PLANNING — THE APPROACH OF THE NEW ZEALAND FOREST SERVICE*

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SYNOPSIS

A feature of New Zealand's forest planning is the need to provide for the steady expansion of forest-products exports. This need arises from New Zealand's heavy dependence on international trade. Planning aims to meet estimated long-term demands for home consumption and for exports with supplies that will be available (from imports, from the dwindling indigenous resources, and from the increasing areas of exotic forests). By studying the nature of regional supplies, planning pays special attention to the development of large exotic forests suitable for integrated industries capable of producing paper, pulp, and timber for export.

Forest utilization in New Zealand is mostly undertaken by private enterprise. Some two-thirds of all the supply forests, however, are State-owned. Planting of new exotic forests is being continued by the State to ensure adequate future supplies, and incentive schemes are being investigated to encourage increased planting by private interests.

No great accuracy is expected of the supply and demand estimates; nevertheless, it is recognized that long-term planning gives an essential sense of direction and purpose to present-day activities.

THE ELEMENTS OF PLANNING POLICY

When planning for a specific section of the national economy such as, in this case, the forest-based industries, it is vitally important to ensure that the programme for that section fits into the general picture of the country's development. For consistency, and to avoid waste and disorganized effort, care should be taken to ensure that the particular programme is a coherent and co-ordinated part of the whole. This presents difficulties in New Zealand for, as yet, there is no formal machinery for national planning (although it was recommended to Government by the Monetary and Economic Council in May, 1962). Nevertheless, this country's economy is small and, relatively speaking, uncomplicated, so that there are certain outstanding features which provide some guide to integrated economic planning.

First, New Zealand is vitally dependent on international trade. Imports are equal to about one-fifth of the Gross National Product or roughly £100 per head of population. Should imports fall much below this level, the shortage of imported machinery and raw materials for industry would lead to unemployed equipment and labour. On the other side of the ledger, our balance of payments is chronically unbalanced and necessitates borrowing overseas funds and applying import restrictions, the severity of which varies with

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the level of export returns. New Zealand has one of the highest standards of living in the world; yet we are still as dependent on international trade as we were 60 years ago. It is commonly emphasized that a steadily expanding income from exports is essential to improve the New Zealand standard of living but merely to maintain it.

The second guide, and one clearly related to the first, is that for the last 60 years, and still today, almost the entire export income of New Zealand has been earned through sheep and cattle farming and selling the products. This provides but a narrow range of exports, and, except for the possibilities of developing other forms of land use, scope to broaden the export base significantly seems hardly to exist. High labour costs, limited mineral resources, and the remoteness of all export markets—other than Australia and the Asia-Pacific region—aggravate this situation.

These two features are vital elements in New Zealand’s economic situation and have great meaning in planning for forestry and the forest-products industries. Besides these purely economic elements, the part to be played by forestry is assured by three basic advantages:

(1) The New Zealand climate, which has been found to be so suitable for agriculture, has proved likewise to be particularly suitable for the growth of exotic softwood forests.

(2) Considerable areas of suitable land are available of which exotic forestry may well be viewed as the most economic use.

(3) There is the prospect of more-than-adequate markets in Australia and the Asia-Pacific region for the types of long-fibred pulp products and softwood timbers that New Zealand is well suited to supply.

Radiata pine and Douglas fir, two of New Zealand’s major and most productive exotic species, attain average growth rates ranging from 250 cu. ft to over 350 cu. ft per acre per annum in different regions. The potential for growing high-quality milling timber with either of these two species is possibly unexcelled in any other country. Moreover, radiata pine has proved to be outstanding, in terms of product quality, as a raw material for one of New Zealand’s most rapidly expanding export industries—the pulp and paper industry.

Such are the facts that are moulding the shape of forest policy in this country. There are, of course, other fundamental considerations. Two of the major ones are to provide exotic forests for future domestic consumption to replace the dwindling indigenous wood resources and to re-vegetate high-country areas which are prone to erosion. But these considerations tend to be in the nature of given or fixed internal factors and, although they are the foundation of policy, they are not the variable item in the calculation that decides the eventual pattern for forestry planning.

