

FORESTRY PRODUCTION AND PLANTING TARGETS

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Abstract

Planting and production targets for exotic forestry in New Zealand are presented for the period 1975-85. Factors likely to affect these are examined.

INTRODUCTION

In this, the 1974 Forestry Development Conference, it is my task to set before you the planting and production targets for New Zealand's exotic forests over the next decade, and explain, or at least endeavour to explain, how these targets have been derived and the justification for the substantial increases proposed in the planting programme. Production of wood over the next decade is determined by the productivity of existing forests and the management systems adopted. Theoretically it should be possible to define precisely the volumes we can expect to harvest between now and 1985. In practice a number of factors, over which the forest manager has little or no control, and which can adversely affect production, may come into play. Consequently, it is desirable to be conservative when predicting future yields to allow for possible losses in production through fire, biological attack or climatic damage. Also, we are dealing with estimates which are subject to some degree of error. Taking these factors into account, we are still confident that the volumes derived for the period 1976-1985 give a reasonable idea of the volumes of exotic timber that will become available from forests of all tenures. In setting planting targets the approach is rather more speculative. What is done now will have a major effect on the use of capital, labour, power, transport and various other resources 25 to 30 years in the future when utilization commences. Also, as the existing forests are capable of sustaining wood-using industries already established, any further exten-

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sion of the exotic forest estate implies the establishment of new industries along with the expansion of those at present in production. Additionally, the existing forests are capable of meeting domestic demand beyond the year 2000 with a surplus available for export. Therefore all new plantings, either directly or indirectly, will have to be absorbed by export markets. With the existing and increasing world shortage of forest products there should be an assured market for all that New Zealand can produce, assuming of course that stable trading and economic conditions exist. It was on this basic assumption that the Targets Working Party of the Forestry Development Council set about determining levels of planting for new exotic forests over the next decade.

PREVIOUS PLANTING TARGETS

In the 1969 Forestry Development Conference, the national planning model recommended an annual planting rate of 21 000 ha. This was based on the need to accommodate an expanding domestic market and to ensure that the exporting industries were supplied with sufficient raw material to allow a modest degree of expansion. By 1971 new planting exceeded the figure set in 1969 and in 1972 the target was lifted to 28 300 ha. The increase was made to ensure that additional wood became available for export beyond 1982 so that export earnings from the forestry sector were maintained at least at 9% of total export earnings. The area planted in 1972 was 33 140 ha and in 1973 it was lifted to 43 600 ha, 55% above the level set twelve months before. Planting in the current year is expected to be about the same level as in 1973 but consolidated planting returns have not yet been received. This rapid increase in the planting rate has resulted from the increase in forestry activity in both the State and private sectors. In the past the private sector has contributed 30 to 40% of new planting but it is now above 50% and is expected to be maintained about this level. The reasons for this very rapid increase in the planting rate to the point where target figures are virtually meaningless are not all that clear. However, it does seem that public confidence in exotic forestry as a productive form of land use has followed on the success of the major forest companies. These companies have been amongst our industrial leaders and N.Z. Forest Products Limited is generally regarded as the bell-wether of the New Zealand sharemarket.

With increasing confidence there has been a willingness to invest in forest development. Allied with this, smaller companies have come to realize that it is desirable to have their own forests if they are to be certain of adequate supplies of raw material in the future. The Forest Service for its part

has expanded its planting programme to meet the expanding demand for forest produce, to utilize productively seasonal labour which becomes available in the winter months, to meet its contractual commitments to the owners of Maori land which it has leased for forest development, and to assist in Government's policy of regional development.

In setting planting targets in 1969 and 1972, a relatively cautious approach was adopted. In 1969 the primary concern was to accommodate the domestic market and provide a small but increasing surplus for export. The 1972 target was set to maintain the relativity of forest products' exports with total exports. The 1974 exercise has been approached differently, the philosophy being to expand the planting rate to the maximum level that resources of land, labour and capital will permit. By planting at this level it will be possible to increase export earnings from forest products very dramatically towards the end of this century. Rather than maintaining its current position in total export earnings forest products could contribute 20 to 25% of the total assuming that price relativity with other exports does not vary greatly from the present position.

