THE STRUCTURE OF FORESTRY
When will we be big enough to think small?

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ABSTRACT
Current forest ownership and wood industry conglomerations are placing New Zealand forestry in a corporate oligopoly structure. There is a case for resisting such development and seeking to maintain some diversity in size amongst the forestry sector. The substantive argument for smaller-scale independent forest units includes improved political representation and public image, more flexible wood supply, sharper management effectiveness, greater opportunities for reduced growing costs, maintaining a wider scope for innovation, and general social values. Achieving a wider diversity in forest-growing units could arise through co-operatives, deliberate policy insofar as disposal of State forest plantations is concerned or more imaginative organization management within the present large growers.

A CASE FOR THE SMALLER FOREST UNIT
This paper focuses on the social organization of New Zealand forestry, and more particularly forest growing, in a largely quantitative manner. I hope to persuade you to the view that an imbalance has developed in forest ownership, and that the current position warrants change.

Do we need more small growers in New Zealand and what role should they have?

Over the years foresters have taken an interest in the small grower and espoused a good deal of effort in the farm forestry arena. The prime purposes for such forestry interest have been multiple use encompassing shelter, diversification of farm income or simply better land use; only recently has forestry been advocated as a financially superior activity to agriculture.

This interest in the small grower quickened appreciably in the wake of the 1981 Forestry Development Conference where sectoral targets for afforestation were compared against actual and probable regional landbanks. Achievement of new land planting targets clearly required additional lands outside existing forest gates and pastoral lands were seen as the logical source. The potential was there as surveys of agricultural holdings indicated extensive vacant or poorly productive areas. Launching innovative legislation (Forestry Rights Registration Act 1983) to facilitate planting of areas by 'farmer's choice' seemed certain to result in an increased rural woodland estate and assist afforestation goals.

But times change and economic circumstances today challenge the confident planting targets of the 1970s and early 1980s. Loss of the Forestry Encouragement Grant Scheme and declining farm incomes make it clear that small growers are in a poor position to finance forestry activity. Government attitudes to forestry taxation continue to vacillate and do not encourage investor confidence. Afforestation now for timber harvest 20-30 years ahead offers little real income diversification for individual farmers or anyone else operating in an ailing business activity.

The second planting boom has run its course for some 15 years, but it has not generated a significant subsector of independent growers. Independent forest growers are typically very small-scale and associated with pastoral agriculture with a predominant income for the individuals concerned derived from outside forestry (Trotman and Lewis, 1984). There are few examples of sustained independent income through forestry—a 'forest-farm' if you like with regular annual income and expenditure through management of a normal or nearly normal forest.

The concept of forest-farms is not new and farm forestry folks especially have described and enthused over integration of forest and farm personal incomes as demonstrated by much of Scandinavia and to a lesser extent Europe. The evidence from New Zealand farm forestry (Meister and Smalter, 1983) or generally acknowledged is that farmers have established forests principally for multiple uses and not as a predominant source of income. Visible small forest units do not seem likely to emerge from traditional farm forestry forests because:

- stands are typically fragmented and poorly accessible;
- most stands are young and the age-class distribution is clumped;
- woodland size is small to the point of being limiting;
- harvesting often compromises farm management;
- owners are frequently ignorant of real values and the benefits/cost relationships of silviculture;
- farm labour is committed to agriculture and unfamiliar with forestry work;
- management is not forestry-oriented.

In any event current ownership of forest land seems hardly conducive to independent growers, judging by gross statistics. At 31 March 1995, New Zealand's plantation forests totaled 1,097,000 hectares (NZFS, Planning Division); present forest ownership is estimated to be:

State Forest 52%
Public and Private Companies 37%
Private Individuals 5%
Trusts/Societies, etc. 2%
Local Authorities 3%
Other Government Departments 0.8%
Unknown 0.2%

With the New Zealand Forest Service soon to become a State-owned corporation and given the small group of companies concerned with forest management, the position effectively is that 80% of our plantation estate is owned amongst five commercial entities. This oligopoly of forest ownership approaches a monopoly position in wood supplies for some regions. The stage is set for corporate forest-growing and corporate utilization and there appears to be little scope for the independent smaller grower and probably smaller industry. I view this situation with scepticism and concern.

