

## FORESTRY AND THE SMALL GROWER: DIVERSIFICATION IN FORESTRY\*

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Foresters tend to strike an attitude on the righteousness of their cause. Why don't people agree with them?

It boils down to a question of land use. Farmers got hold of most of the land first, and they want to cling on to it no less tenaciously than any old-time Maori rangatira. So, if foresters have any sense, they need to look, first and foremost, at farming. I make no apology for doing so, nor do I make any apology in equating the small grower of trees with the farmer.

New Zealand still suffers from colonial status — that is, we produce more or less raw material and ship it to distant places for processing. It has become clear that, while the processors, shippers and retailers work on a cost-plus basis, the raw material producers get only a residual value. This has led to continuing deterioration in our terms of trade, which we have tried to mitigate by borrowing; which, in turn, means that there is an enormous amount of debt, and debt servicing, built into our costs of production. Report No. 1 of the Economic Monitoring Group of the New Zealand Planning Council (1983) (EMG) shows that we are spending nearly \$NZ3 million per day in interest payments to overseas lenders. If we had any intention of refunding our debts, that would amount to more than an additional \$NZ3 million per day. It cannot be done. We are in a Catch 22 situation.

We have tried to remedy our position by encouraging manufacturing industries to produce exports, generously aided by our long-suffering taxpayers, but many of these industries rely heavily on imported raw materials, and they have not done us nearly as much good as the pundits thought they would. EMG notes that they suffer from "small size, financial insecurity, weak technical resources, and more costly inputs than those of most of our international competitors".

We also have the "think big" projects but, although they may ease our financial situation in the short term, they are based on

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non-renewable resources, and we may have to scrap them in a few decades.

We need a basic re-think, on the following criteria:

- (1) Our prosperity must always be based on the products of our land, aided by our incomparable climate.
- (2) We are a long way from markets which have the money to pay for the sort of salaries and wages to which we have become accustomed.
- (3) Our biggest bill is for transport, both internally and externally. There is good reason to suppose that this will increase both absolutely and relatively.
- (4) We cannot break out of our colonial status until we produce high-value goods.
- (5) In spite of Sir Robert dashing about the world to try to get people to agree to what the media call a new "Bretton-Woods-type" conference, the financial powers that be do not want the present woeful system changed. It will, of course, have to change in time because it is based on a profound fallacy, but that will not be until it reaches the point of collapse. In a world of finite resources, it will have to give. But that will not do us any good right now.

Therefore, our exports must be based on maximum indigenous input, minimum imported input, and high value:weight ratio.

Let us, then, look first at our traditional agriculture. For a long time our agricultural experts have been plugging the line that we can get ourselves off the hook if we expand production of our traditional farm products — milk, meat and wool. We have done this, and steadily got further into the cactus. EMG points out that "New Zealand depends on a narrow range of exports which are subject to considerable price fluctuations". Our slow economic growth "relates to our particular mix of export products" and we are "not well placed to take advantage of growth in the world economy".

Farmers tend to feel that their woes are due to gross mismanagement of our internal economy, and to the Common Agricultural Policy of the EEC. Mike Carter (*N.Z. Farmer*, May 1983) wrote: "Isn't it time we faced the truth?" Our traditional customers "do not need our products and . . . their policies will ensure that the home product gets priority, whatever the cost". Boyd Wilson (*N.Z. Farmer*, Dec. 1983) wrote: "Ours is a chronically sick economy, heavily dependent on exports of farm produce which the affluent world can ignore and the poor can-

not pay for". Other writers in the *N.Z. Farmer* point out that farm production will decline because farmers can no longer pay to keep up fertiliser applications and other maintenance costs. Hill country is reverting, farmers are going broke and leaving the land. Since 1960 the number of sheep farmers has declined by 15%. In other words, farming is depopulating the countryside.