From a regional survey which set out to determine the maximum area that could be planted annually in each region, based primarily on available labour, a national maximum figure of 55 000 ha was derived. This can only be indicative because of the limited time available for the survey and the possibility of changing conditions in the labour market.

THE PLANTING PROGRAMME OVER THE NEXT DECADE

Minimum Planting Rate

Having already decided that the long-term prospects for selling products from our exotic forests on the world's markets were assured and that under normal trading conditions we could compete successfully in selling both processed and unprocessed products, it was then necessary to determine a reasonable minimum annual planting rate and a realistic maximum annual planting rate. As we had already planted in excess of 40 000 ha in 1973 and it seems certain that there will be some increase in 1974, if past experience means anything, it was decided that 40 000 ha would be a reasonable minimum level. Historically, forest development, in the State sector at least, has reached its peak levels in times of economic depression. That it was possible to plant 44 000 ha at a time when heavy demands were placed on labour and when the economy was booming indicates that such a programme is feasible. If it is possible to plant this area without embarrassing other sectors of the economy, and this seems to be the case, we

should regard this now as the absolute minimum. Obviously there are other factors to consider such as availability of land and capital resources but these can be considered when we look at the next stage, the realistic maximum planting rate.

Maximum Planting Rate

In considering the maximum planting rate it was first of all necessary to define the constraints which would set the upper limit. In broad terms there are three major considerations: Capital, labour and land.

(a) *Capital*

As about 50% of the new planting will be carried out by the State, changes in emphasis in Government policy can and do affect the availability of capital for forest development. If development is to be continued on a well planned basis, and synonymous with good planning is good economics, it is essential that the Forest Service is assured of a minimum annual planting area so that it can plan its land clearing and nursery operations at least two years in advance of actual planting. The availability of capital from the private sector will depend to some degree on the state of the national economy. When finance is difficult to obtain and companies have liquidity problems, there could be a reduction in the area planted. The Grant Scheme and the increasing interest shown by local bodies may have some cushioning effect but if the larger companies are forced to reduce their investment in forest development the effect nationally will be significant. Expenditure in the forest establishment phase is not high if the initial purchase of land is disregarded. However, in the tending stage, that is from release cutting to final thinning and pruning, a number of expensive operations are involved and with a rapidly increasing planting programme these accumulate at a considerable rate.

Economists can illustrate very clearly that intensive tending regimes, that is, heavy and early thinning associated with pruning, give the optimum financial return to the forest owner. However, if the same forest owner is hard-pressed for cash, then he may have to opt for a no-pruning, one-thinning regime (minimum tending). This flexibility of management enables some adjustments to be made in capital requirements. Also, if markets are available for smallwood it is possible to generate an early cash flow from thinnings. Alternatively, grazing may be integrated with forest management for the same purpose. As a last resort, existing forests may be overcut for brief periods or the felling age brought forward to increase income.

Provided forest managers are prepared to utilize the flexibility available, it is not anticipated that lack of capital will be

a limiting factor to the proposed maximum planting rate. A projection of the capital resources needed to sustain such a programme may well be an exercise which should be carried out before the next Conference.

(b) *Labour*

The establishment phase in forestry is labour-intensive and for that reason it has traditionally been used, not only in New Zealand but in other countries of the world, to mop up surplus labour and at the same time create an asset of national value. However, when labour is in demand, there can be problems in recruiting sufficient people to carry out the planned land clearing and planting programmes. Mechanization of these operations, particularly land clearing, has advanced significantly in recent years and this has reduced the labour requirement. Also, the use of female labour in what was previously a male domain has enabled some forests to meet their targets.

Careful planning and the best use of the labour available are essential in any job and there are probably some improvements we can make in this respect in most forest operations. However, it was considered that, under conditions of reasonable economic stability and full employment, labour shortages would make it difficult to expand the planting programme beyond the proposed maximum. Certainly there will be variations between regions and some adjustments can be made by stepping up the planting rate in areas where temporary surpluses of labour occur. A continuing effort will be needed to further mechanize all operations associated with the early stages of forest development if stop/go policies to accommodate surges in the labour market are to be avoided.