To put it all in broad perspective, forest-products exports are not expected, in the foreseeable future, to produce more than about 8% of New Zealand’s likely total overseas exchange earnings. Nor is it expected, for several decades, that the wood volume available for exports will be more than about 65% of that required for the home market. Yet the need to expand exports dictates the pattern
for new exotic planting so that future forests will be suitably located for large-scale export industries. This need also creates urgencies which have not long been foreseen; that is to say, even the achievement of the above production levels by the end of the century will be dependent on being able to harvest at least half of the exotic wood supply from new forests not yet planted. Thus the provision of exports, though not the major item in the national wood balance sheet, has clearly become the dominant theme in New Zealand forest planning.

PLANNING BY THE FOREST SERVICE

Estimate of Aggregate Demand

The first step has been to estimate New Zealand's aggregate demand for wood up to the year 2000 and, very tentatively, up to 2050 and 2100. This necessitates not only attempting an assessment of domestic consumption but also nominating a target for exports.

Internal Demand

To assess internal demand, consumption of wood is divided into the conventional categories:

1. Round produce (posts, poles, etc.)
2. Sawn wood
3. Wood-based panel products
   (a) Plywood
   (b) Fibreboard and particle board
4. Pulp products
   (a) Cultural paper (i.e., newsprint and other printing and writings)
   (b) Industrial paper.

(Fuel wood, an important commodity in many countries, has always been readily obtainable in New Zealand and does not require special consideration.)

Wood requirements for each of these categories are projected chiefly on the basis of estimated growth rates in the economy and in population. In this work the various recent FAO commodity studies are an invaluable guide. Also, as timber and paper usage in New Zealand has reached a relatively advanced stage, the example of the United States is recognized as a useful indicator of future trends.

Official estimates of the future demand in New Zealand for sawn wood were made in 1925 and more detailed estimates covering all categories of wood were prepared in 1960. Most of these earlier estimates, especially those of sawn timber, have been close to the figures subsequently attained.

A current revision aims at estimating plausible future levels of consumption as distinct from either minimum needs or total demand. Deliberately low estimates could depress the rate of new planting and create unwarranted difficulties in attaining export targets. High estimates, on the other hand, could possibly lead to an excessive rate of planting, at least until the estimates are corrected, and might create difficulties in marketing and tending.
As there is little chance of obtaining accuracy in these long-term estimates, frequent revision in the light of new developments would appear to be the only safeguard.

New Zealand has only a small population and, to be reasonably accurate statistically, future demand estimates must be made in the first instance for the country as a whole. For planning the supply of timber, however, produced locally from indigenous and exotic forests almost throughout the country, it is necessary to resolve the national figures into local-demand figures. This means recognition of local population trends and patterns of timber usage, and the current practice is to allocate the national demand to some fifteen different planning districts. These are geographic and economic units of convenient size for broad regional planning. Each generally has its own demand and supply characteristics. When it comes to utilizing the forests, the location, extent, nature, and condition of the regional resources are the all-important issues. Thus the key factors in planning are not at the national level but at the regional or planning-district level.

Export Provision

Fixing export targets for the forest-products industries appears to be more arbitrary than rational; but wherever large expansions are visualized, both the physical and the economic aspects are of major significance. The Forest Service previously assessed the export potential by deciding on what appeared to be an appropriate target in relation to domestic requirements and an increased but realistic rate of new planting. This was the approach used with an overall planting rate of 25,000 acres a year to reach the current official export target of 150 million cu. ft a year by the year 2000. It was further estimated that, of this quantity for export, more than half would be as paper, chiefly newsprint, about a quarter would be as pulp, and the remainder as sawn timber and logs.

Recent thinking within the Forest Service has now suggested that the provision for forest-products exports should be expanded:

(1) To allow the forest-products industries as a whole to maintain a high growth rate. Since 1937 the production of indigenous and exotic roundwood has increased at an average rate of 4.4% a year. From now until the year 2000, however, in meeting all expected demand for home supplies from the indigenous and exotic forests plus the 150 million cu. ft for export, the average expansion will be at the relatively low rate of 2.6% a year.

(2) To increase the average growth of forest-products exports to more than the rate of 4.0% a year, which is implied in the current 150 million cu. ft export target.