All sorts of reasons are suggested as to why we are in such a bind, with appropriate remedies. The remedy applied by the government is Supplementary Minimum Price support. This means that, in 1983, the government paid farmers \$4.25 for each lamb sent to the freezing works. But this was insufficient. The Meat Board had to fork out an additional \$6.25 per lamb, and is now \$340 million in debt.

Many farmers do not like SMP payments, even though they would (so it is said) go broke without them. However, calculation by economists (e.g., Laing and Zwart of Lincoln College) show unequivocally that SMP payments cannot be justified.

Peter Elworthy, speaking for Federated Farmers, advocates a "significant devaluation of the N.Z. dollar". He does not seem to have noticed that this would make our terms of trade even worse than they are already. The associate Minister of Finance (J. Falloon) notes that devaluation "has not worked in the past, and would not in the future". He puts the blame on the inefficiency of farm service industries.

Nobody knows what to do about farmers' debts. Interest payments are now the farmers' largest item of expenditure, amounting to 16-17% of their total payments.

Some experts point out that increase in production has led to dumping of farm produce on overseas markets; it has been, in other words, counter-productive. We ought to have reduced our agricultural production and thereby got higher unit prices.

The *N.Z. Farmer* blames the "obstructionism and inflexibility" of our "administrative and political structures" and says we ought to change the way we do things.

Agricultural interests (MAF, DSIR, etc.) claim that we ought to do more processing in this country, but do not allow for the fact that we would then put a lot of people out of work in our customers' countries, and they are not likely to agree to that.

EMG has this to say: "It is no longer realistic that New Zealand's economic growth strategy is based largely on livestock growth . . . the competitive position of primary industries and

subsequent processing will be eroded if national policy continues to emphasise farm production growth as a central element of its overall growth strategy". "Export assistance and import protection have not solved New Zealand's problems in the past and there is no reason to suppose they will do so now". "Over the next few years it would be inappropriate to seek to meet our balance of payment difficulties through a deliberate expansion of the pastoral sector".

Nothing could be clearer than that.

We are, moreover, up against the big guns. The dairy industry hangs on the decisions made by the CAP of the EEC, while European and U.S. dairy farmers are subsidised to an enormous extent, and butter mountains pile up around the world. The future of the dairy industry looks bleak. How can our dairy farmers, whose gross income is some \$NZ100 000 per annum compete with Irish dairy farmers whose gross income is \$NZ275 000 per annum? All the evidence indicates that the real income from dairying will fall steadily over the next few years.

The meat industry is in even worse case. Red meat consumption is falling, in favour of chicken and pork. The EEC meat stores are expected to hold 700 000 tonnes of beef and mutton by the end of 1984, and we are still trying to quit 1983 stocks in Britain, where *per capita* consumption of lamb has declined from 12 kg per annum in the mid-1970s to only 7 kg today. An article in the *N.Z. Farmer* in January 1984 noted: "The crazy world of the Common Agricultural Policy, devised 15 years ago to prop up the peasantry, is now wildly out of control as it is manipulated by giant wheeler-dealers and agribusinesses". In other words, we are getting towards the time when we shall have to forget Europe where (and our farmers do not seem to have noticed this) agricultural efficiency has improved markedly over the last two decades. Can we rely on the oil-producing nations to take up the slack?

The *Review by Sectors of Science and Technology in New Zealand* (NRAC, 1983) (RSST) lists these current threats to the meat industry:

- trend away from ruminant pasture-fed animals to more efficient meat producers (pig and poultry);
- trend away from red meat consumption;
- prohibitive freight costs;
- move to protein self-sufficiency in world markets;
- chronic adverse terms of trade;

- a diversion of land to other uses (*e.g.*, to forestry, horticulture, urban use);
- emergent agricultural industries in developing countries;
- impact of farmer support schemes on agricultural efficiency;
- under-utilisation of capital in seasonally based processing industry;
- inflation;
- on-farm costs;
- EEC and the CAP.