There is increasing recognition that the much more competitive future facing the forestry sector will require improved cost-effectiveness in all operations and greater attention to efficient utilization and marketing. It appears to be widespread belief that such progress implies maximum aggregation of the forest resource into large, preferably contiguous blocks in order that resultant wood supply may be exactly matched.
to the optimum conversion process. Utilization efficiency relative to throughput is very arguable on current evidence. If we are
to draw valid conclusions on forest size and efficiency, good comparative data on growing
costs should be available but aren't.
In any case, to hear citizens of such a
small insignificant nation as New Zealand
give unquestioning support to 'economies of scale' and the necessity for 'big blocks' is
disquieting. Small is not invariably beauti-
ful but if this country is to succeed in an
internationally competitive arena like fore-
stry we need to sharpen and develop all our
skills, not rely on supposed economies of
scale. The discussion vacuum on what
might be an optimal basic structure for fore-
stry enterprise stimulated me to offer some
support to the smaller grower.

The substantive case for smaller-scale
forestry includes many facets:

(1) Representation and Image
Forest-growing, and to a lesser extent the
forestry industry, seems likely to continue
as a regional rural activity. Our country's
population is not well represented in rural and
ingovernmental corridors of power. Those
living in country areas or towns of less than
one thousand people. Government policies
for New Zealand and 'democratic' de-
cisions taken by Government directly mir-
or urban concerns and offer 'politically
acceptable' urban solutions. Nowhere is this
more apparent than in Government and
public attitudes towards forestry, particu-
larly forestry and the environment.

It is awkward for forestry to escape the
poor press accorded a juggernaut image
(corporate or departmental) with production
forests owned by so few organizations
and the forestry industry moving towards
multinational status. Economies of scale
may be real enough within the wood pro-
cessing industry and large capital invest-
ment may demand some security of supply;
nonetheless I believe our sector could im-
prove its public image greatly by encourag-
ing local family concerns and communities
and emphasizing their importance within
forestry. The remarkable public acceptance
of the pastoral farm unit illustrates the
scope for improvement.

Government's stance to forestry taxation
in both basic principles and mechanics, let
alone the demise of forestry incentives, re-
veals an underlying public ignorance of
forest management and an indifference,
even hostility, towards those whom the
public perceive to be directing the sector.
Taxation issues are political and will con-
tinue to be determined through interactions
of Treasury, Government and the forestry
sector where lobbying power is based direct-
ly on the assumed media presentation of the
issue and public response to such presenta-
tion. In this game it is very important to
have supportive numbers. The ordinary
rank and file of forestry are unaware of the
significance behind say taxation policy or
even general economic policy and typically
leave representation of their interests to
national unions or bodies. This does not
help advance New Zealand forestry.

(2) Wood Availability
Economic theories have difficulty in adjust-
ing from assumptions of perfect competi-
tion to the realities of monopoles, oligo-
polies and non-market price-setting. Like
others, I believe a more elastic supply-
demand curve in wood availability to be
healthy.

In some ways greatest competition would
arise from many processors bidding for the
supplies of a few growers. Present circum-
stances for wool processing favour sizeable
plants and this seems likely to continue for
the bulk of the annual cut. If timber sup-
ply continues to be negotiated short to
medium term sales, then an increased
number of independent forest units could
generate uncommitted parcels of wood on
to the market, introducing greater com-
petition and improved returns to growers.
However, I regard assumed increased re-
turns as exaggerated. Far more valuable to
the forestry sector are the improved pros-
pects for entrepreneurs to enter the wood
processing field either via acquiring rights
to small wood parcels or simply having the
confidence that wood can be procured by
competitive tendering. In most industries
entry into the marketplace is straightfor-
ward — if New Zealand wood conversion is
to reach its maximum, wood availability
systems is a vital aspect of sector planning.

(3) Management Effectiveness
The vigour of a large organization as judged
by its ability to formulate intentions and ob-
jectives, instil direction and achieve physi-
cal results is never easily determined. It is
obvious enough that an agreement on objec-
tives becomes more difficult and specialization may even lead
conflict. Resource allocation may be viewed
as unfair and unjust to activity managers
and impersonal quantitative results assess-
ments can raise doubts about overall orga-
nization purpose. Problems I have ex-
perienced related to organization size will
be unfamiliar to many others too:

— confusion over objectives;
— confusion over resolution of work activi-
ties that stem from the objectives;
— difficulties in allocating resources;
— concealed personal prejudice by man-
ger towards objectives;
— expenditure of undue effort by managers
in establishing their spheres of responsi-
bility;
— erratic or inconsistent delegation;
— confusion about specific control of
people;
— pervading stress through difficulty of
maintaining co-ordination and commu-
nication between widely spread people;
— inconsistent reference to policies or
guidelines and poor 'maintenance' of
such documents;
— difficulties in incorporating servicing sec-
tions that operate on manager request;
— undue concentration upon approval
procedures;
— confusion over differentiation between
urgent requests or tasks that come from
higher levels as opposed to achieving bas-
ic routine tasks vital to longer-term or-
ganization survival;
— difficulties in assessing individual per-
formance.

