

# **Small Scale Forest aggregation is the key to the expansion of processing capacity and adding value.**

by **Hamish Levack**

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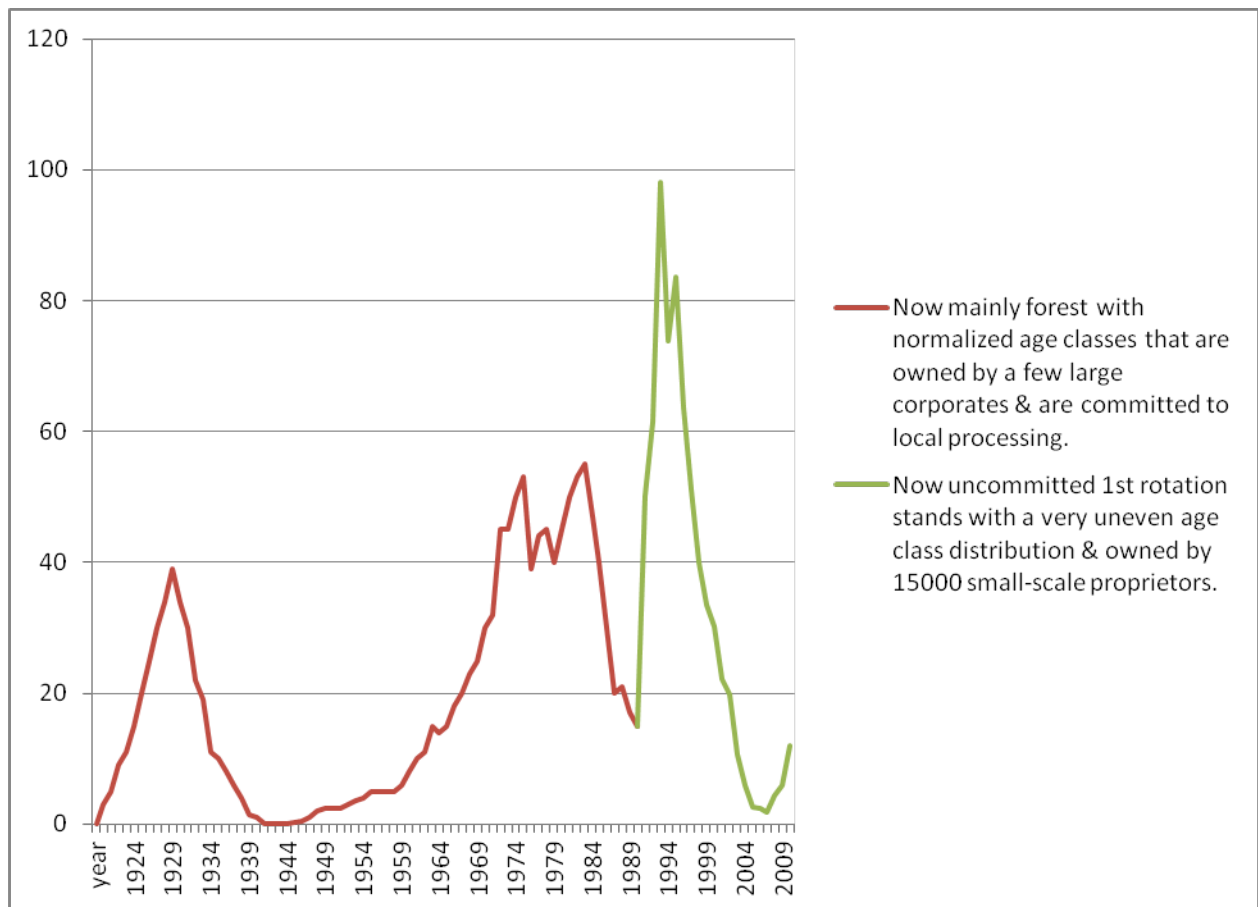
## **Summary**