This is a sobering list of problems, but there is the thought behind the article that the meat industry is in step, and everyone else is out of step. At least one problem (diversion of land to other uses) appears more like a solution!

Wool seems to be the most viable of the "big three" agricultural products, but we still send the bulk of it overseas in a raw state, and EMG suggests that "further increases in production with no change in processing would be likely to force down wool prices. New markets with large capacities for raw wool . . . are unlikely".

As EMG points out, the agricultural position has been deteriorating for several years. So what has the agricultural research sector been doing about it? Judging by Table 1, very little.

TABLE 1: FARM RESEARCH EXPENDITURE, 1983

<i>Field</i>	<i>\$ millions</i>	<i>%</i>
Pastoral .....	38.5	53.0
Dairying .....	7.3	10.1
Crops .....	10.8	14.9
Horticulture .....	10.7	14.7
Miscellaneous .....	5.3	7.3

The bulk of research expenditure is still on conventional farming. The *N.Z. Farmer* (104 (16)) asked: "Are scientists conservative and reluctant to accept new ideas which challenge accepted wisdom?" In the same issue, K. Syers quotes from two books. One by Thomas Kuhn (*The Structure of Scientific Revolution*) notes that "research is conducted more and more within certain boundaries which are defined by theories and rules which have become acceptable". The other book, by Richard Harwood (*Why Science wears Blinkers*) notes that many scientists are locked into research programmes which are not

only specialised, but which are to a degree self-perpetuating in terms of their failure to challenge accepted theory and to tackle new areas of work".

As examples, farm researchers have ignored work done by the Forest Research Institute on gorse eradication, and improving the efficiency of aerial application of fertilisers; and they devote very little effort to any aspect of farm forestry; total research on shelterbelts is about one man-year per year, for example. It is interesting to observe that an agricultural writer (*N.Z. Farmer*, 104 (17)) speaks of FRI as "atypically unbureaucratic and energetic".

Another disturbing fact, which seems to be largely ignored by farming interests, is that, kg for kg, superphosphate application on steep country produces only half the amount of dry matter as it does on easy country; the economic value of fertilising steep country is apparently negative.

Nor are farming interests unduly worried about soil erosion. John Hawley (of Aokautere Research Centre) reports that "potential pastoral production from big areas of hill country has already been reduced by 16% by accelerating soil erosion" and suggests that "Any policy for farming should aim to use each piece of land so that its productive capacity is enhanced". The definitive publication by Eyles (1983) shows that sheet erosion, the most insidious and widespread, affects some 7.7 million hectares of farmed land, of which nearly 700 000 ha is severe to extreme.

One problem, in several regions of New Zealand, is that, in terms of modern technology, farms are too small. There is a long-standing objection to farm aggregation, and legislation to discourage it. However, of all farm land sold in New Zealand in 1980, 40% was aggregated: in Hawke's Bay it was 57%. So the farming community is bowing to economic necessity, and I doubt whether one could find one dairy farm that was not an aggregation. If we are to progress in intelligent land use, we must forget the lines drawn on maps by surveyors a century and more ago, and start considering redistribution of properties by both aggregation and subdivision to take maximum use of our land. Present landholdings are inappropriate for this age.

Let us turn then to competition for land. The main conflict is between farming interests and large-scale forestry. Planning authorities use every possible means of circumventing the acquisition of what is always called "good farm land" (even if

it is class 8) by forestry interests. Yet I detect that the climate is changing. It is beginning to be appreciated, for example, that forestry leads to repopulation of small rural centres. And many farmers are beginning to see that forestry can be, and should be considered, a complementary, not a competitive, form of land use.

Other competitors with conventional farming are also gaining ground. There are now over 2000 deer farms, and the number is increasing. Goat farming for mohair seems to have prospects, and goat meat farming would have progressed further had it not been that SMPs favoured sheep, for goat is the traditional meat for a large segment of the world's population.