(c) *Land*

Availability of capital and labour are within the compass of man to do something about. However, New Zealand in total has approximately 26.7 million hectares of land, a very large part of which is unproductive and which for various reasons will remain unproductive. Land is a finite resources and it is becoming more apparent as each year passes that pressure on our limited area of productive land is increasing. It is therefore unfortunate that we now find decisions on land use being made not on the basis of well reasoned and factually substantiated argument but as the result of pressure applied by what are euphemistically called special-interest groups.

At various times there has been pressure to stop exotic forest establishment on manuka scrub country, open grassland, coastal sand dunes and cutover indigenous forest. Therefore, although it is possible to make a reasonable estimate of land availability, it is not always possible to predict whether pro-

ductive land may be withdrawn because of public hostility or the activities of pressure groups. This could be a factor of some importance over the next decade.

To determine the total area that might be available for new planting, the Forest Service, through its Conservancy staff, made a survey in each of the planning regions. Only undeveloped or underdeveloped land was included in the survey and land tenures were not defined. At the suggested maximum there is adequate land suitable for forest development to sustain the planting programme well beyond the next decade. However, the emphasis in forest establishment must shift from the Bay of Plenty where the planting rate will drop to areas such as Northland, King Country, Gisborne, Marlborough, Otago and Southland. If the West Coast Beech Scheme goes ahead, there may be an increase in exotic planting in that region. The future of exotic forest development in the King Country is largely dependent on the conversion of cutover indigenous forest. If recent public reaction to Forest Service proposals for a small area of cutover forest in the Kaimai Range can be taken as a guide, then there is the distinct possibility that only limited development will be possible in the King Country.

There are therefore several factors which could have a bearing on future centres of forest development. In the long term, Otago and Southland seem to offer the best possibilities as it is here that the greatest areas of land are available.

Assuming that land, labour and capital are available, is there any other justification for continuing to extend our exotic forests? We have sufficient to meet our own requirements in a wide range of forest products, we have well established export markets for any surpluses, existing forests can be made more productive by better management, the replacement of unthrifty stands and the application of research findings, and we are still exporting wood in an unprocessed form. Should we concern ourselves that the world demand for forest products is expected to double by the end of this century and in the developed countries, such as New Zealand, the demand will be even higher? Should we concern ourselves with increasing the supply of a renewable versatile raw material in a world which is fast devouring finite resources of aluminium, iron, copper, fossil fuels and other minerals and in some cases the very land itself? Should we worry about locking up productive land in a world threatened by catastrophic shortages of food and fibre?

It would seem that, apart from the need to diversify and expand exports to maintain our present standard of living we have an international obligation to supply less fortunate countries in the Pacific Basin with timber and timber products at a reasonable price so that they can enjoy better housing and

improved living standards. Over the years New Zealand has accumulated a wealth of experience and a world-wide reputation in the management and utilization of fast growing exotic softwoods. We are probably better placed because of this and because of natural advantages of climate and easy access to deep-water ports to make some contribution to meeting the needs of the South Pacific and South-East Asia. Whether we can play such a role in future will depend to a very large degree on public attitudes.

Exotic forests in recent years have for some unexplained reason come to be regarded as a blot on the landscape. It seems that converting cutover indigenous forest to pasture is acceptable but to plant exotic tree species is an assault on the environment. This schizophrenic thinking may be in part due to foresters paying little regard to landscaping forests, failing to provide better access and more areas for recreation, and failing to let the public know what they are doing. Whatever the reason, before we can make the progress we should in forest development, we will have to get public acceptance of our proposals. Hopefully between the present conference and the next session in May 1975 some of these difficulties can be ironed out.

