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# A survey of afforestation intentions in New Zealand between 1996 and 2010

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## Abstract

A survey of New Zealand industrial forest growers, local government authorities and industry experts was carried out to ascertain new land planting intentions to the year 2010. Industry experts expect nationwide intentions of all ownership groups for all forest species to decrease from about 72,000ha in 1996 to nearly 66,000ha in 2000, and to level out at about 56,000ha/yr between 2001 and 2010. It is anticipated that more than 80% of the area involved will be planted with radiata pine. New land planting intentions of individual owners, either independently or through partnerships, joint ventures, trusts, etc., are expected to exceed those of either industrial growers or local government authorities. Estimates of the new land planting intentions of the industrial growers indicated a drop from about 27,000ha in 1996 to 16,000ha/yr between 2001 and 2010.

## INTRODUCTION

The aim of this project was to obtain bounded estimates of the afforestation (new land planting) intentions of forest owners in New Zealand to the year 2010. The data were to be used to model trends in carbon absorption by New Zealand's exotic plantation forest estate. New land planting was defined as: "Planting of commercial forest species into areas currently in pasture, scrub, or non-commercial forest species." It does not include replanting of logged commercial forest areas. This report summarises data submitted in response to a questionnaire survey.

## METHODOLOGY

A survey was undertaken in November, 1995 to obtain an overview of the new land planting intentions of New Zealand

forest owners. A nonprobabilistic sampling method (Kalton, 1983) was used because it was not possible to identify all potential respondents before it commenced. Three main groups were targeted:

1. **Industrial growers (IG)** - Central Government, State-Owned Enterprises, registered public companies, registered private companies.
2. **Local government authorities (LGA)** - District councils, regional councils, local authority trading enterprises.
3. **Industry experts (IE)** - Including forestry consultants and Ministry of Forestry staff. These respondents were asked to estimate nationwide new land planting intentions on the basis of their professional knowledge.

The intentions of owners outside the IG and LGA groups, defined as **Other forest owners (OFO)**, were not sought directly because difficulties involved in identifying respondents could have led to double-counting. These owners include individuals investing independently, or through partnerships, joint ventures, trusts, etc.

Initial contact with respondents was by telephone, and responses were obtained by telephone interview where possible. Questionnaires were sent out if the telephone approach was not appropriate. Each respondent was asked to provide:

- (i) A bounded best estimate (ha) of annual new planting intentions, by species, for each of the five years from 1996 to 2000; and 2010.
- (ii) A bounded best estimate (ha) of the anticipated rate of new land planting during the period 2001-2010.

Additional questions sought information about:

- (a) net stocked areas (ha);
- (b) areas of new land planted in 1994 and 1995 (ha);
- (c) time periods used for planning new land planting (years);
- (d) extent of land banks secured for planting (ha); and
- (e) anticipated rotation lengths (years).

New land planting intentions of the IG and LGA groups were obtained for their own forest holdings only. Estimates of planting intentions for these two groups were obtained by summing data from individual responses. The mean of estimates for nationwide new land planting intentions was used to describe the overall response from the IE group. Estimates of new land planting intentions of the OFO group were derived as the difference between the IE group response and combined (i.e., summed) estimates for the IG and LGA groups.

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<sup>2</sup> This research would not have been possible without the willing cooperation of the respondents - in many instances, these extremely busy people provided confidential and commercially sensitive information. The support of the New Zealand Forest Owners' Association is also gratefully acknowledged. Planning undertaken by David Evison and Gerard Horgan in the early stages of this research contributed significantly to the efficiency of the survey. The efforts of Paddy Hodgkiss in seeking and obtaining respondent participation were essential to the successful completion of the project. Mark Kimberley assisted in deriving estimates for the upper and lower bounds by ownership category, and Ken Kliischer and Ruth Gadgil provided invaluable editorial and style advice.

Methods used to analyse the bounds about individual estimates depended on the defensibility of an assumption of independence of responses within each group. Because it seemed likely that common sources of information and peer group discussion would influence IE responses, the upper and lower bounds for this group were calculated as simple arithmetic means of individual estimates. The IG and LGA respondents were considered to be using information that would not be available to other individuals within their groups. This allowed the definition of more accurate group bounds by calculation of the root mean square deviation from individual estimates.