The major thrust is in horticulture, the total earnings from which, in 1982, was \$222 million — an increase of 178% over 1978. It too repopulates the countryside, employing a permanent work force amounting to one person per three hectares, and an additional 40 000 seasonal and part-time workers for 50 000 ha in production. Development of horticulture has a long way to go. It covers 30% of suitable soils in Marlborough, down to only 0.2% in Southland. The N.Z. Tree Crops Association publication *Growing Today* lists the following possibilities:

- Flowers.
- Live nursery plants.
- Vegetables: asparagus, buttercup squash, celery, chicory, Florence fennel, garlic, onions, potatoes, telegraph cucumbers.
- Nuts: acadamia, almond, chestnut, hazelnut, peanut, walnut.
- Fruit: Asian pear (nashi), autumn raspberry, avocado, babaco, blueberry, boysenberry, Cape gooseberry, cherry, feijoa, grapes, kiwifruit, mandarins, melons, passionfruit, pepino, persimmons, strawberries, tamarillo.

But this periodical also observes that "horticulture in New Zealand is expanding more rapidly than research facilities".

Let us now turn our attention to conventional forestry. The original planting boom was designed to conserve the native forests, but governments persisted in the older policies of cheap wood, and land clearing, until the preservationists persuaded them of the error of their ways. However, these same preservationists now claim that no native forests should be managed for timber production (they call it "logging"), so we are going to

be faced with an acute shortage of decorative and special-purpose timbers. At present only 5% of native forest is scheduled for sustained-yield management but, if the preservationists have their way, this may be further reduced. On the other hand, we are shortly to have an immense glut of general-purpose radiata pine at our disposal.

Because of the objections of farming interests, exotic forests have been forced on to more remote, steeper and less productive land. I myself noted, in 1972, that "It is quite possible that production forestry will be forced to abandon steep country . . . the location of forests has a marked bearing on the economics of growing [them and] utilisation of large tracts of land exclusively for forestry is not usually optimum land use."

The definitive statement on this aspect of our traditional forestry is found in CNIPS (1983). "The study indicates that a change in direction of forestry planning . . . would be in the national interest. The sector should shift from the tradition of extensive back-country estates on low fertility land, to smaller-scale, low tree-density forestry integrated with farming on better and more accessible sites . . . Traditional forms of afforestation are economically marginal . . . The new direction in forestry should lead to greater economic efficiency and wider distribution of benefits. It offers prospects of diversifying the rural income base and increasing the number of farmers and private landowners participating in forestry . . . to the benefit of the regions in which the forests are located."

In view of all these trends, let us turn to land use planning. At present it is severely restrictive of forestry in many planning districts, and it works in a policy vacuum. Rob Storey, President of Federated Farmers, has called for "a framework of strategic planning" but "there's no central mechanism to implement one". Simeonidis (1983) shows that "most policy-making is 'incremental' in nature . . . [and is] carried out by a process of 'muddling through'." I also noted (1980) that "The trap of land use planning is the natural attempt to encapsulate present use rather than adopt an open-ended approach on the basis of potential opportunities." It is a profound reflection on our dynamic young country that so many people and organisations want to stop everything in its tracks or even to turn the clock back.

W. B. Wall, Chairman of the N.Z. Forest Owners' Association, stated: "The task of selling forestry to the farming sector was being made more difficult . . . by generally entrenched land use



patterns" and also that the "amount of shelterbelt planting here is negligible" although "they can be managed profitably for timber production". (See also NWASCO, 1984).

CNIPS "confirmed that future forestry development is a matter of great national and regional importance" and felt that, once that is recognised, regional planning authorities might be able to bring pressure to bear on district planners to incorporate forestry in their schemes as a legitimate and valuable land use." In this climate, the Lakes/Wakatipu District Scheme is a rarity. "Forestry is accepted as a legitimate land use within the country's rural zones, just as much as agriculture" (Ernest New, *N.Z. Tree Grower*, 4 (1)).

