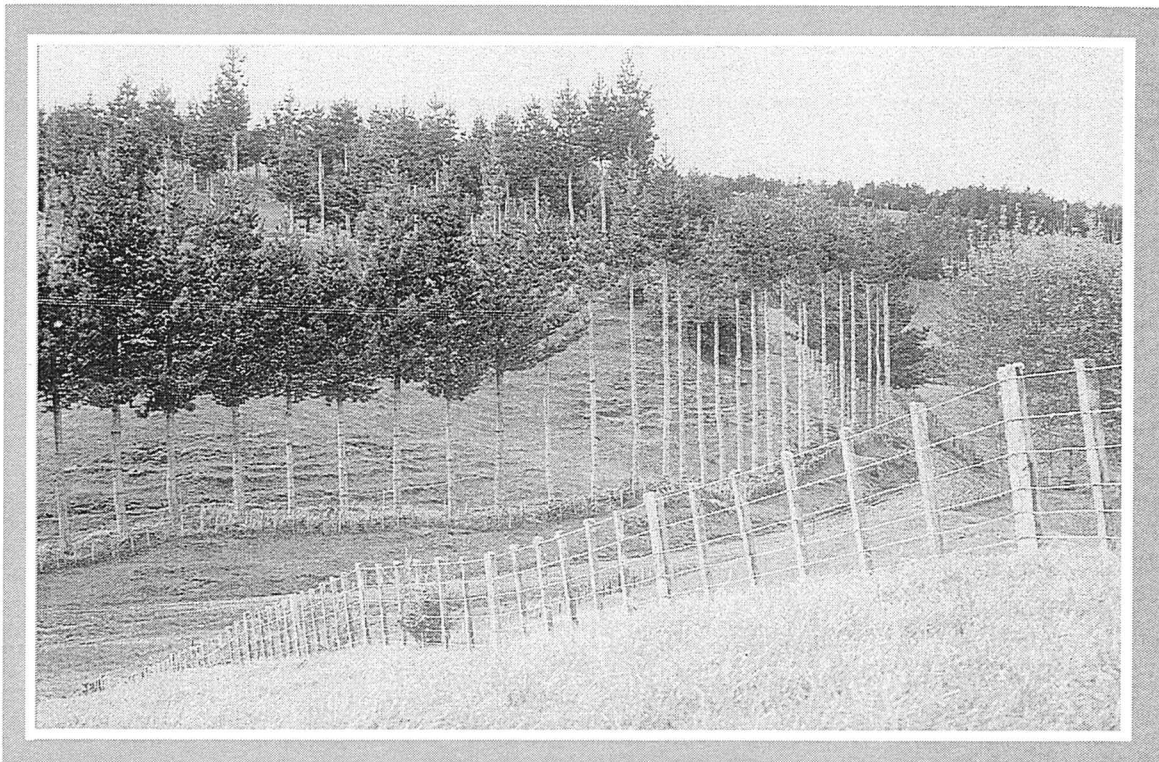


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Farm Forestry Report

A Farm Forestry Study Tour of New Zealand and Victoria
21-30 April 1995



DEPARTMENT OF CONSERVATION
AND LAND MANAGEMENT

Front cover photo: High-pruned pines are grown as a major enterprise on Ian and Robbie Moore's dairy farm at 'Te Rakau' near Rotorua, New Zealand.

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Farm Forestry Report

**A Farm Forestry Study Tour of New Zealand and Victoria
21-30 April 1995**

Report of a tour undertaken by a group of farmers and advisers
associated with farm forestry in Western Australia.
The tour was financed by the Minister for Primary Industry,
The Hon. Monty House, MLA, with support from the
Department of Conservation and Land Management and
Agriculture Western Australia

**Editor: P.P. Eckersley - Bunbury
Agriculture Western Australia**

Acknowledgments

The concept of a farm forestry study tour was proposed by Department of Agriculture, Senior Land Management Research Officer, Ross George in response to a call by the Minister for Primary Industry, Monty House, for regional initiatives. Department of Conservation and Land Management agroforestry specialists Richard Moore, Peter Beatty and John Bartle helped to develop the concept.

Our hosts in New Zealand, the Bay of Plenty Branch of the New Zealand Farm Forestry Association, made us feel very welcome. Many farm foresters and associated professionals willingly shared their experiences and insights with us. We enjoyed sharing the strong camaraderie that exists within the association. In Victoria we were also made very welcome, and were greatly helped by Rowan Reid, John Kellas, Arthur Lyons and Digby Race.