*Half a million hectares of uncommitted maturing radiata pine will provide New Zealand with a major expansion in wood supply from the 2020s. They are owned by 15000 small scale forest owners, a small scale forest owner being defined as the owner of 1000 ha or less. The expansion will provide an opportunity for adding substantial value by further processing the logs before the wood is exported. It is estimated that dozens of export-scale mills and tens of thousands of new jobs could result, but this opportunity can only be realized if the national new planting rate is increased to 20,000 ha p.a. and the owners of these new plantings and the existing small-scale forests can somehow be aggregated into entities big enough to manage their harvesting so that a steady and continual supply of raw material to the new mills is guaranteed. The current multiplicity of owners, the asymmetry of the forest age classes (almost all of it being planted within a 6 year period), and current forestry taxation anomalies militate against this. Most of the small-scale forest owners do not know each other, and have yet to think about how it would be best to harvest, transport, process, and market the products from their forests. Most are unaware that profitability will be maximized if they cooperate to achieve scale economies, and a sustainable cut. Notwithstanding this, a transformation of this “wall of wood” into a sustainable yield is possible, but there needs to be a paradigm shift in awareness by both Government and the forest owners. The Government may need to provide more incentives to ensure that the new planting rates are stepped up to the right levels in the right regions. This can be justified on the basis of the off-site community and environmental benefits alone. The forestry sector also needs to work with Government to ensure that all the small scale owners are identified and engaged with, and that the tax anomalies, that prevent the aggregation of their forests, (be it directly, or be it via the formation of effective harvesting and marketing cooperatives), are circumvented or nullified. If this does not eventuate, do not rule out the Government stepping in and regulating the private forest cut. After all, we already have legislation in NZ that requires private indigenous forest to be managed sustainably according to Government approved plans, and laws requiring pre-1990 plantation forests to be regenerated. Furthermore Government could cite several OECD countries that have government regulations stipulating how, where, and in what quantities privately-owned wood may be cut.*

## Introduction

Fig 1 below is a familiar MAF graph showing national new planting since 1920, but expressed in a new way. The red line represents the part of the national forest estate which is currently mostly owned by a few large corporate entities, which has now mostly been replanted and transformed into an even distribution of age classes, and which currently provides for the regular sustainable wood supplies that feed New Zealand's existing wood processing plants and the log export industry. In contrast, the green line is almost all owned by small scale forest proprietors, (these being defined as entities that own less than 1000 ha), and currently is mostly uncommitted, first-rotation forest. MAF estimates that these 'green line' plantings are owned in small-scale forest holdings by 15000 proprietors.

**Fig 1: National new forest planting 1920-2011 in thousands of ha p.a. versus year.**



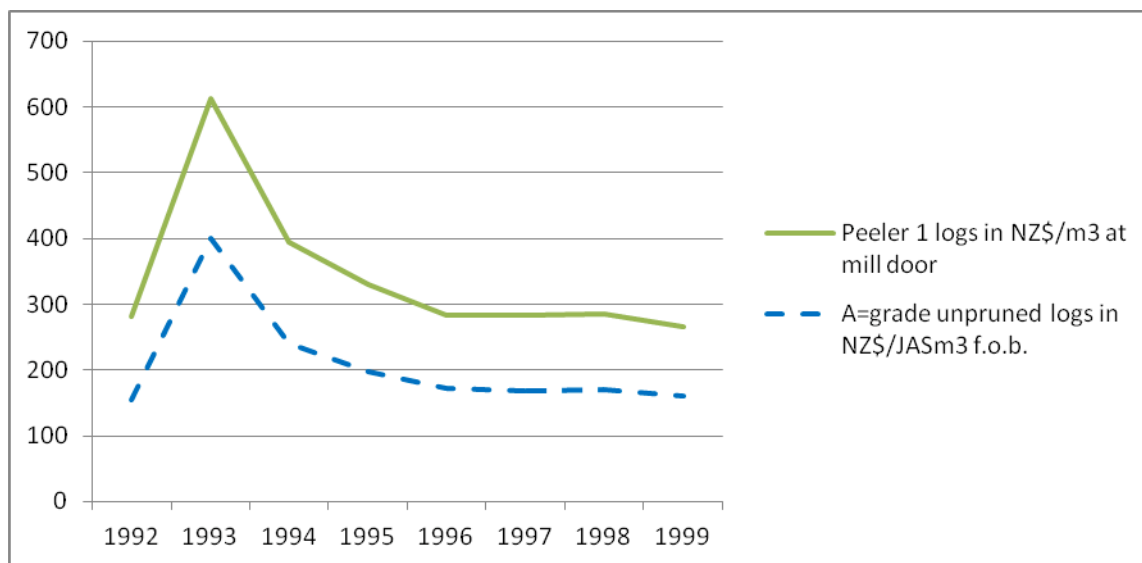
### How did this change come about?