So let us go back to square one, and see what are the facts on the capability of land already held by farmers. The areas are given in Table 2, derived from figures supplied by the Soil and Water division of MWD.

TABLE 2: OPEN AND FORESTED LAND IN NEW ZEALAND  
EXCLUDING NATIONAL PARKS AND STATE FOREST  
(Hectares)

L.C. Class	North Island		South Island	
	Open Land	Forested	Open Land	Forested
1	150 357	—	35 966	—
2	715 603	385	489 452	145
3	966 510	31 626	1 396 912	7 144
4	991 392	153 890	1 313 105	73 544
5	84 552	841	195 476	8 733
6	3 148 358	486 988	2 716 624	297 508
7	1 541 269	652 812	1 880 018	450 052
8	169 764	321 348	1 637 578	901 729

The forested areas include some large private forests in the North Island (mainly classes 6 and 7, with some class 4), most scenic reserves (mainly classes 6 and 7) and farm and local body woodlot planting, about 87 000 ha under grants and loans, plus some established by private capital. These will not be further considered in this paper.

It will be seen that by far the bulk of farmable country is indeed farmed (classes 1 to 5); only about 4% carries forest. If we take land capability classes as being a rational basis for assessing land use, then we could have the position indicated in Table 3.

TABLE 3: POTENTIALITIES FOR LAND USE ALLOCATION ON THE BASIS OF LAND CAPABILITY CLASSES

<i>L.C. Class</i>	<i>Agriculture, etc.</i>	<i>Forestry*</i>
1	Horticulture, nurseries, fruit, nuts, flowers, vegetables, etc.	Shelterbelts; amenity planting
2	Some horticulture, orchards, vegetables, crops.	Shelterbelts; amenity planting
3	Orchards, cropping, some grass farming.	Shelterbelts; agroforestry using valuable hardwoods for decorative and special-purpose timber production.
4	Limited cropping; mainly pastoral farming.	As for 3.
5	Mainly pastoral farming.	As for 3.
6	Pastoral farming.	Agroforestry using general-purpose species, pines, Douglas fir, etc., some woodlot forestry.
7	Run-off grazing only.	Woodlot forestry.
8	None.	Protection forestry only for soil and water conservation and water yield (irrigation, hydro power, domestic/industrial water).

\*See Appendix for definitions.

Combining Tables 2 and 3, we obtain the broad figures given in Table 4.

TABLE 4: APPARENT AREAS SUITABLE FOR DEFINED LAND USES

<i>L.C. Class</i>	<i>Land Use</i>	<i>North Island Total (ha)</i>	<i>South Island Total (ha)</i>
1	Horticulture .....	150 400	36 000
2	Horticulture, orchards, etc. ....	715 600	489 400
3-5	Crops; pastoral farming .....	1 042 500	2 815 500
6	Agroforestry .....	3 148 500	1 996 600*
7	Woodlot forestry .....	1 541 300	1 047 000*
8	Protection forestry .....	169 800	1 292 600*

\*Areas in MacKenzie, Lake, Vincent, Maniototo and part Waitaki counties are omitted.

Before deciding what sort of forests we should encourage, it is necessary to consider markets; they are indeed a critical issue. EMG (1983) states: "Forest industries are even more difficult to manage in terms of production response to changing market

signals." They were thinking of such industries as pulp, paper and logs.

Both the DFC study (1980) and CNIPS (1983) were seriously disadvantaged because they lacked medium- to long-term market information, but CNIPS concluded that: "Income growth opportunities lie in a diversified solid wood industry producing sawn timber and other forest products [which] is likely to offer a range of opportunities to a greater number of participants operating within more diverse and less constrained market environments . . . In contrast to the pulp and paper industry, internal transport economics favour the establishment of sawmills close to the forest resource . . . This means that the solid wood sector is likely to meet a variety of regional needs, without imposing heavy demands on local infrastructure and without social dislocation in the centres where it will be located."