RESULTS AND DISCUSSION

In terms of survey coverage, a total of 58 responses (IG: 24; LGA: 29; IE: 5) were received. These became the basis of the estimates for the new land planting intentions reported here. Few of the industry experts contacted felt confident about making the necessary large-scale predictions. It was clear that some had consulted colleagues and that their responses represented the views of more than one individual.

Comparison of the survey coverage with the National Exotic Forest Description (NEFD) of April 1, 1994 (Ministry of Forestry, 1995) indicates that data had been captured for 92% of the area owned by the IG group and 83% of that owned by the LGA group (Table 1).

Table 1 Coverage for new land planting intentions survey

Ownership group	NEFD Coverage <sup>1</sup> (ha)	Survey Coverage <sup>2</sup> (ha)	Coverage <sup>1</sup> as a % of NEFD
Industrial growers	1,115,179	1,024,824	92
Local government	55,875	46,576	83

- Notes:
1. National Exotic Forest Description as at April 1, 1994 (Ministry of Forestry, 1995)
  2. Based on ownership at December 31, 1993 and excludes reported new land planted in 1994

Estimated areas of new land planting for the period 1994-2010 are presented by ownership group in Table 2. (Survey estimates for 1994 were used to adjust the area coverage data presented in Table 1.) NEFD actual data for the period 1991-94 are also included in Table 2 for comparison. Overall, the 1995 survey estimates were consistent with ownership trends in the NEFD data since 1990. An exception was the IG estimate for 1994 which was substantially lower than that reported by NEFD. This discrepancy can probably be attributed to a difference in the degree of coverage, particularly that relating to small private companies.

Length of period over which planning for new land planting extended was similar (10-11 years) in IG and LGA groups (Table 3). Planning horizon lengths were not specified by all respondents, but many suggested that they were related to anticipated rotation lengths. Because overall horizon lengths were calculated as unweighted averages, data in Table 3 should be regarded as indicative rather than definitive.

Table 3 Planning horizon for new land planting intentions

Ownership group	Planning horizon (years):		
	Min.	Mean	Max.
Industrial growers	1	11	35
Local government	1	10	40

Table 2 Estimated areas of new land planting, 1994 - 2010

Year	All ownership groups	Industrial growers	Local government
1990	15.8	9.5	1.2
1991	15.4	7.2	1.6
1992	50.2	7.7	1.3
1993	61.6	12.0	1.1
1994	98.2	23.1	1.5
1994	n.a.	12.4	1.8
1995	n.a.	22.6	1.3
1996	71.7	26.9	2.0
1997	70.3	30.1	1.6
1998	66.6	30.0	1.5
1999	66.7	17.9	1.2
2000	65.8	17.6	1.1
2001-10	56.5	15.7	0.3

n.a. = not applicable

- Notes:
1. Shaded area is actual data from the NEFD as at 1 April 1995 (Ministry of Forestry, 1996)
  2. Unshaded area based on survey results; calendar years

Rotation length estimates for groups were also produced. They were calculated as unweighted averages and should be regarded as indicative only. They varied with species, ownership group, and management intentions, and individual responses tended to lie within a range of five years about the group mean value (Table 4). Only the IG group intended to produce pulplogs, and new land planting intentions of the LGA group were confined to softwood species. There were no indications of eucalypt planting for sawlog production.

Table 4 Rotation length (years) for new land plantings

Species	Anticipated rotation length (years):					
	Industrial growers			Local government		
	Min.	Mean	Max.	Min.	Mean	Max.
Sawlog production:						
Radiata pine	25	28	30	25	29	31
Douglas-fir	43	46	55	27	52	80
Other softwoods	35	41	45	38	43	50
Eucalypts	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Other hardwoods	40	40	40	n.a.	n.a.	n.a.
Pulplog production:						
Radiata pine	14	14	14	n.a.	n.a.	n.a.
Eucalypts	10	13	15	n.a.	n.a.	n.a.

n.a. = not applicable (because of no new land planting intentions)