By the late 1980s more than 90% of the national plantation forest was owned by the Government and a few large private companies. Up until then large organizations had done almost all the new planting. The first surge in new planting, which was a largely a result of employment creation

schemes during the great depression, was followed by the dearth of afforestation during the war and immediate post-war years because of a lack of labor. This dearth was balanced by greatly increased new planting rates from the late 1960s to the 1980s, more than half of it being carried out by the New Zealand Forest Service on behalf of Government, but then Government decided to sell its plantations. Instead of doing any more new planting, the existing large private forest companies geared up to buy these Government-owned forests at what they hoped would be bargain prices.

While Government was preparing, and then selling, its forests, much wider changes were taking place, including the extensive liberalization of financial capital and other markets, the lowering of trade protection, a floating of the exchange rate, fiscal restraint, monetary deflation and a radical liberalization of the labor market. Many of these reforms made new planting a more attractive investment. The labor and transport sectors had become more cost efficient, interest rates came down and rural land, no longer held up by agricultural subsidies became cheaper for forestry, at least for a while. Furthermore the RMA was introduced, which meant that it was more difficult for planners to arbitrarily exclude forest establishment from zones that had previously been deemed ‘too good’ for forestry. Because of these reforms, many people perceived that investment in small-scale forests would be profitable. This perception was enhanced by a sudden rise in log prices in 1993 [see Fig 2] which was caused by the simultaneous collapse of wood supply from Russia due to political regime change, and the locking up of much of the USA forest for nature conservation. However by 1999 log prices had fallen back to low levels. It can be seen from Fig 1 that enthusiasm to invest in new planting mirrored this rise and fall in log prices. The lesser down and up of new planting rate over the last decade will be discussed later.

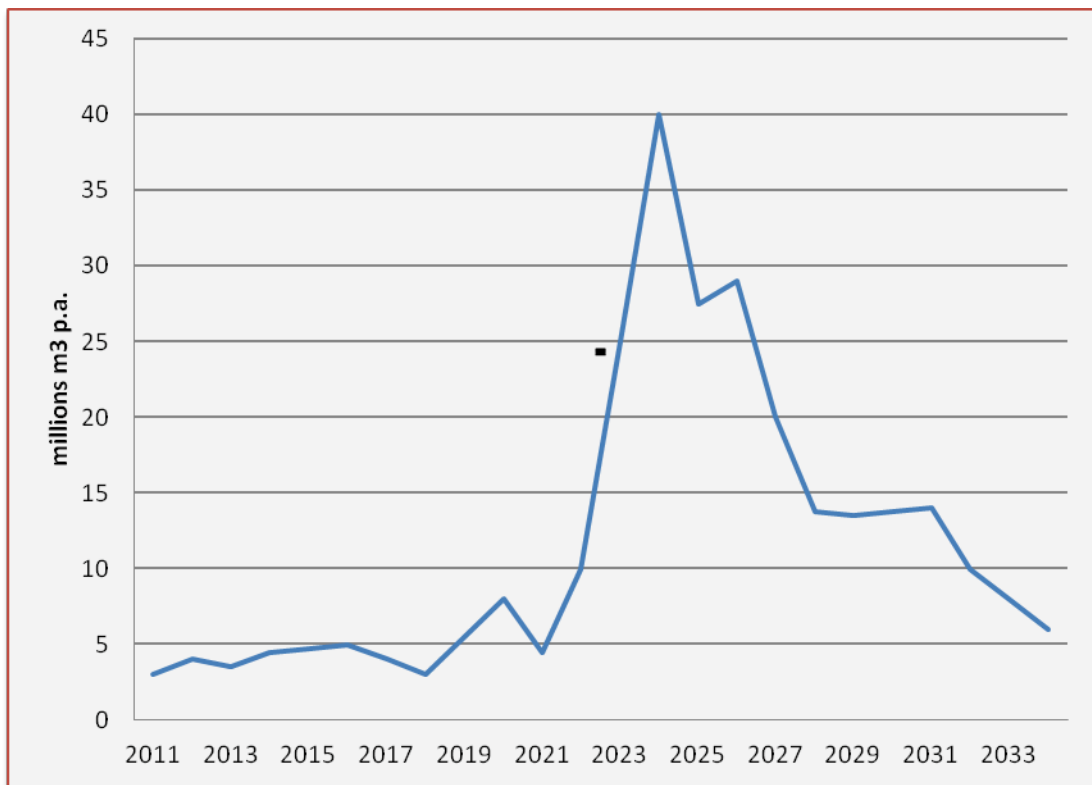
**Fig 2: The log price spike that incentivized small-scale private new planting in the 1990s.**