The Processing Options Working Party of the Forestry Conference (1981) described four scenarios to deal with present crops when they reach maturity after 1990. The number of manufacturing plants for these are shown in Table 5.

TABLE 5: NUMBER OF NEW PLANTS REQUIRED TO USE PRESENT CROPS (MAINLY *RADIATA* PINE) TO THE YEAR 2005

<i>Scenario</i>	<i>Plywood</i>	<i>Sawmills</i>	<i>Pulp/Paper*</i>
Maximum solid wood processing .....	21	34	12
Maximum export of logs and chips .....	12	26	5
Maximum mechanical pulp production ....	10	24	24
Maximum chemical pulp production ....	10	24	20

\*Input varies from 300 000 to 1 000 000 m<sup>3</sup> roundwood equivalent annually, depending on type of plant.

It is perhaps significant that RSST mentions pulp, paper, sawmills and panel product manufacture, but does not mention hardwoods or small industries producing high-value and specialty products; but also states that "it is unlikely that there will be a world shortage during the next 25 years" for industrial wood products. "Thus it can be taken as given that New Zealand will face strong competition in all commodity markets."

We now (virtually) have all our eggs in one basket — *radiata* pine — but there is likely to be buyer resistance to this species in Japan (surely a major future market) and in Europe. And the evidence is that markets, even in the short term, are simply not known or even guessed.

We need to look at the wider world and the longer term. The world demand for industrial wood is now 2.5 billion m<sup>3</sup> annually, not including firewood. Of this, 1.5 billion m<sup>3</sup> is hardwoods. FAO considers that demand will rise a further 75% in the next decade while "by the year 2100 tropical forests . . . will vanish".

Kirkland (1983) reviewed the situation. He considered that present trends would continue. Although there are "a massive 1900 million hectares" of tropical forest, future harvests would consist of progressively less valuable resources on more remote and difficult country; 7.5 million ha of closed forest and some 3.8 million ha of savannah forest are removed annually at present, and a further 4.4 million ha are creamed. Since 1950 the consumption of tropical woods has risen 500%, and almost 60% of the total comes from the "tropical forests of our region". "Only one hectare is at present established for each ten hectares of natural forest cleared."

Kirkland (in my view, rightly) considers that Japan will become our major market because their demand will be greater than the combined export potential of Australia, Chile and New Zealand within 20 years, when supplies from North America and the USSR will be declining. Another potential (and massive) market may be China where annual *per capita* consumption of industrial wood is said to amount to 0.03 m<sup>3</sup>. But both the Japanese and Chinese are discriminating wood users and one must doubt whether they would be content with radiata pine (whether pruned or unpruned) except for low-value purposes.

Europe's imports of timber are likely to increase. Professor Liese (President of NFRO) estimated that imports would need to be 550 million m<sup>3</sup> in 20 years' time. Like Japan, a major component of imports is in the form of decorative and special-purpose hardwoods. But Europe is a long way, and we shall in time be able to send only the highest-value exports there.

The lesson of agriculture should be noted by foresters. We shall remain poor so long as we neglect the production, for export, of high-value manufactured products rather than logs, pulp and paper. We therefore need to develop industries to produce veneers, turnery, furniture components, joinery, panel products and plywood in which decorative and special-purpose woods play a major part.

Radiata pine is a marvellous tree. It grows almost anywhere, it has exceptional silvicultural plasticity, its wood is versatile, it produces a lot of wood in a short time. We have therefore

devoted the greater part of our attention to it these last 30 years. As a corollary, we have neglected a host of other species which could no doubt be grown successfully in this country. And the only special-purpose wood we are left with is clean radiata from pruned trees, and currently not much of that. It is soft, unstable and strictly non-decorative, and I suggest that our potential customers will be quite happy to do without it.

Yet in the countries which could be our major markets there is going to be a very large and unsatisfied demand for decorative and special-purpose timbers which we are in no position to meet because our resources of these are so small. Nor are many of the sites currently devoted to forestry suitable for growing these species, as far as we know.