More particularly, it has been suggested that, should it be possible to increase exports by the year 2000 to 230 million cu. ft a year, this would raise the annual average growth rate for the forest-products industries as a whole to 3.0% and that for forest-products exports to 5.2%.

These suggestions receive support from the fact that an expansion of 4.0% a year in the Gross National Product has already been accepted as a reasonable working figure for New Zealand in plan-
ning agricultural developments for the next 10 years. Although this figure may be over-high for a long term, that is to the end of the century, it is broadly agreed than an estimate of 3.0 to 3.5% a year growth in the Gross National Product may well be within the capabilities of the economy. However, whether it will be possible to produce increases of the order suggested in forest-products exports during the next 35 years is yet to be ascertained. Also, much will obviously depend on the provision of adequate land, capital, and manpower, and on thorough early planning of how these can best be used.

### Supply Estimates

New Zealand’s present supplies of forest products come from three sources. In terms of roundwood equivalents, a little less than 10% of New Zealand’s total consumption is imported; some 30% comes from our indigenous forests; and a little more than 60% comes from our exotic forests. In addition, the exotic forests are supplying an increasing volume for overseas exports, currently equivalent to 23% of the total home consumption. The future levels of supply from each of these three sources are estimated separately.

Forest products imports include mostly special timbers, rounds, veneers, pulps, and papers that are not produced in New Zealand. In the future, with increasing diversification of the forest-products industries, the level of imports per head of population is expected to fall. Nevertheless, the total volume of imports will probably remain much the same as at present, at least for another 30 to 40 years.

With inevitable future reductions in the rate of cutting in the limited (and largely State-owned) indigenous forests, planning aims to reduce the indigenous supply gradually and avoid undue disruption to the existing industry. Other considerations are that the quality of the timber from the virgin stands is high. As about half is suitable for finishing uses, the indigenous supply is complementary to, and aids, the marketing of the typically knotty timber at present being produced from the exotic forests. Unfortunately, except in limited areas, there is little effective regeneration of commercial species in the worked-over indigenous forests.

Detailed knowledge of the location, nature, condition, and merchantable volume of the indigenous resources was obtained from a national survey, which was completed in 1956. Based on the results of this survey, it has been possible to prepare estimates of future cutting rates. The latest of such estimates (McKinnon, 1964) shows that there are sufficient resources to allow the maintenance of the present rate of supplies in three Forest Service administrative districts (conservancies), and to maintain more than half of the present supply in three other conservancies during the next 20 years. However, other than for long-term reserves in the State-owned forests, only a few regions in the South Island can be expected to retain any sizable resources beyond the end of the century, by which time the over-all indigenous supply is expected to have fallen to scarcely more than a third of the present-day production.

After allowing for regional supplies from imports and the indigenous resources, further estimates are made of the adequacy
or otherwise of expected regional exotic-wood supplies in relation to total future regional demands. Few planning districts are expected to be balanced supply-and-demand areas, even for timber, and the possible distribution of expected surpluses and deficiencies between nearby regions allows the planner to estimate in a realistic way the total exotic-wood supplies that may be sought and met from each region's forests so as to achieve a satisfactory overall result.

Emphasis is given in this way to regional-supply planning as distinct from national-supply planning. It was not until 1962, however, with the completion by the Forest Research Institute of the area assessments of the National Exotic Forest Survey, that the important step of estimating possible exotic-wood supplies by regions first became practicable. Prior to that there were no reliable area figures by localities, species, age classes, and ownerships. The future position could only be estimated very broadly by multiplying the estimated total national area, plus the area of expected new planting, by an estimated mean annual increment for all species. Though this approach produces plausible estimates of future increments it is an uncertain step to assume that these increments will be matched by equivalent available supplies. There remain the difficulties of making due allowances for the known maldistribution of age classes (which is a feature of New Zealand's present exotic forests) and for the location of the existing forests in relation to future markets. Inevitably both of these considerations have an influence in practice on the future volumes which can be utilized.