We were privileged to visit many outstanding properties and forestry projects. These are listed in the itinerary.

We are grateful for the support given by these and many other people who made the tour a memorable and invaluable experience.

Special thanks are due to Minister for Primary Industry, Monty House MLA, who provided the core funding for this project.

The report on the September 1994 Farm Forestry Study Tour of New Zealand, by a group from eastern Australia led by Digby Race, so eloquently expresses many of our own observations that we have in places borrowed from their text.

Finally, we thank our families for their support in enabling us to leave day-to-day responsibilities behind us for 10 days.

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Summary and recommendations

In April 1995, a group of six Western Australians attended the annual conference of the New Zealand Farm Forestry Association (NZFFA) and visited Agroforestry Networks in Victoria, all in the space of 10 days. The tour enabled us to establish contacts with leading farm foresters and with industry and cooperative leaders and learn from their successes and failures.

The NZFFA has developed since 1957 into a 4800-strong network of 30 autonomous branches throughout both islands. The association is active in research, development and education and is influential in policy matters. Three regional marketing cooperatives have grown out of the membership of local branches.

Victorian landholders are also rapidly catching the vision of agroforestry as a land use system to address both market opportunities and environmental needs. Over 2,000 farmers now participate in the activities of the nine regional agroforestry networks.

New Zealand farm foresters have fitted commercial trees into farm plans to reduce their own land degradation problems and are now proving that their trees can produce large, high-priced logs. The strong export focus of the New Zealand forest industry is linking small growers through efficient ports to growing overseas markets.

Farm forestry has been encouraged by New Zealand government policies and is now producing environmental, social and economic benefits.

Farmers' enthusiasm for planting commercial trees has been boosted by the high recent log prices. Harvesting of first rotation woodlots has helped overcome the reluctance to invest in a 25 to 30 year crop. A high level of silvicultural care is a feature of New Zealand farm forestry, stimulated by the realisation that this can add a great deal of value to trees.

Western Australian farmers can achieve similar benefits through the integration of commercial trees on their properties. While the industry in New Zealand is based around pines (*Pinus radiata*), the industry in WA is developing around both bluegums (*Eucalyptus globulus*) and pines. WA farmers have less trees in the ground now, but we have the advantage of short rotation bluegums to produce earlier cash flow.

Western Australian plantation establishment techniques appear to compare well with those used in New Zealand and Victoria. However, the organisation and resourcing of active farm forestry appears stronger there than here. The development

of grass-roots organisations of farm foresters is a cost effective way to stimulate the development of farm forestry.

Forest rights legislation enacted in New Zealand in 1983 has made joint ventures easier, giving farmers access to city capital. This also enables them to trade in immature forests via a secondary market, improving the accessibility of forestry investments. Forest rights legislation has been enacted in Tasmania and New South Wales and is under consideration in Victoria, in line with commitments made in the 1992 National Forest Policy Statement.

The tour has strengthened our confidence in the potential for a vibrant farm forestry industry running in conjunction with, and diversifying from, commercial pulpwood and sawlog operations already in place in Western Australia.

Despite the considerable differences between Western Australia, Victoria and New Zealand, we have a lot in common when it comes to issues of finance, marketing, relationships between industry sectors, environmental and occupational health and safety policy. It is therefore valuable to maintain regular contact with farm forestry people in these and probably other places.

The evidence suggests that developing farm forestry takes many years. We cannot expect too rapid a change in attitudes, and there are financial realities to face up to, but face them we must and the greater the early effort, the quicker we will achieve our goal.

Recommendations

The following suggestions are put forward as ideas for action by governments and industry bodies:

1. Improve coordination by cooperatively developing regional farm forestry strategies based on the climate, soils, land use pressures, processing, transport and port facilities and an inventory of existing private forestry resources for each region. The strategies should complement the existing forest industry.
2. Increase government assistance through either long term loans to landholders, Commonwealth insistence on a minimum investment in farm forestry by superannuation funds, or tax breaks for establishment of farm forestry on up to an appropriate proportion (e.g. 20 or 30 per cent) of each farm/catchment.
3. Boost State Government resourcing of trees on farms research and extension. Examples are:
 - Appoint, to CALM's Albany office, a farm forestry adviser who is independent of , but linked with, South Coast Sharefarms.



David Rush demonstrates high pruning of pines with a squirrel at 'Oak Valley', property of Ian Elder near Euroa, Victoria (winners of 1995 Stihl-Private Forestry Award).