Like the agricultural interests, we aim to continue producing more of the same, even though we know full well (or ought to know) our customers' preferences. For example, we know the Japanese dislike pine timber and favour cypresses and sugi. Yet we are making no real effort to grow these species. All our potential customers appreciate fine figured or coloured timbers, yet we virtually ignore them. Radiata pine might well become the forest equivalent of stockinette-covered nondescript lamb carcasses.

Let us then return to the question of rational land use in New Zealand. The demise of pastoral farming is a challenge and an opportunity. The challenge is to find alternative crops, and the opportunity is that these could, over a wide spectrum of farmer-owned land, be trees. To achieve this, foresters need to consider the following:

- Forestry should be small-scale to fit the land-owning pattern in New Zealand and also to make best use of the land's capabilities.
- Farmers must become convinced that growing trees is a normal component of farm management.
- Forest industries must be sufficiently small so as to do no violence to established patterns of rural lifestyles.
- Forest management and silviculture should be easy and cheap (*i.e.*, as far as possible, not labour-intensive).
- Financial or other inducements to grow trees must be acceptable to most, or all, farmers.

The 1981 Forestry Conference expressed the view (which seems more like a pious hope than a policy to be actively pursued) that there would be increasing tree planting on farms, while large-scale forest establishment would be tapered off. There is very little sign of this hoped-for increase in farm planting, although there has been an increase in tending over the last three years.

A study by Meister and Smaller (1983) (Table 6) designed to discover why farmers plant trees, found that the expectation of any financial benefit came well down on the list; over 50% of planting was for shelter and for weed and erosion control. On the other hand, the major disadvantage was the amount of work which growing trees entailed. As for incentives, the authors found that: "Tree planting grants appear to be a bonus to those already committed" to planting, "not an incentive to those who are not". This study referred to a sample of 200 farmers in the Wellington Conservancy, and may have no wider validity. And many farmers have obtained clear evidence, from their own tree-growing operations, that farm forestry can be financially rewarding. Yet farmers, on the whole, do not like radiata pine, many of them because they have a solicitude for the landscape in which they live.

TABLE 6: ADVANTAGES AND DISADVANTAGES OF  
WOODLOTS AS PERCEIVED BY FARMERS  
(after Meister & Smaller, 1983)

	%
Advantages:	
Shelter .....	28.6
Weed and erosion control .....	21.8
Diversification/better land use .....	16.0
Financial benefits .....	15.1
Aesthetic values .....	10.9
Cheaper fencing materials .....	5.9
Little work .....	1.7
Disadvantages:	
Extra time and work .....	39.6
Cash expenditure now/delayed returns .....	19.8
Miscellaneous disadvantages .....	17.7
Loss of productive land .....	7.9
Tax disincentives .....	4.0
Uncertainty .....	4.0
Fire risk .....	3.0
non-availability of labour .....	2.0
Not enough information on species other than radiata pine .....	2.0

Under the Forestry Rights Registration Act, farmers may enter into forestry covenants with companies, to grow woodlots on their farms. Within the farm forestry movement there is a fair degree of opposition to this sort of development; farmers would prefer to be masters of their own affairs. There is also a move, by the Development Finance Corporation, to provide some sort of funding over and above the 45% of costs obtainable under the Forestry Encouragement grant scheme.

By and large, however, these various incentives are not achieving a great deal. I feel that one reason for this is that the philosophical basis of incentives is wrong. Incentive schemes are based on the view that farm forestry is in some way separate from farming, whereas it is only another form of farming called silviculture rather than agriculture. Ideas are much more potent than financial incentives, and progress can be made only when everyone accepts that the integration of farming and forestry is normal, correct, and profitable to the land owner. If this idea is accepted, then any expenditure on growing trees on farms can be treated as normal farm expenditure for taxation purposes, whether the trees are to be used for shelter, animal fodder, honey production, woodlots, agroforestry or landscape improvement.