Protection Planting

To this stage we have been dealing with production exotic forests. There are areas which are being planted primarily for protection purposes, but which may have some productive capacity. Obviously management of these forests will vary with the function they are designed to accommodate. These plantings are not included in the maximum and minimum figures we have been considering but rather form a part of the 8 000 ha additional planting programme for protection purposes recommended by the 1969 Conference. Such areas would be the coastal strip in the sand dune forests of the west coast of the North Island, high altitude planting and sowing on eroding country in Hawke's Bay and Marlborough, and planting on unstable country on the east coast of the North Island. In the long term it can be expected that these areas will produce limited volumes of usable wood subject to the protective function of the forests being unimpaired.

Large areas of eroding high country, particularly in the South Island, require some form of remedial treatment. Methods of revegetating this difficult country have been developed by the Forest and Range Experiment Station, a branch of the Forest Research Institute. Exotic tree species are used for this work but they do not have any productive function. Because of the scale of the problem, it is necessary to define the areas where remedial work is most urgently needed and where the maximum benefit will be obtained. The use of cost/

benefit techniques may be applicable but when such benefits are difficult to quantify and have to be measured over long periods it is not reasonable or practical to hope for great precision in the data available. Revegetation of the eroding high country is difficult and expensive and progress to date has not been spectacular. A more determined effort to come to grips with this problem will have to be made in the next decade.

PRODUCTION

In this discussion production refers specifically to roundwood from exotic forests. Although we are primarily concerned with production over the next decade, the long-term implications of the expanded planting programme cannot be ignored. To deal first with production over the next decade: For the ten-year period in question there have already been two forecasts, one prepared for the 1969 planning model and the other for the 1972 model. It may be of some interest to compare these with the latest projection and determine the reasons for any variations.

PRODUCTION FORECASTS
(Volumes in million cubic metres)

<i>Period</i>				1969	1972	1974
1976-1980	....	....	....	5.9	9.0	8.5
1981-1985	....	....	....	8.5	10.0	9.6

The area of forest under consideration for all three projections is virtually unchanged so this factor can be disregarded. Between 1969 and 1972 substantial changes were proposed and generally accepted in the silviculture of radiata pine which enabled this species to be grown on shorter rotations. Because second crop stands, and newly planted forests would become available at an earlier date, it was possible to fell the old crop over a shorter period, thereby making additional volumes of wood available. Other factors, including increased utilization of minor species and a greater percentage of radiata pine in new plantings, also had an effect. The drop in volume between 1972 and 1974 has resulted from the incorporation of new and somewhat more conservative yield tables in the calculation. These changes in the prediction of volumes that can be harvested in the ten-year period 1976-1985 illustrate two things: first, with high-producing species such as radiata pine changes in management can have a dramatic effect on the wood supply; secondly, as our methods of yield prediction are improved and the tools for doing the job refined, changes may result which will be less significant with the passage of time. Our exotic forests are producing at near capacity, so we

are now at the point where considerable care is needed to guard against over-cutting.

Accepting that production from our exotic forests over the next decade can be sustained at the level predicted in the most recent exercise, some consideration has to be given to the effect of the proposed expanded planting programme on production towards the end of the century. This is necessary as we could find ourselves in the position of having large surpluses of wood which we are unable to utilize. Such a situation applied immediately after the Second World War and well into the 1950s. There is a danger that with very large increases of wood becoming available over a short period it may not be possible to muster the capital resources to build the mills and associated facilities to process this material. For this reason it is essential that our access to markets for wood as logs and chips is kept open even at the cost of the loss of some export earnings over the intervening period. The total volumes that would be available based on the three different volumetric predictions and four different levels of planting are as follows.