### The upcoming harvesting spike of the 2020s.

New Zealand's current round-wood harvest is about 21 million m<sup>3</sup> p.a. Based on owners harvesting their pine trees at 28 years, which is the rotation of maximum theoretical profitability, this cut is forecast to increase only a little until about 2022 but then leap to nearly 55 million m<sup>3</sup> p.a. by 2024, followed by a fall back to about 28 million m<sup>3</sup> p.a. by 2030. Such a spike in harvesting follows from the surge in new planting described by the green line in Fig 1. The effect this would have on the national timber yield from small scale forest owners [Note only small scale forest owners] is described on Fig 3.

**Fig 3: Harvest yields if Small Scale Forest Owners cut their forests at age 28 years.**

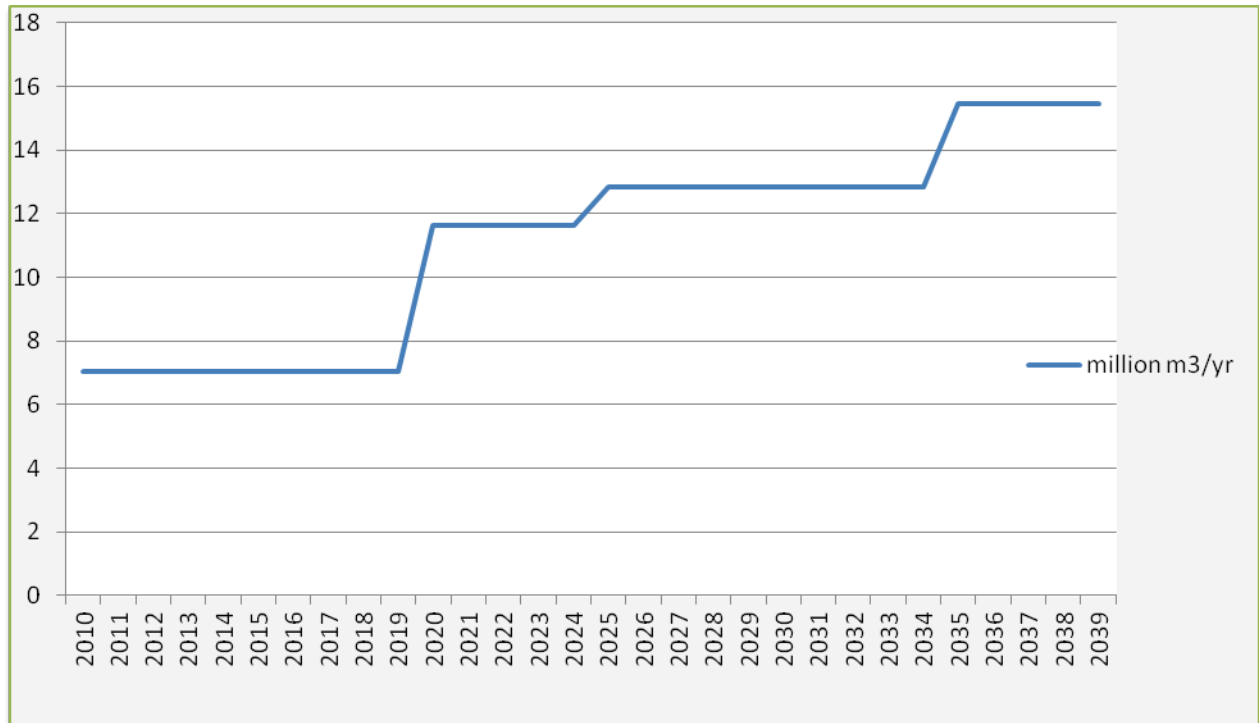


Because of infrastructural bottlenecks and shortages in machinery and skills, industry will not be able to cope with a near-trebling of the annual cut in two years, but even if only a significant proportion of this spike in harvesting occurs it will depress profits for some time. A flooded market will reduce revenue and a shortage of logging gangs and congestion will increase costs. Other disadvantages will be social disruption and a blow-out in Government's greenhouse gas budget, but the biggest drawback will be the loss of opportunity to attract investment in local timber processing. If the Fig 3 spike in harvesting was to happen, almost all of the logs would be exported without further processing.