However, the financial returns from tree growing take some years to appear, and some financial assistance is warranted. The greatest single cost is establishment. I would thus advocate 100% subsidy on actual and reasonable establishment costs, and then leave farmers to do their own thing. We should drop paternalism, a relict of a bygone age. But, as far as possible, we should steer farmers in the direction of growing valuable decorative and special-purpose timbers.

There is, however, a major need to ensure that farm timbers are properly marketed. This means that the State, the largest seller of stumpage, has to create a climate where logs are properly graded and priced in relation to their intrinsic qualities and uses, and also to oversee the setting up of collective marketing systems (and maybe, later, appropriate farmer-owned co-operative manufacturing industries).

The two most promising areas for the development of farm forestry in terms of full integration are shelterbelt forestry and agroforestry. Farming organisations have consistently discouraged the planting and management of shelterbelts, yet the information is enormous that production of all forms of farm crops could

be greatly increased in New Zealand if shelterbelts became a normal integral part of farming. Horticulturists know this; farmers do not. It is also abundantly clear that shelterbelts can be managed to produce high-quality timber without detriment to their shelter values.

Agroforestry can be shown to give even greater advantages. More needs to be learned about this form of land use, especially from the agricultural point of view, but the two most important aspects are that the amount of labour required, per hectare, is low (about 40 hr/ha per rotation as against 150 hr for conventional forestry, excluding logging), and the financial returns are high. The system has much more than this going for it, including its value for shelter, erosion control and, with broadleaved trees, visual amenity. If it were adopted on a wide scale by farmers, much wood production would also be nearer to ports and industry than timber from many of our back-country forests, and thus costs of logging and transport would be reduced.

Let us then look at the potential, shown in Table 7.

TABLE 7: AREAS WHICH COULD BE CONSIDERED FOR FARM FORESTRY\*

<i>L.C. Class</i>	<i>Forestry Option</i>	<i>%</i>	<i>North Island (ha)</i>	<i>South Island (ha)</i>
1	Shelterbelts .....	8	12 000	2 800
2	Shelterbelts .....	5	35 800	24 500
3-5	Shelterbelts .....	3	61 300	84 500
	Agroforestry† .....	20	408 500	563 100
6	Agroforestry‡ .....	30	944 500	599 000
7	Woodlot forestry .....	All	1 541 300	1 047 000

\*The table does not include some 87 000 ha already planted in trees under encouragement loans and grants; or residual native forest remnants.

†Using trees producing decorative and special-purpose timbers.

‡Using trees producing general-purpose timbers.

Broadly speaking, we could have something like 220 000 ha of shelterbelt forestry, up to 1 million ha of agroforestry for the production of high-value decorative and special-purpose timbers, and a further 1.5 million ha in agroforestry for highly-tended crops of conifers: all on land which is now largely in pastoral farming producing meat which the world is more and more reluctant to buy. But note that I have allowed for only 20% of land capability classes 3 to 5 to be used for agroforestry, and only 30% of class 6. Even such a limited investment in farmer-operated small-scale forestry would have a major impact on our



trading position within the next four decades if we begin to implement this policy now, that is, just about the time when the crunch comes in international supplies of decorative and special-purpose timbers.

### APPENDIX

#### Suggested definitions

- Agroforestry — Growing trees and farm crops, including animals, on the same area. (Has been called "two-tier" farming.)
- Amenity forestry — Management of trees for amenity, but with an eventual yield of usable wood.
- Farm forestry — All forms of forestry on farms, including shelterbelts, woodlots, agroforestry and amenity planting. Does not include plants grown exclusively for forage.
- Farm woodlot forestry — Management of stands of trees on farms principally for wood production which, however, may also have some value as shelter, run-off grazing, etc.
- Shelterbelt forestry — Management of shelterbelts for farm, orchard or horticultural shelter and wood production.

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