) Maintain an efficient and effective quarantine service aimed at preventing new insect pests and diseases from being introduced.
- (g) Evaluate other species fully and know their site requirements, silviculture, timber qualities and end-uses, but don't rely on species diversification as insurance against something happening to a healthy species — it could prove to be expensive and ineffective.
- (h) Be an optimist.

The organisers of this meeting have drawn up a programme that will allow us to examine systematically most of the consequences that might arise from our new planting programme. However, there is one they have left out — the competence, motivation and outlook of the forest managers. In this regard I cannot do better than to quote from a paper by Ian Baumgart, the Commissioner for the Environment, which was published in Volume 24, No. 1, of the *N.Z. Journal of Forestry*:

I would stress the importance to New Zealand's future that we should have forestry thinking which is progressive and future-oriented, tuned to contemporary public thinking and objectives, skilled in anticipating changes in those objectives, and with flexibility built in to adjust readily to these changes.

It seems that Ian Baumgart applies the same criteria to future forest managers that I apply to the management of future forests.