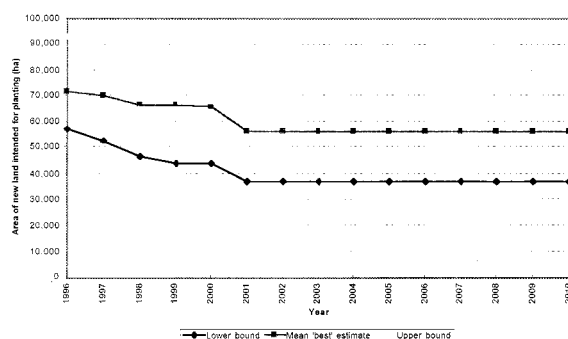
Land bank areas exceeding 50,000 ha for the IG group and 8,000 ha for the LGA group were reported (Table 5). Data on management intentions for land banks were not collected, but it is likely that much of the land will be planted during the 1996 and 1997 calendar years.

Table 5 Land bank area secured for new land planting

Ownership group	Land bank area (ha)
Industrial growers	50,639
Local government	8,140

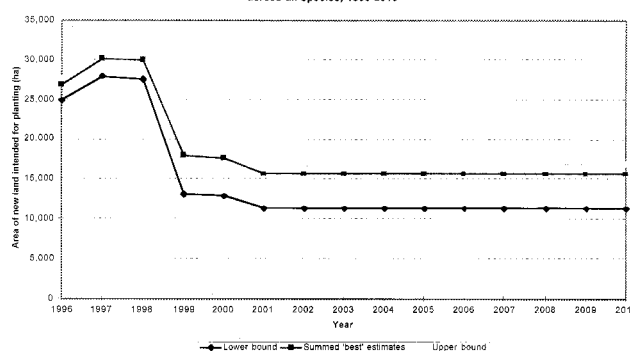
New land planting intentions by ownership group show that industry experts predict that nationwide new land planting intentions for all species and ownership groups will decrease from 71,650 ha in 1996 to 65,000 ha in 2000. New planting will then level out at 56,475 ha/yr between 2001 and 2010 (Figure 1). It should be noted that planting intentions levelled out over the 2001-10 period because respondents were requested to estimate mean annual values over this period rather than on a year-by-year basis. The upper bound of the overall estimate was found to lie just above 90,000 ha/yr for the whole 1996-2010 period, whereas the lower bound declined from about 58,000 ha in 1996 to about 38,000 ha/yr between 2001 and 2010. The upper bound was further from the mean than the lower bound, indicating that respondents expected their intentions to be over- rather than under-achieved.

Figure 1: New Zealand-wide new land planting intentions across all ownership groups and species, 1996-2010



Trends in the new land planting intentions of the IG group are discussed in detail below, but it is worth noting here the relative distances of bounds from the mean in Figure 2. These suggest that respondents in the IG group anticipated under-achievement of their individual estimates. By comparison, LGA new land planting intentions were modest at less than 2000 ha/yr, and there was an indication of expectation of slight over-achievement (Figure 3).

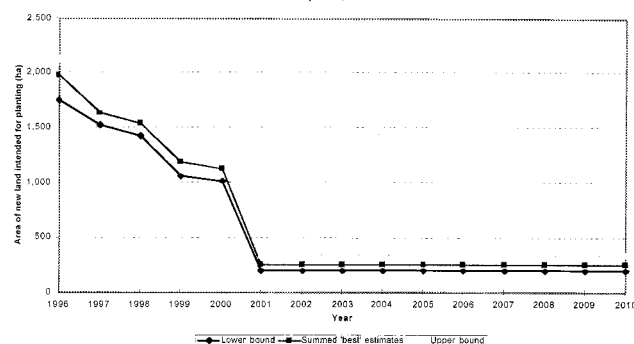
Figure 2: New Zealand-wide new land planting intentions for industrial grower ownership group across all species, 1996-2010



By subtraction, new land planting intentions of the OFO group appeared to be greater than those of the IG or LGA groups. From 2000 onwards a rate of about 40,000 ha/yr is expected, which is twice as great as that anticipated for the IG category (Figure 4). The relative positions of mean and bounds in Figure 4 suggest that estimated intentions are likely to be over- rather than under-achieved. The relatively large distance between mean and both bounds when compared with those for IG and LGA groups (Figures 2 and 3) indicates some lack of confidence in the mean value.