Production forestry exists now and will
continue in landscapes and localities where
non-production values are important,
maybe even predominant. Even the most
straightforward plantation will differ from
another forest in terms of age-classes, estab-
lishment problems, legacy of regitees, sale
commitments and so on. Integration of
forests and forestry's diverse and irrep-
sensible individuality within a few large orga-
nizations facing the inherent problems listed
above will be difficult.

(4) Improved Opportunities for Reduced
Growing Costs
If forest growing is concentrated in a few
commercial entities, these entities will be
very large. The Forestry Corporation in par-
ticular spans an extensive disjointed geo-
ographical area. Those responsible for
organization design should consider opti-
num sizes for forest management tiers as
well as total corporate size.

Bureaucratic procedures that do little but
add costs to production activities may de-
velop within any institution or organization
not just public agencies. The larger the size
and geographical spread of an organization
the greater the risk that inconsistent dele-
gation and autonomy to various tiers will
result in bureaucracy. Furthermore, most
people are aware of the incentive in Govern-
ment departments and agencies to simply
enlarge; in-house concern for management
efficiency rarely tackles size as a problem
or constraint (Morris 1985).

My observation is that the potential ad-
vantage of organizational specialization and
rationalization in forest-growing and to some extent
harvesting are often illusory because in-
evitably the quality and efficiency of forest
operations is set by the workers and work
supervisors at the forest face. Planning and
budgeting for work and the motivation and
supervision of forest workers is acknow-
ledged by top forest administrators as the
key to productivity though appropriate
recognition to individual forest managers
may be awkward to assign; paradoxically
recognition and promotion invariably
brings less involvement with direct work
supervision.

As more labour is employed and as lab-
our operations become more frequent in-
sidious dilution-by-distance comes to bear
on managers. This encourages use of sub-
stitute 'eyes-and-ears' and larger forests
have squads of quality control and moni-
toration staff monitoring and measuring
operations at significant cost basically to ensure operations do not derail. Similarly highly-trained specialists will toil with computers and digitizers in forest mapping, inventory and harvest planning systems simply because many MARVL inventories, cutting plans, yield control, supervision and payment procedures are greater than the comparable expenditure of a small grower who may walk-out a ten hectare felling block, mark the skid tracks, tally the 2929 trees to be felled, estimate mean tree size with the ‘Ready Forest Reckoner’ then supervise the contract gang daily for the five weeks it takes to harvest the year’s cut.

The point is: What constitutes a reasonable and efficient level of indirect costs and overheads? Forest managers are confident to set work and cost quantities over a range of silvicultural and logging operations based on work study, but how do we feel about the work content in managing and administering a plantation forest? New Zealand’s plantation forestry is recognized internationally for the sophistication of our technical understanding. We can simulate our forests from seedling to finished products using complex computer systems. The challenge now is how to arrange forest management so as to capitalize on the comparative advantage of our knowledge whilst costing an affordable few dollars per hectare per annum.

When economic evaluations of afforestation and/or restocking are calculated using realistic indirect costs and overheads (at levels incurred by many forests) these costs emerge as far more significant than the direct costs of planting and silviculture. Reducing overheads by a few dollars per hectare alters considerably internal rates of return and/or net present values equivalent to major savings in tending operations. Such a comparison does not prove indirect costs and overheads to be excessive but it illustrates the need to research and study this aspect of forest-growing.

(5) Maintaining Scope for Innovation
Effective application of applied forest science research relies upon a cadre of forest managers willing to prescribe for and implement change. Forest managers (including farm foresters) and the Forest Research Institute have combined well in the past two decades to develop and introduce major improvements to nursery practice, establishment, tending treatments and design of silvicultural regimes. Can we rely upon the Forest Research Institute to continue its contribution to efficient plantation management under a user-pays philosophy? Forest Service departmental structure gave considerable autonomy to Forests/Districts/Conservancies and the independent free-thinking spirit of many forest managers was advantageous to innovation and introduction of change. One wonders if centralization and/or unthinking may accompany Forest Service corporatization at the expense of innovation. It is difficult for me to judge the innovation present in existing companies but it seems no less than that of the State. However, my observations of agriculturists and horticulturists lead me to suggest forest managers overall are inclined to be conservative if not said.