- Employ a forest economist or consultant forester to assist with the development of regional cooperatives.
 - Arrange contract employment of leading farm foresters on a part-time basis to enable them to promote farm forestry.
 - Expand regional research to develop sustainable agroforestry systems.
4. Investigate the options for Forest Rights legislation in Western Australia, by conducting a workshop at which local and interstate speakers could outline the advantages and disadvantages of alternative mechanisms for encouraging joint ventures and increased investment in farm forestry.
 5. Encourage the development of regional farm forestry organisations and increased dialogue between farmers, the forest industry and government.
 6. Evaluate the New Zealand Forest Research Institute models, STANDPAK and Agroforestry Estate Model, to determine their value under Western Australian conditions.
 7. Part fund at least two Western Australians (one from government and one from industry) to attend the NZFFA conference each year, and provide funding for regular visits by farm forestry workers to Eastern Australia.
 8. Tell the story of successful farm forest sales, such as the recent bluegum harvests by a number of farmers between Busselton and Boyup Brook.
 9. Encourage the development of forestry consultancy based on professional competence and high ethical standards, as these are key resources for the industry.
 10. Continue the post graduate certificate course and develop courses for farmers and operatives through regional TAFE colleges.
 11. Change the guidelines of the National Landcare Program and One Billion Trees Program to accommodate initiatives using commercial trees and/or establish a new program to cater for developing and encouraging farm forestry initiatives.
 12. Establish breeding and selection programs to cater specifically for farm forestry needs, including species such as spotted gum (*E. maculata*) and others for sites unsuited to present commercial species *P. radiata*, *P. pinaster* and *E. globulus*.
 13. Fund demonstration sites for alternative species where pines or bluegums are unsuitable.
 14. Fund a study into parrot damage and control. This is seen as a major impediment to farm forestry in a growing area of the State.

Introduction

We have a major opportunity to address land and water resource degradation and increase farming returns and regional employment by planting commercial tree crops on farms in southern and west coastal parts of Western Australia. This has been expressed in reports like that of the Select Committee into Soil and Land Conservation, in papers by leading Western Australian foresters, and in desktop economic studies.

However, until farmers enthusiastically take up the integration of commercial tree growing into their farming systems, it appears that the scale of planting needed to regain the right water balance and build a new industry will not be realised.

The farmer-driven New Zealand Farm Forestry Association (NZFFA) has been largely instrumental in the widespread adoption of commercial tree growing into New Zealand farming systems. A membership of 4800 shows that it has become a part of the culture of New Zealand farming. A similar cultural change needs to take place in Australia and it is of interest to study how the New Zealand development was achieved.

The annual conference of the NZFFA offered the best opportunity for a small group from Western Australia to meet leading farm foresters, find out how the association works, and see some of the latest developments in the industry.

It was decided to look closely at -

- how the culture of commercial tree growing was developed in New Zealand
- how the NZFFA is effective in serving its members
- what factors helped spark the rapid growth of farm forestry in New Zealand
- how they facilitate joint ventures so that off-farm capital can be harnessed to effect land protection and the intensification of farming
- how this might translate into a practical vision for farm forestry in Western Australia

Leading Victorian farm foresters, Arthur Lyons and Rowan Reid, offered to help us see developments in Victoria on the return journey. Victoria has many similarities to Western Australia in terms of the tree species used and land management issues, has recently developed extensive regional Agroforestry Networks, and has a well developed framework for coordinated agroforestry research and extension.

A further aim of the tour was for members of the group, from different regions and with different experience and training, to learn from each other.

In planning the tour we saw we had a unique opportunity to record for others our observations on important matters not previously discussed widely in Western Australia.

That is one of the aims of this report.

Tour group members

Peter Eckersley (tour coordinator)

Agriculture Western Australia
PO Box 1231 BUNBURY WA 6231 Tel: (097) 25 5255
Peter studies the economics of agroforestry, leads the Department's Farm Forestry Project, and represents it on Australian Forest Growers (WA Chapter) Council. He is also a Harvey Shire councillor.

Peter Coffey * "Trentham" Jingalup RMB 316
Kojonup WA 6395 Tel: (098) 33 6268

Peter and his wife Jan planted 2-row belts of Tasmanian bluegums on 130 ha of their "Bloomfield" property south-east of Boyup Brook in 1994. They see this as a way of arresting the spread of salinity and providing shelter at the same time as growing a valuable pulpwood crop.