As outlined in a discussion of the possible demand, supply, and exports of forest products from the North Island of New Zealand (Williams, 1963), estimates of long-term exotic supplies are now calculated from a series of cutting schedules. Each schedule covers a broad category of forest, either that of a major species under a particular ownership and management regime, or of an appropriate grouping of minor species. A sufficient number of schedules, but generally no more than six or seven, are used to include all the exotic forests within a planning district. The layout of the schedules shows the distribution of areas in age classes and the area available for thinning and clear felling by successive five-year periods. Volume and age data are applied to the respective areas to be harvested, and the area to be clear felled during a particular period to meet the expected demand is calculated and subtracted from the oldest age classes. Similarly, the area of new planting and regeneration during a period is added to the youngest age classes.

Each cutting schedule has to be based on a number of assumptions, such as the rate of new planting, the nature of thinning regimes, the minimum (and locally the maximum) length of rotations, and not least the wishes of private forest owners. Thus, with the usual additional complications resulting from the irregular distribution of the existing age classes, there is a considerable element of trial and error in working through the schedules to arrive at what could be considered a suitable regional programme.

This method of supply estimation and planning does offer many advantages, however. The expected yields can be related to particular categories of forests within the planning districts; the age of the wood at the time of harvesting can be noted and consideration given to quality aspects for both sawlogs and pulpwood; the need
and opportunity for special tending can be evaluated; the necessary rate of new planting to meet regional and national requirements can be estimated; cost summaries can be prepared for future programmes in terms of both manpower and money; and broad regional forest plans can be developed to provide a reliable basis for formal management plans for individual forests.

Industrial Considerations and Regional Planning

Future export opportunities appear to be most promising in long-fibred pulp products, newsprint, and high-quality timber. For a sulphate pulp mill the minimum wood requirements are around 9 million cu. ft a year, and for an economic newsprint mill producing 200,000 tons (with two paper machines) the requirements are possibly 25 million cu. ft a year. In addition, it would be desirable, if not essential, to arrange for the same supply forests to produce well-tended sawlogs and peeler logs amounting to 50% or more of the pulpwood volume. Not to grow high-quality sawlogs along with the pulpwood would be to waste the opportunity that pulpwood markets offer for profitable thinning and tending, provided, of course, that the sites are suitable for thinning and tending. Moreover, because quality sawlogs and peeler logs naturally command higher stumpages than pulpwood, the production of an adequate supply of sawlogs and peeler logs can markedly increase the over-all financial return to the grower. The minimum wood supply for an integrated export industry is accordingly over 15 million cu. ft a year and preferably, to keep costs at a competitive level, this volume should be available within a short haul to the mill averaging no more than 30 to 40 miles. Other requirements for the establishment of these integrated industries are abundant fresh water, fuel, and electricity, easy disposal of effluents, transport and port facilities for exporting, and a huge capital investment. All these considerations make it essential to plan so that the necessary forest resources will be in carefully chosen locations.

Kaingaroa Forest (with a stocked area of 280,000 acres) was established during the 1920s and 1930s in the Bay of Plenty region, North Island, and the Tasman Pulp and Paper Company, an integrated newsprint, pulp, and sawn-timber mill, was able to begin utilization of it in 1955 and expand to nearly double its initial output by 1963. Also in the same central North Island region are two companies, New Zealand Forest Products Ltd. and its subsidiary Whakatane Board Mills Ltd. These companies control exotic forests of an area approaching 200,000 acres, and they turn out a wide variety of pulp products (including kraft wrappings, fine papers, paperboard, moulded products, and fibreboard) in addition to producing sawn timber on a large scale. The size of this region's total resource with its natural, and now many man-made, advantages suggests that it will remain the largest centre of the forest-products industry for a long time to come.

However, the central North Island is not the only region where suitable land and the other necessary facilities can be made available for large-scale afforestation and industrial developments. Also, the sheer bulk and cost of transporting forest products make it necessary to have geographical diversity in the forest industries. Consistent with this, State and private interests have been planting
areas during the last 30 years close to the port of Nelson in the north of the South Island. The stocked area of exotic softwoods is now about 70,000 acres and a recent Forest Service assessment indicates that there will be sufficient wood for an economic chemical pulp mill to begin operating within the next ten years. A joint company to investigate the establishment of an industry based on the Nelson forests has been formed by several New Zealand forest-products companies and two companies from overseas.