Forestry needs to retain a human-scale dimension to forest-growing. Owner-operators in close working contact with forest operations could become a key factor in maintaining technical innovation and ‘smart’ practice in forest-growing and harvesting. It is important that operation efficiency and profitability be closely linked to individuals who have sufficient hands-on responsibility to perceive the scope for improvements if not also benefit personally from any gains in efficiency. Fostering such an atmosphere in a large organization is difficult.

(6) General Social Values
Predominant agricultural and horticultural land uses inevitably contain areas of underutilized and/or unutilized land, frequently suitable for forestry but individually small though significant in total. If attitudes to small-scale forestry are condescending incorporation of such sites into a system of effective and efficient land use will be limited. It seems only common sense to maximize output from the settled areas of New Zealand with their well-developed infrastructure and services. Note, too that the much-vaunted export log trade was established on a foundation of small woodlots and shelterbelts, not from the more extensive large-grower plantations.

Good land use, including very intensive single land use, is attractive to most people if only in the sense of being reassuring. Trees and forests enrich many landscapes especially pastoral localities generating a feeling of permanence and husbandry that is real and valid albeit awkward to price. Similarly the general social well-being of us all arises in no small measure from our perceptions of the physical environment about us. Are we at ease with it all? In the end pursuit of a target rate of return on assets employed is no more than an attempt to increase our overall standard of living — we assess funds quantitatively even insensitive-ly and then expend them qualitatively often on intangible. This approach has performed satisfactorily at times though it does not necessarily foster quality of life. For many self-expression through business or vocation requires individual identity — such people can be expected to secure more fulfilment through smaller-scale forestry operations rather than in corporate entities.

If my thesis that smaller-scale forestry could be efficient and worth pursuing is correct, where and how might such forest units arise? As mentioned earlier, independent units have not arisen from traditional farmland forestry afioresawing. New joint venture measures may generate an increased area of manageable forest blocks but the terms and conditions for joint ventures protect the interests of the partner financing the project and consequently they do: not engender smaller growers with real independence or managerial accountability.

The extension of joint venture principles to management of a working circle of immature and mature forests could stimulate independent small-grower organizations. Forest co-operatives are provided with legislation but have not formed as vigorous business units. Involvement with processing industry by co-operative members along the lines of the dairy industry would initiate greater progress though unfortunately one needs to have a reasonably advanced age-class series to contemplate investment in utilisation.

To a large extent the export of departmental forestry has been towards active achievement of extensive establishment and tending programmes. Nonetheless calls for diversity of forest ownership in more recent times including straight-forward privatization are a sign of maturity. The 1981 Forest Service Review considered submissions to this effect but “did not favour outright sale of State forests lands to private interests” nor did it endorse alternative arrangements such as leases, etc. Clearly the greatest potential for establishing viable independent growers lies principally in the current State holdings through identification of appropriate working circles and assistance in financing. Given present Government attitudes to either privatization or financial incentives it is hard to imagine independent growers arising from the State forests.

However, if the Forestry Corporation seeks to exclude the less clearcut production forests or areas of lesser predicted economic return then independent forest units could arise though reasonably large and by definition not principally commercial. The possibility of multiple use exotic forests being managed through ad hoc boards or authorities encompassing major production operations will hopefully be evaluated by those dismembering the Forest Service.

Lastly, I expect to see within the large-grower organizations themselves a move towards more efficient forest growing through different management systems. An effective large forestry organization must recognize at some stage that its activities embrace competing objectives: these are those that relate to output (planting, pruning, logging) and there are those that make possible the means for output to continue (sales and marketing, public image, investor confidence, yield regulation). Efficiency
advantages that I have suggested for owner-
operator forestry can also be integrated with
in corporate forest ownership and its con-
comitant financial and servicing resources.
Large manufacturing organizations con-
tract out production of components and in-
gredients vital to the finished product; the
food processing industry commonly pur-
chases inputs from numerous small suppli-
ers add/or contract growers. It seems
reasonable to foresee independent farm
forestry growers arranging forward wood
supply contracts with processors for all or
part of their annual harvestable increment.
Given initiative and a willingness to experi-
ment, the large companies/corporations
may consider financing forest managers
into established forests with current or on-
coming yield that is regulated or predeter-
mined by contracts from the management
specialists. Contract logging and transport
would function much as it does now in fore-
stry. Additional harvest volumes or value
through good practice could be treated as
a bonus to efficient forest management.
Restocking and tending treatments could
also be handled by such management con-
tacts. The ‘profit motive’ would operate
strongly in such situations and incentive
would be far closer to the work face than
its current company or corporation balance
sheets.