David Jenkins * "Glenford" PO Box 121
Bridgetown WA 6255 Tel: (097) 61 1128

David and his wife Diane began establishing woodlots on their farm in 1979. Of special interest are their 3-row timberbelts of *E. globulus* and *E. saligna* planted in 1987, half of which were thinned for pulpwood in March 1995. Their plantings total about 30 ha and include *E. regnans*, *A. melanoxylon* and *P. radiata*.

* Participant in the first Certificate of Forest Science (Farm Forestry) course.

Rob Johnstone * PO Box 632
Esperance WA 6450 Tel: (090) 71 4422

Rob and his wife Mary farm north-east of Esperance, where Rob has planted Tasmanian bluegums on deep sands for shelter and pulpwood. He sees trees as reducing land degradation and providing a resource for regional economic development. As Chairman of the South-East Forest Foundation and a Director of the Esperance Agroforestry Cooperative, he strongly promotes farm forestry in the region.

Barry Jordan Manager, South Coast Sharefarms
Department of Conservation and Land Management
Albany WA 6330 Tel: (098) 41 3810

Barry has been a key person in the successful development of bluegum plantations on the south coast. He sees great potential for farm forestry to complement extensive plantations and assist development of the region and the port of Albany.

John O'Dea Green Range, via
Albany WA 6330 Tel: (098) 46 6010

John and his wife Ivana sharefarm bluegums with CALM and have planted radiata pine for windbreaks and pulpwood. Keen to see the forestry potential of Albany realised, John is Chairman of the Albany Timber 2002 Development Group and is an Albany Shire Councillor.



Western Australian study tour members at Dean Redwood plantation, Victoria (from left) Barry Jordan, Peter Coffey, Peter Eckersley, John O'Dea, Rob Johnstone, David Jenkins.

Itinerary

| <i>Date</i> | <i>Location</i> | <i>Activity</i> |
|----------------------|---------------------|---|
| NEW ZEALAND | | |
| Friday 21 April | Tauranga | New Zealand farm forestry Association Conference Dinner and presentation of awards. |
| Saturday 22 | Tauranga | Technical Session:- How the farm forester should manage for top dollar; Forest health and protection - current issues; Resource Management Act - implications for the farm forester; Selling the crop. Visit to 'Summerhill', David & Cloie Blackleys' farm. |
| Sunday 23 | Tauranga | Visit to Port of Tauranga:- Log scaling and marshalling, debarking operations, log stockpiles, wood chip piles, log ship loading, and other port activities. NZFFA AGM - reports and resolutions. |
| Monday 24 | Rotorua | Visits to NZFRI's 'Tikitere' pine agroforestry research site, Ian & Robbie Moore's dairy farm, NZFRI nursery, Rotorua wastewater purification project and oversowing of forest. |
| Tuesday 25 | Te Puke | Visit to Geoff & Gill Brann's farm - people and trees growing together - 140 ha integrated planting since 1963. |
| Wednesday 26 | Te Teko | Post-conference tour of Tasman Forestry complex - Biotechnology Centre, clonal blocks, nursery, tissue culture. |
| VICTORIA | | |
| Thursday 27 | Otways Region | Visits to 40 ha Bambra Agroforestry Farm of Rowan and Claire Reid, and 240 ha farm of Andrew & Jill Stewart, Otways Agroforestry Network with Roger Leakey and Chin Ong of ICRAF, Kenya, Ian Ferguson, Melbourne Uni. |
| Friday 28 | Otways Region | Visit to sawmill at Forrest using eucalypts and Tasmanian blackwood. |
| | Ballarat | Visit to radiata pine spacing trial at Carngham (John Kellas) and redwood plantation at Dean. |
| | Melbourne | Dinner meeting and presentation to 20 key farm forestry people, Melbourne. |
| Saturday 29 Group | North East Victoria | Field Day held by Benalla Landcare Farm Forestry at Russell & Janine Washusen's farm, Warrenbayne. 'Oak Valley' property of Ian Elder, managed by David Rush at Longwood near Euroa, with Digby Race. |
| Sunday 30 | Melbourne | Debriefing and identification of key findings. |

Overview of forestry in New Zealand

Plantation forestry covers 1.3 million hectares of New Zealand and is almost totally privatised. Small forest growers own about 10 per cent of this in addition to the 100,000 hectares that are managed as farm forestry.

The industry has developed into an extremely efficient and vigorous one with a major focus on exports. Australia and Japan are its two largest customers. Log export volumes have grown substantially, Japan and Korea being the main destinations.