However this does not have to happen. The harvesting spike could be transformed into a sustainable yield if new planting rates were increased to 20,000 ha p.a. over the next decade and

small scale forest owners spread their tree harvest age from 25 to 35 years. The outcome of such a possibility is described on Fig 4.

**Fig 4: The harvest spike described in Fig. 3 can be converted to a non declining yield if new planting rates are increased to 20,000 ha p.a. and small scale forest owners spread their tree harvest age from 25 to 35 years.**



**What would an increased sustainable cut of, say, about 12 million m3 p.a. in the 2020s mean?**

What would a sustainable cut of, say, about 12 million m3 p.a. in the 2020s, as described in Fig 4, mean? It would still be a massive increase in wood supply. In fact it would be equivalent to more than New Zealand's total annual timber harvest in 1990, and it would allow current wood processing capacity to double.

There is a range of ways in which such a sustainable yield of uncommitted wood could be processed. Factors, like the proportions of the harvest that will be available from different regions, the availability of industrial water, local difficulties in mitigating pollution, and general economics will affect what a practical configuration of processing plants might be but Fig 6 gives an indicative idea of what the logs could be transformed into before they are exported, this being based on an assumption that the logs will be processed by modern export-scale mills in the categories described on Fig 5.

**Fig 5. Input of wood, output of products, and employment generated by modern export-scale<sup>[‡]</sup> mills of different categories.**

Mill category [§]	Input (000m3) p.a.	Log types	Output (000m3) p.a.	Construct- ion phase FTE	Operation phase FTE p.a.	Comment
Large sawmill	400	sawlogs	202	100	65	framing mill (2-shift) uses S1/S2, L1/L2, and S3/L3
Plymill	132	pruned	60	200	60	Uses only P1/P2
Fibre- board mill	176	pulp (& saw mill residues	100	400	65	uses pulp logs, residues, S3/L3
			<b>000 t.p.a.</b>			
newsprint mill	583	pulp (& saw mill residues	210	1500	220	uses pulp logs, residues, S3/L3

Footnote [§]: From Page 100. New Zealand Forest Industry Strategy study 1992 by M J Edgar, D Lee and B P Quinn. NZ Forest Industries Council.

Footnote [‡]: One of the matters noted in Woodco's "...Forest Industry strategic study 2011" was that any new processing industry has to be internationally competitive with world-scale processing facilities, like those in Fig 5 above. Whether such investment is in existing process technologies, such as solid wood, panels, pulp and paper, or in new technologies such as bioenergy, bio-fuels, or wood-derived chemicals, the need for scale to be internationally competitive will be substantial.

**Fig 6. One possible configuration of modern export-scale mills, (as described in Fig 5), which could result from harvesting small scale forests in the manner described in Fig 4.**

Wood type	million m3 p.a.	Number Large sawmills	Number ply-mills	Number newsprint mills	Number Fibreboard mills	FTE <sup>[†]</sup> /yr Construction phase	FTE <sup>[1]</sup> /yr operational phase
peeler logs, i.e P1/P2	1.4		11			2151	645
Saw logs S1/S2, L1/L2, & S3/L3	7.9	20				1986	1291
sawmill residues	4.0						
'Pulp' logs	2.6						
Pulplogs +residue	6.6			2	31	3,000 12,371	440 2,010
Total logs	12.0						
<b>Total FTE</b>						<b>19,508</b>	<b>4,386</b>

Footnote: [†] FTE = full time person equivalent job

Tens of thousands of direct jobs from the construction and running of all the mills described in Fig 6 would not be the only benefit. Almost as many indirect jobs would result. There would also

be substantial fiscal savings in unemployment benefits, large boosts to regional economies and eventually an increase of billions of dollars in foreign exchange earnings.