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ABSTRACT
The history of expenditure and other data
on NZ Forest Service fire prevention con-
forms that fire prevention expenditure per
hectare is greater in the high-risk districts
as compared with the moderate and low-risk
districts. However, there has been consid-
erable variation in expenditure over time.
In the past, these expenditure levels have
been based on management’s experience, intui-
tion, and local assessments. Such practices
do not necessarily provide an optimal eco-
nomic solution. This requires expenditure
to be such that expected costs and losses are
minimized. Managers are then required to
trade-off between efficiency and risk as-
associated with their fire prevention pro-
gramme.

When exotic plantations were first estab-
lished in New Zealand in the late 1800s fire
prevention measures were very quickly
found to be essential. Ideas on equipment
strategies and legislation were gleaned from
North America and as a result fire preven-
tion costs became part and parcel of the
plantation management (Cooper 1981).

Over the intervening years serious fires
have occurred in both State and private
plantations. They range up to 13,000 ha in
the Tahorakuri Block during the 1946 Taa-
po fires (Fenton 1951, Church and Stanley

-Harris 1967). Fires in the recent dry sea-
sons of 1981-83 have kept forest managers
on their toes and fire prevention costs are
therefore still an essential item of expendi-
ture in the management of exotic planta-
tions today, especially as young forests
planted in the 1960s increase in value with
the approach of harvesting.

Historic Costs 1900-1966
Data are difficult to obtain. A study of early
annual reports of the Lands and Survey
Department (which was responsible for
State forests until 1918) from 1896 onwards
reveals some crumbs, one being that the cost
of plantation fire prevention was “6 pence
per 100 acres” in the early 1900s.

In the 1912/13 annual report H.A.
Goudie, superintendent nurseryman, North
Island, stated that “the present system of
firebreaks is, on the whole, satisfactory, but
as it entails an annual expenditure of 10
pence for every acre planted. . . .”. He went
on to say that this sum compounded at four
and a half percent amounted to 12 pounds
in 60 years; it was better therefore to sow
pasture and graze to bring in a “profit at the
rate of seven and a half percent on the
outlay”.

A few more details are available from the
State Forest Service annual report to the
Commissioner of State Forests.

In the 1923 report the costs of protection,
prevention, detection, and control amounted
to 2297 pounds 4 shillings and sixpence
and the plantations totalled 44,646 acres.
Costs were therefore 12 pence or 1 shilling
per acre. The value of timber destroyed
totalled 6080 pounds but some of this was
indigenous forest and an accurate costing

is impossible to obtain. At that time wages
for patrolrs amounted to 84 percent of costs
with equipment and transport taking up the
remainder. Cost analysis in annual reports
ceased after 1928 and have not been con-
tinued to the present day.

Fire protection cost data appear to have
been poorly recorded because managers
had to rely on time-consuming handwritten,
typewritten or the Hollerith commercial
accounting systems. The advent of the
first electronic commercial accounting sys-
tems in 1967 changed this situation.

Costs - 1967 to 1982
It is useful to consider these data together
as a consistent system was employed over
this period. Examination of average costs/ha in 1983 dollars, by NZ Forest Serv-
vice Conservancies, show changes from a
low to a higher expenditure, or vice versa,
from year to year which cannot always be
accounted for by either wet seasons or high
fire danger (Table 1). Improved salaries o:
award wages such as occurred in 1977 trans-
lated into increased 1978 costs. In the case
of Canterbury, windthrow, log salvage
and the need for extreme care in the years
1975-1979 also reflected increased costs per
hectare. In 1980-81 the onset of a dry spell
with an increased number of days in high
and extreme fire hazards resulted in some
increase in prevention costs, particularly in
Nelson, Westland and Canterbury.

The data confirm generally what we
would expect. Expenditure per hectare is
greater in high-risk than moderate or low-
risk areas — for example, in Canterbury
compared to Auckland and Southland,
respectively. It is difficult to pinpoint why
fire prevention expenditure moves unevenly

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