Export earnings from forestry are expected to rise from NZ\$2.5 billion in 1994 to \$7 billion over the next 20 years. Forestry would then be the nation's largest export earner.

98,000 ha of forest was planted in 1994, 85 per cent of which was undertaken outside the corporate sector. This was a six-fold increase on 1991 plantings, in response to an apparently long term shift to higher log prices on the world market. Survival rates were lower than normal, indicating that technical resources have been stretched at this scale.

4.5 million cubic metres of logs were exported at an average value of \$160 per cubic metre in the year to June 1994. The modern port of Tauranga can now hold up to 300,000 logs at any one time and clear that volume within a four to six-week period. Each of about 2.8 million pieces handled in the last year was given a bar coded identification tag, measured, inventoried, stockpiled and ultimately delivered to ships.

Radiata pine is the main production species, as it is fast growing and versatile. Growth rates are especially high on ex-pasture sites.

Well managed pines are expected to yield revenue of NZ\$100,000 per ha from a 25 to 30 year rotation. The net income from this is commonly four to 10 times greater than the returns from sheep and cattle grazing.

It was predicted that trading in carbon credits (a mechanism to allow efficient limitation of greenhouse gas emissions) will further enhance the monetary value of forests.

Farm forestry associations were already developing in the late 1950's, with an emphasis on integration of forestry with agriculture. Farmers were encouraged in the 1960's to plant pines when foresters showed that this would be more profitable than grazing (Forestry Encouragement Loan and Grant Schemes). Tree growth has been highly satisfactory on many sites which have low agricultural productivity or are otherwise subject to land degradation, especially on steep country.

As more landholders have received income from log sales over the last decade they have tended to swing more strongly into forestry, with less emphasis on agriculture.

We were impressed by the enthusiasm, professionalism and positive attitude shown by farm foresters and representatives of industry, exporters and research institutions.

The tour has strengthened our confidence in the potential for a vibrant farm forestry industry running in conjunction with, and diversifying from, commercial pulpwood and sawlog operations already in place in Western Australia.

Farm forestry organisations and Cooperatives

New Zealand Farm Forestry Association

The New Zealand Farm Forestry Association Inc. (NZFFA) was formed in 1957 by a small group of tree farmers led by Neil Barr. Since then it has grown to a membership of 4800 across 30 autonomous branches throughout New Zealand.

Women are very well represented in the association and commonly play an equal role in decision making and implementing farm tree planting programs.

The emphasis is on local branches sharing knowledge and experience at meetings and field days. Branches take it in turn to host the national conference, which alternates between the North and South Islands. The six-member National Executive has equal representation from each island.

Strong membership now means that NZFFA is able to effectively lobby Government and other authorities. During 1994 NZFFA contracted a professional forester based in Wellington to be Executive Officer on a half-time basis. The association has also developed close links with other organisations and with agencies involved in farm forestry research and development. NZFFA is a member of some of the research cooperatives run by the New Zealand Forest Research Institute (NZFRI).

In 1985 the association set up the New Zealand Farm Forestry Foundation, funded by donations and 1 per cent of annual subscriptions. The foundation is used mainly to finance research on alternative species.

Subscriptions are determined and collected by individual branches. \$40 per member is remitted to the National Association, which covers the production of the quarterly journal "New Zealand Tree Grower" as well as other expenses. Membership is restricted to "farm foresters", though journal subscriptions and conference registration are available to, and increasingly sought by, industry and professional foresters.

The 1995 Annual General Meeting of the association heard reports from a range of special interest groups, including a research committee and the harvesting and marketing societies. Resolutions proposed in remits from branches related to training, registration of consultants, occupational safety and health regulation, fire hazards posed by honey bee inspections, and market information. While the meeting did not agree to ask branch secretaries to collate sales data, reference was made by one speaker to the "complete void of market intelligence". The "New Zealand Tree Grower" has recently included a market report section, which includes indicative log prices.

Cooperatives in New Zealand

Some NZFFA branches provide practical services such as seedling and equipment supplies. Cooperatives have been formed in three regions. The Canterbury Forestry Foundation Cooperative was set up in 1981 and now markets a substantial volume of wood, although it has had quieter periods. The resurgence of this cooperative over the last five years may be related to the visit by a group tour to look at Swedish cooperatives. These are very strong and have their own mills. Another reason may be the increased availability of private forestry consultants following down-sizing of government forestry organisations.

In May 1994, members of the South Otago branch of the association set up a cooperative as a limited liability company. The branch, which has 500 members, had accumulated funds from savings made by bulk purchasing of seedlings and equipment.