### **Steps that need to be taken to convert the harvest spike of the 2020s to a sustainable yield.**

However two critical steps need to be taken if any of these benefits are to be realized.

#### **Step one: Accelerating the new planting rate.**

The new planting rate needs to be increased to at least 20,000 ha p.a. Fig 1 shows that the new planting rate drifted down almost to zero in 2007. This was a response to a downward trend in log prices. However since then, almost entirely due to the following Government initiatives, the line has lifted, reaching 12,000 ha p.a in 2011.

- The introduction of the Emissions Trading Scheme [ETS].
- The permanent forest sink initiative [PFSI]
- The Afforestation grant scheme [AGS]
- Continuation of the East Coast Forestry Project [ECFP]
- The SLM hill country erosion programme. [SLM]

Although it involves measurement costs and risks, the ETS is likely to have provided the biggest impetus to recent afforestation rates because it was perceived to increase an investor's return substantially by bringing forestry income forward. However a major collapse in the price of carbon, another downturn in export timber prices in 2011, and the parking of the AGS, is likely to mean a substantial reversal in the new planting rate next year unless Government provides further incentives.

By introducing the initiatives listed above, Government has acknowledged that new planting is desirable because of its off-site community and environmental benefits, but a management deficiency has been that its targets are unspecified. The forestry sector needs to challenge this lack of Government clarity and lobby to have a national new planting target of 20,000 ha p.a. split by regions.

#### **Step two: Aggregating small scale forests into much larger management units.**

The many thousands of small scale forests planted since 1990 need to be aggregated into much larger management units if sustainability of wood supply, (and at the same time substantial economies of scale at the forest level), are to be achieved, i.e. the owners will need to organize themselves so that their forest cut is managed rationally at tree harvest ages ranging between 25 and 35 years.

Some argue that, under free market conditions, such aggregation will occur naturally. After all, Fig 1 indicates that New Zealand coped with a spike in new planting before. The national new planting rate surged from a few thousand ha p.a. to 37 thousand ha p.a. by 1930 and then rapidly

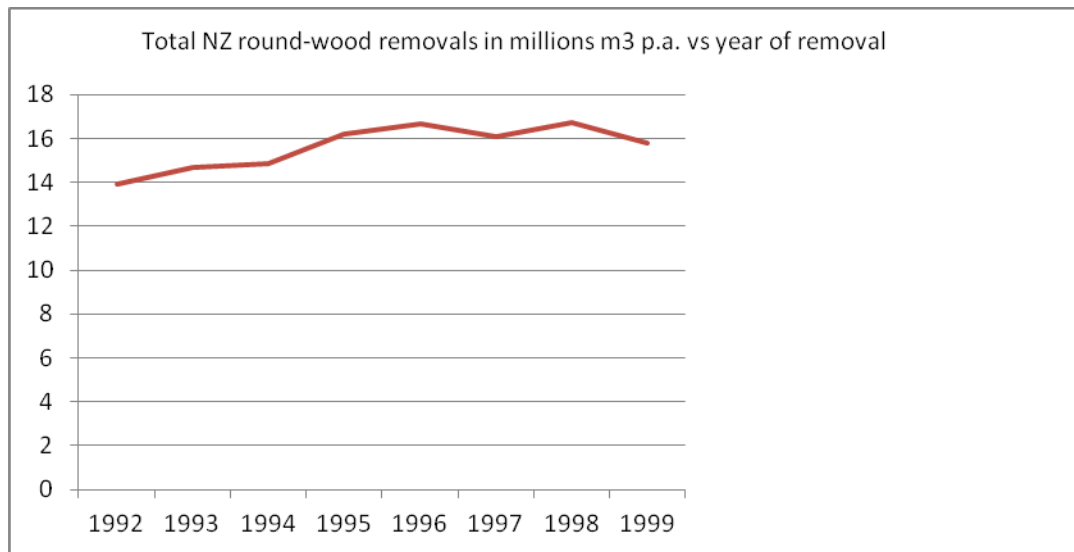
dropped back to the old level, staying there for 25 years, but the implied surge in harvesting from about 1 million to 18 million m<sup>3</sup> p.a. in the late 1950s did not happen because the supply spike was converted to a sustainable yield by (a) letting the age that the trees were harvested climb to 55 years, and by (b) greatly increasing the new planting rate.