PREDICTED YIELD FROM EXOTIC FORESTS
(Volumes in million cubic metres)

Years	1969	1972	1974	
	Planting Rate 21 000 ha	Planting Rate 28 300 ha	Planting Rate 40 000 ha	Planting Rate 55 000 ha
1976-1980	5.9	9.0	8.5	8.5
1981-1985	8.5	10.0	9.6	9.6
1986-1990	9.6	11.0	10.7	10.7
1991-1995	10.3	13.0	11.9	11.9
1996-2000	11.8	16.0	16.4	18.5
2001-2005	—	18.7	24.8	30.8
2006-2010	—	—	28.8	36.1

At the proposed expanded planting rates, sufficient additional raw material would become available in the 15 years between 1995 and 2010 to supply 15 to 20 mills each with the equivalent present capacity of the Tasman Pulp and Paper Company's mill at Kawerau. Industrial expansion of this order would be well beyond the capacity of New Zealand to accommodate. There could also be difficulties in finding outlets for such very large volumes of wood as raw material although FAO predictions of future wood use indicate otherwise. By delaying felling or by commencing felling at an earlier age, it is possible to spread the total volume increase over a longer period and thereby reduce the annual increase. To enable industrial development to be phased in progressively, and to ensure orderly marketing, we must accept that substantial areas will have to be managed as pulpwood crops or carried

well beyond rotation age. In practise some combination of both methods will almost certainly be necessary. To test the effect of early clearfelling, future yields were calculated on the basis of 10% of both existing and new forests being felled at age 15 and 10% at age 20. Because crops are being felled before or about the time that the mean annual increment reaches its maximum, there is a reduction in the total volume of wood produced. Over a 35-year period this amounted to about 3 million cubic metres, a reduction of 2% in the total wood supply. The adoption of such clearfelling strategy did assist in levelling out the wood supply.

Holding stands beyond rotation age has a built-in risk factor in that with increasing age and height they become more susceptible to wind damage. In some regions this risk could be so high that it may not be acceptable. However, we have, and are, holding large areas of radiata pine up to and beyond age 50 years and windthrow has not presented a serious problem in the major forest areas. Species other than radiata pine will be grown on longer rotations, particularly Douglas fir, and as a result there is a greater measure of choice in determining the age at which the stands will be felled. At the levels of planting proposed, delaying felling of radiata pine must inevitably mean that large volumes of wood will begin to accumulate as in stands thinned to 200 stems per hectare the periodic increment will still be rising. Finally, we should not only be concerned with the quantity of wood that will come from these production forests in the future but also the quality.

Management is at present geared to producing sawlogs and the silvicultural regimes have been designed accordingly. There have been recent indications that in certain localities it may be more profitable to grow pulpwood crops, so for economic reasons alone some forest owners may change to this type of management. However, there is also the question of the type of wood that industry will need from our new forests. Will the demand for sawn timber diminish significantly as reconstituted products become more freely available and are adapted and accepted for a wider range of uses? Are any technological developments foreseen which could change the use of wood as a raw material? I assume that these questions do not have to be asked in companies that draw the wood for their mills from their own forests. Other forest owners look to industry for guidance in these matters.

A forum such as this will be of little value if we are unable to establish some guidelines for the quality of wood needed in the future. Provided industry and Government are aware of the changes that can be expected in the total wood supply, there is no reason why these very large increases cannot be marketed to New Zealand's advantage. The exotic forests can

give New Zealand the opportunity to diversify its exports over a wide range of manufactured products, partially processed products and raw material. For the first time we can see the possibility of the economy being no longer tied so closely to agricultural exports. Whether this opportunity is taken will depend very much on the deliberations and findings of this Conference.

SUMMARY

(1) We have already reached an annual planting rate of 40 000 ha/yr and this is recommended as the minimum level of planting for the future. This level was attained at a time when there was severe competition for labour and capital.

(2) The maximum level of planting which is thought to be physically possible is 55 000 ha/yr. From the limited information available, there is sufficient undeveloped and underdeveloped land to support a planting programme at this level well beyond the next decade. It is possible that a limiting factor other than land, labour and capital could be the attitude of a section of the public towards the conversion of cutover indigenous forest to exotics.

(3) Annual production over the next decade can rise to 9.6 million cubic metres. Roundwood removals from exotic forests for the year ended 31 March 1974 totalled 7.8 million cubic metres. If pulpwood regimes are adopted for some of the new and existing forests, there will be a reduction in the total volume available.

(4) The effect of an expanded planting programme on production from 1995 onwards will have wide-ranging effects on industrial development and the nation's export capabilities.