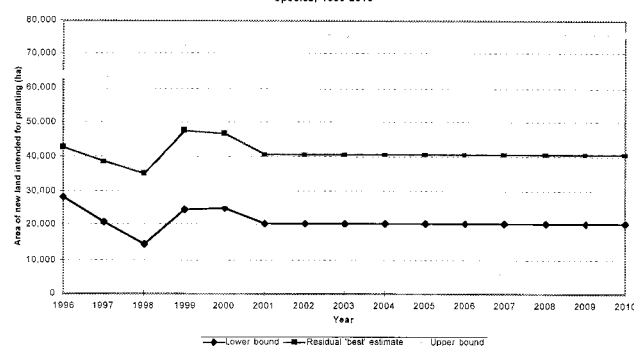
Fluctuations in 1996-2000 new land planting intentions estimated for the OFO group (Figure 4) are due to calculation of esti-

Figure 3: New Zealand-wide new land planting intentions for Local government ownership group across all species, 1996-2010



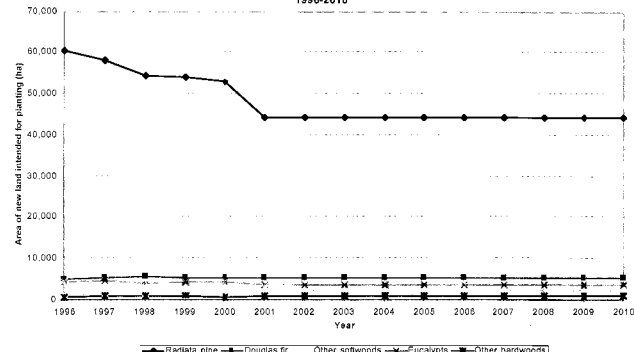
mates on an annual basis, and can, to a large extent, be traced back to data for the IG group. After an initial increase in IG intentions to about 30,000 ha for 1997 and 1998 (Figure 2), a marked drop was indicated to about 18,000 ha for 1999 before the anticipation of levelling off at 15,000-16,000 ha/yr during the 2001-10 period. The sudden decline of 12,000 ha between 1998 and 1999 may be related to the size of the land bank held by some of the group members. Much of the new land intended for planting in 1996-97 appears to have been already acquired (Table 5); later planting is likely to depend on land availability.

Figure 4: New Zealand-wide new land planting intentions for 'Other' ownership group across all species, 1996-2010



Nationwide new land planting intentions for all ownership groups by species are presented in Figure 5. Expectations are that radiata pine will continue to occupy the greatest area, although this area will decline from just over 60,000 ha in 1996 to about 44,000 ha/yr between 2001 and 2010. The area intended for Douglas-fir and eucalypts appears to be fairly constant over the whole 1996-2010 period. Areas intended for softwoods and hardwoods are very small and do not exceed 2000 ha/yr.

Figure 5: New Zealand-wide new land planting intentions across all ownership groups by species, 1996-2010



New land planting intentions by species and ownership group show that most radiata pine planting on new land is likely to be carried out by members of the IG and OFO groups, with the OFO

group likely to involve the greatest area. The LGA intentions account for less than 5% of all anticipated radiata pine planting on new land, and their intentions with respect to other species are also very small. The bulk of Douglas-fir and eucalypt planting is expected to be undertaken by the IG group, while most new land planting with other softwoods and other hardwoods is likely to be carried out by the OFO group.

From this survey, forest owners in the OFO category appear to have the greatest new land planting intentions. NEFD estimates support this conclusion, which indicates the increasing importance of the group in terms of ownership of the national forest estate. The NEFD data are known to underestimate forest land ownership in this category (Ministry of Forestry, 1996). Very little is known about the OFO group. More precise knowledge of its composition is vital if potential impacts on forestry issues of national significance such as carbon storage, afforestation, management practices, forest health, and wood supply are to be assessed and used as a source of accurate information for the industry as a whole.