However, the very different ownership structure that existed then made such management easy. Half of the depression-planted forests were owned by the Government and almost all the remainder was owned by a few large companies that merged to become NZ Forest products Limited. In contrast, the uncommitted wood that is coming on stream now is owned by 15000 small scale forest owners, of which around 14,000 hold less than 100 hectares each. Typically these small-scale forest owners do not know each other, and have yet to think about how it would be best to harvest, transport, process, and market the products from their forests. Usually they are not members of any forest industry organization, and have a naïve attitude that it is best to remain completely independent, cutting their forests “*when the price comes right*”. When a sample of owners were asked whether they would be interested in joining with others to keep down the costs of harvesting, most argued that they were disinclined to pass the control, of when to harvest their trees, to a cooperative. Trees keep on growing they pointed out, and being able to choose when to harvest is worth a great deal, i.e. one can wait until log prices are high before cutting begins. They did not know that in practice such dreams are almost never realized. Typically, owners are unable to get their wood to market at the time of a log price rise because of the factors that limit production. Fig 7 proves this point. The halcyon log price spike of 1993, described in Fig 2 did not result in a significant increase in the national harvest rate because of port bottlenecks, the time it takes to ramp up the skills that are needed, the lack of machinery, and other infrastructural constraints. Just to get harvest-ready often takes 2 years. Moreover the decision to get harvest-ready is often postponed on a rising market in the hope of even better prices.

A much better idea for the forest owners would have been to have gained economies of scale by having formed a forest cooperative. The economies include reduced risk, reduced operating costs, greater market leverage, the ability to attract additional local timber processing, and (depending on how the cooperative was structured) more liquidity. Don King estimates that the net return to the grower by being part of a collective that controlled as little as 300 hectares of maturing pine that was harvested in sequence would mean an increase in profit of between 15 and 33% to the grower. Generally that might translate into increased net income of \$3,000/ha.



**Fig 7: The 1993 spike in log prices [see Fig2] did not result in a spike in forest harvest rates.**



### **Current tax laws are a disincentive to forest consolidation.**

There would be an administrative cost in running a co-operative that would reduce the benefits noted above, but the biggest impediment to forming co-operatives may be the Income Tax Act 2007. This says the seller must declare the sale of standing timber as income when it occurs, whereas the buyer must carry the 'cost of timber' in an account until he 'disposes of the timber' by sale or harvesting. This 'Cost of Bush', as it is commonly known, can create irreconcilable differences between buyers and sellers when engaging to trade forests and is particularly pronounced for forests with no early income.

For example, if someone buys a 15-year-old mid rotation forest and does not harvest it until year 30, the cost of purchase is only deductible against the revenue obtained from that forest in 15 years' time. Say inflation averages 2% p.a. then the buyer's purchase price will decrease in real value by 26% over the 15 years before it can be deducted. Not having the benefit of early deductibility also means that the buyer has to pay more for raising the necessary funds, i.e. he has to pay interest for 15 years on money that he would otherwise have recovered from tax deductibility. If a 3% real interest rate applies, then the buyer suffers a 17% penalty arising from the time cost of money on the tax element, which is on top of the 26% loss of deductibility caused by inflation.

This disconnection is peculiar to forestry, scarcely any other commodity having such a long stock turn time. It means that immature forests are worth much more to a seller than to a buyer, even if the buyer and seller have identical perceptions of the trees' future growth, harvest value and discount rate. This explains why there is currently no interest in exchanging cutting rights for shares in a forest cooperative.

## So what needs to be done?

- **Translate the model, described in Fig 4, to several regional models to show that it is also feasible to have regional cutting plans that produce non declining yields. From this information determine the minimum regional new planting rates that would be needed over the next decade to achieve this.**

Although the Government has several incentives in place to encourage new planting it does not yet monitor regional progress or have planting targets. It has already been explained that new planting deserves Government encouragement because of its soil-and-water conservation, biodiversity, carbon fixing and other environmental benefits alone. The socio-economic benefits of being able to produce a sustainable yield of timber to a local processing plant is another justification for taking regional new planting targets seriously.