A third region is already being examined for the possible establishment of a pulp and paper mill centred on exotic forests in the south of the South Island. The forest resources in this locality are far from being sufficient at present but an expanded planting programme could provide for a 150-ton-a-day chemical pulp mill by the late 1980s. Other regions where similar developments could take place are under consideration for an early increase in the rate of new planting. Ideally, to suit marketing considerations, the aim should be to plan the development of each new project so that the forest will be ready for the industry to start up at an appropriate interval of several years after the preceding mill. Also, as most of the industries supplying forest products for export would want a share of the home market, it would aid the economic distribution of the products to alternate the development of new utilization units according to their proximity, broadly speaking, to the northern and southern demand centres.

This brief outline may serve to illustrate the principle that in regional planning a prime consideration is to decide where the heavy concentrations of forest designed to support a large-scale industry are to be located. The remainder of the afforestation programme is then distributed over the other forests (and in all there are now more than ninety State-owned exotic forests in New Zealand). Particular account is still taken of proximity to large or prospectively large consuming centres, especially as it is expected that other forest industries, notably those producing wood-based panel products, will want to establish plants near to a sizable domestic market and to draw their raw material from nearby forests. Nevertheless, it is also reasonable to provide for the numerous small settlements spread throughout the country, provided that production costs are not excessive in relation to the costs that would otherwise be incurred in bringing the supplies from the larger production centres.

THE PART PLAYED BY PRIVATE ENTERPRISE

In all private-enterprise countries where planning is undertaken by a Government agency, there is a further necessary step to transform the plan into actual production by private concerns. In New Zealand, forest utilization is almost entirely in the hands of private enterprise. Two Forest Service sawmills produce a combined total of 36 million bd. ft. or roughly 5% of the sawn timber cut annually. The State also has a 20% holding in the ordinary share capital of the Tasman Pulp and Paper Co. This, however, is almost the total extent of Government participation in utilization.

As far as the forest resources are concerned, the situation is quite different. Of the indigenous forests, 70% by volume are held by the State, and of the exotic forests, 60% of the total area of forests of 50 acres or more is grown by the State. New planting by the
The Forest Service is also being undertaken at twice the rate of private planting.

The State enables private concerns to utilize its forests by offering to sell either cutting rights or logs. In the case of the indigenous forests, the acquisition of cutting rights is generally keenly sought. The same keenness usually applies with the exotic forests; but, depending on timber quality, the prospects for continuity of supplies, and to a great degree on the location of the resources in relation to markets, there is wide variation in the salability of particular stands and forests. Under the existing conditions of temporary surpluses of exotic supplies, some relatively mature forests are as yet far from being fully utilized. Provided industries can be established under favourable economic conditions, however, there is every reason to expect that private enterprise will be able to meet all essential future forest utilization requirements.

Most of the private sector of the industry is predominantly interested in utilization and makes greater investments in new industrial plant than in afforestation. Though there are a few afforestation companies and numerous small-scale private growers, such as farmers, who take their profits from the sale of stumpage, the supply which can be sustained by this source is not large. Of course, one of the main considerations influencing private investment in forests is the long waiting period of 20 years or more before any returns can be expected. To help overcome this difficulty, afforestation incentive schemes are at present being investigated by the Government to help farmers, companies, and local authorities to establish forests. The importance of these incentives could be great, not only in spreading the investment necessary to get new forests established but also in ensuring that land which is eminently suitable for forestry will be used for this purpose to an increasing extent.

Whatever the achievements may be in new planting by the private concerns, it is recognized that the State will have to plant the remainder of the total area required for future supplies. It is also recognized that the much-needed large forests to provide for export industries can in most cases only be developed with a large measure of State participation. There will still be every reason, however, to encourage private interests to plant new forests either for contributory resources for large-scale developments or for local supplies.

A FINAL COMMENT

The problem facing the planner is much the same whether he plans the development of a national economy or of an industry. The essence of his problem is to interpret supply and demand in terms of time.

While it is not without complexities, the supply side is mostly concerned with reasonably tangible considerations, and, given realistic assumptions, can generally be projected without too great an error. Unfortunately, the influences governing demand, being human and social, are rarely stable and are frequently capricious, so that there can be no certainty in estimating distant future needs.

Subject to their frequent review, however, it is recognized that national and regional long-term forestry programmes do provide
present-day activities with an essential sense of direction and purpose.

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