## SUMMARY

A survey of New Zealand industrial forest growers, local government authorities and industry experts was carried out to ascertain new land planting intentions (to the year 2010) for use in carbon modelling work. Industry experts expect nationwide intentions of all ownership groups for all forest species to decrease from about 72,000 ha in 1996 to nearly 66,000 ha in 2000, and to level out at about 56,000 ha/yr between 2001 and 2010. It is anticipated that more than 80% of the area involved will be planted with radiata pine. New land planting intentions of individual owners, either independently or through partnerships, joint ventures, trusts, etc., are expected to exceed those of either industrial growers or local government authorities, and to decline from about 43,000 ha in 1996 to 41,000 ha/yr between 2001 and 2010. Little is presently known about the composition of this group, even though it owns an increasingly large proportion of the

national exotic plantation forest estate. Estimates of the new land planting intentions of the industrial growers indicated a drop from about 27,000 ha in 1996 to 16,000 ha/yr between 2001 and 2010. New land planting intentions of local government authorities were very small.

The new land planting estimates obtained from this survey are consistent with NEFD data on new land planting (Table 2). They are, however, considerably lower than the 100,000 ha/yr "vision" promoted four years ago by the Minister of Forestry (Falloon, 1993), and equate with the lower end of the Ministry of Forestry range of new planting estimates (50,000-150,000 ha/yr) reported by Forbes and SriRamaratnam (1995).

Radiata pine has dominated new land planting by all ownership groups since 1990, and the survey results agree with NEFD data in this respect (Table 8). In the future, an increased proportion of new land planting is likely to involve species other than radiata pine, particularly Douglas-fir and hardwoods (primarily *Eucalyptus* species). Annually, areas of new land planted with these species will remain small in relation to those planted with radiata pine.

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# INSTITUTE NEWS



## NZIF President's report

### 1998 AGM

Preliminary organisation is under way for the 1998 NZIF AGM and Conference to be held in Wanganui. The May NZIF Council meeting was held in Wanganui at the Regional Council Offices and included a discussion with the Mayoral Forestry Working Party covering the forthcoming conference and other general forestry issues of concern in the region.

### Issues from 1997 AGM

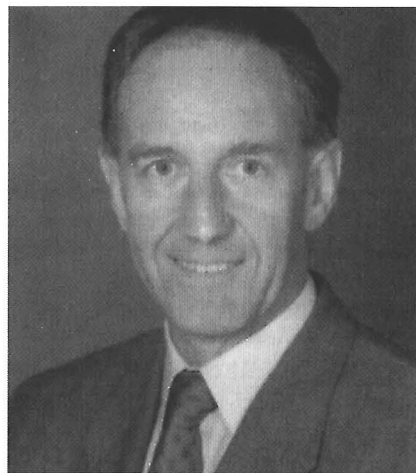
Council has been progressing some of the issues raised during the 1997 AGM in Rotorua.

With regard to forest policy – the current focus has been to get the draft indigenous forest policy document completed ready for circulation to members for final consideration prior to adoption at the 1998 AGM. The future of the existing (1979) NZIF Forest Policy will need to be resolved, but at this stage it appears that the indigenous policy will nest within the broad tenets of the existing policy in the meantime.

The AGM asked that the Council consider setting up a Resource Working Group to pull the previous initiatives of sustainability etc into a broader resource monitoring objective. Current work is focused on encouraging the ongoing Land Cover Database initiatives, which at this stage is indicating significantly increased areas of both indigenous and exotic forests within New Zealand. Clearly such fundamental resource information needs to be firmed before looking again at the measures and reporting of forest sustainability, particularly exotic forests.

### NZ Forest Accord and Principles

The NZIF letter to the Forest Accord partners conveying the resolutions from the 1996 AGM received a very negative reception from a meeting of the Accord partners held in June. To some extent the reception was influenced by the firm tone of the NZIF letter and also other matters on the agenda. However, it is also clear that the NZIF concerns have been well noted and we will have



John Galbraith

a further opportunity to discuss the NZIF position at a meeting of the Accord partners in late August. Council is also mindful that the first object of the Institute is: "to be an independent advocate for forestry" and the NZIF needs to be careful about signing up to particular positions which may constrain its independence in the future.

John Galbraith  
President