- **Investigate the most cost effective way of identifying and building up a register of small scale forest owners.**

This information can already be extracted from the public domain in the form of satellite imagery, cadastral overlays, and rating schedules, but a cheaper method might be to collaborate with District Councils who, because of their responsibilities for emergency and infrastructural planning, also need to identify these owners. The New Zealand Farm Forestry Association is currently piloting this idea with the Kapiti Coast District Council. The information would also facilitate interaction with contributors to the forest owner levy system that the forestry sector is trying to develop.

- **Engage with the small scale forest owners**

This can be done by:

- a) Holding mutually advantageous meetings in collaboration with the District Councils
- b) Establishing a web site that provides one clear portal for the forest sector so that any forestry technical information that is wanted can be readily accessed, and in particular that information on the benefits of co-operatives and how to set them up can be assessed. Such benefits would not necessarily just apply to harvesting, replanting and new planting operations. They could also include the benefits of co-operating re marketing, forest certification, risk management and minimizing brokerage for carbon farming, forest protection, and discounts for contract work and materials. The shareholders of a forestry co-operative may also be able to fund the set-up of saw-mills and wood residue using plants.

- **Get around the ‘cost of bush’.**

Because an immature forest may never yield revenue that exceeds the compounded costs of its purchase, the Inland Revenue Department is against allowing immediate deductibility for the purchase of standing trees. This is a valid argument. The forest may blow over or burn down, or wood substitutes, or oversupply may drive down the price of wood in future. As a consequence the IRD is unlikely to agree that the ‘cost of bush’ be abolished.

The problem might be avoided. Perhaps it will be possible to negotiate successfully that a forest owner could exchange his cutting rights for shares in a cooperative provided the shares were not tradable, and the trees were not on-sold, before harvest. This would leave the IRD no worse-off than if the ‘cost of bush’ had applied; indeed, because of the scale economies arising as a result of cooperative formation, the Government should actually increase its tax revenue under such a regime.

Another way to get around the problem is to use a forestry derivative. Howard Moore has devised a way in which a forest owner can effectively forward-sell his harvest income by issuing a financial derivative based on the net present value of his forest, and redeeming that instrument again when the forest is cut. When he issues the derivative the forest owner is selling the forest investment return, not the standing timber. If shares in a cooperative could be issued in exchange for the derivative, and the co-operative had the right to control the date of redemption of the derivative (and hence the timing of harvest), it could regulate the harvest without having to own the trees.

- **Investigate Forestry Cooperatives in other developed countries.**

An in depth study of how forestry cooperatives function in other developed countries, and how adaptable these systems are to the New Zealand operating environment is needed. Preliminary study shows that landowners have cooperated successfully for decades in Scandinavia, Japan, France, and elsewhere. For example, according to LRF Skogsägarna 2002, roughly 28 percent of the annual wood harvest in Sweden comes from cooperative associations (Swedish Forest Industries Association 2001). Five of the six major associations have developed industrial capacity, and in year 2000 they produced 1.95 million cubic meters of sawn wood and 1.60 million tons of pulp. This represents approximately 12 percent of total Swedish sawmill capacity and 40 percent of raw pulp capacity.

Because a few large companies dominated the wood marketplace in the 1930s, private forest owners felt they could collectively negotiate a better price if they banded together and offered industry significantly larger volumes of wood, in an effort to increase price and market share. Although the objective of these associations was initially to counter the power of industry, they have become industrial themselves, and association members enhance their returns by adding-value. Together the six major associations represent 88,230 members and in excess of 6 million hectares.

## **Discussion and conclusion.**

The forestry sector needs to work with Government to ensure that the “wall of wood” is transformed from a spike into a sustainable yield by ensuring that the new planting rate is stepped up to at least 20,000 ha p.a., by identifying and engaging with all the small scale owners, and by circumventing or nullifying the tax anomalies that prevent the aggregation of their forests. If this is not achieved a huge opportunity to expand local timber processing and add value will be lost. If small scale forest owners are not proactive about organizing themselves there is a risk that eventually the Government will become aware of the socio-economic benefits foregone and step in to regulate the cut of all forests. This is not a far-fetched possibility. There is already legislation in NZ that requires private indigenous forest to be managed sustainably according to Government approved plans, and there are laws that require the pre-1990 plantation forests to be regenerated. Furthermore Government could cite several OECD countries that have government regulations stipulating how, where, and in what quantities privately-owned wood may be cut.

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