The South Otago cooperative marketed 1,700 tonnes of logs in March 1995 and at 23 April had a further 7,000 tonnes on its books. A recognised forestry consultant is employed to provide valuations, quality control and marketing services. Payment is by the hour on consultancy services and by commission on sales. The benefits of the cooperative are said to include cheaper logging rates and freight rates due to selling greater volumes of wood. Without this coordination of harvesting, transport and sales, wood from a single woodlot would not be going to as many as four or five different mills, as now happens.

Aorangi Forestry (principal Alan Laurie) contracts his firm's services to both the Canterbury and South Otago cooperatives.

At Taranaki, in the North Island, a group has spent five years setting up its own cooperative, using information from Canterbury. Fifty woodlots have now been assessed and are ready for harvest. By collating resource information, sales can be arranged before logging takes place.

Cooperatives do not have universal appeal, but provide an alternative which appears to make the market more competitive.

Some farm foresters were said to have sold logs too cheaply as a result of not knowing how much buyers were prepared to pay. Reference was made to "rogue operators" in the industry, including private marketeers who obtain wood from small growers and on-sell it at a substantial profit margin. Other problems for independent private growers included broken promises and hassles at harvesting.

In the main, reputable consultants were said to be providing satisfactory marketing services which link growers to a wide range of buyers.

Joint venturing to finance farm forestry - the role of Forestry Rights legislation and the Forestry Exchange

Forestry is a long term investment. A bluegum pulpwood crop takes about 10 years to reach economic harvest age. Higher value products, such as sawlogs and veneer logs, usually take more than 20 years to reach maturity.

No investor can start a new forestry project without some other source of cash flow during the first rotation. Most farmers cannot therefore finance substantial plantings in their own right.

There are several mechanisms available to enable investors and landowners to pool their resources to develop a forestry venture. These are the mortgage, the lease and the Forestry Right. A mortgage, even a long term one, is barely a joint venture because the landowner has complete control of the enterprise.

Leases can be a very suitable vehicle for joint venture investment in forestry. Rights and obligations of the landowner and investor can be expressly provided in the document. However, lease arrangements become complicated and costly if the lease is for a term longer than 10 years (20 years in NZ) and involves less than the full area in one Certificate of Title. This is because a lease is deemed under the law to be a subdivision and requires local government approval.

New Zealand's Forestry Rights Registration Act 1983 (FRR) is a short piece of legislation that uses the legal notion of "profit à prendre"¹ to enable a formal document under the Land Transfer Act to be registered on the land title. This document, called a "Memorandum of Transfer", describes the agreement made between a landholder and a person or company to jointly grow a tree crop. It includes a formal grant (a Forestry Right) by the landowners to the other party with an interest in the crop.

An important feature of the FRR Act is that it enables registration of the Memorandum of Transfer on the land title without need for the boundaries to be defined by survey, avoiding substantial costs. A sketch plan or aerial photograph is adequate. It is in the interests of both parties to define the site accurately and to indicate it on the ground

Having been registered, a Forestry Right is protected if land ownership changes. An investor can borrow against the value of the right, or sell it before the trees mature. Therefore, Forestry Rights Registration overcomes several of the drawbacks arising from the inflexibility and long gestation period of forestry investments.

Forestry Rights Legislation is a specific commitment given by the Premiers of all Australian States in the National Forest Policy Statement, signed in December 1992.

Tasmania and New South Wales have already enacted Forestry Rights legislation using "profit à prendre". In Victoria, the Department of Conservation and Natural Resources has had legislation drafted which uses the law of bailment, as it is believed to have advantages over "profit à prendre". Under the law of bailment, which farmers already use as the basis for livestock agistment contracts, the 'bailee' (land owner) is entrusted with goods (e.g. trees) owned by the 'bailor' (forest owner).

Under the law of bailment a contract more clearly indicates the separate ownership of trees during the immature stages of the crop. Contracts would have to be written in a way that does not impose unreasonable liability on farmers for tree growth problems beyond their effective control (e.g. salinity).

Application to Western Australia

The CALM Act provides for the use of "profit à prendre" by the Executive Director of CALM. This has been the basis for extensive sharefarming of bluegums, and some pines. However, other joint ventures in WA rely on leasing. Without further enabling legislation, private investors, especially smaller ones, find it very cumbersome and expensive to make their interests in trees secure.

Landowners could use Forestry Rights in a number of ways. Farmers are typically "asset rich" but "cash poor", meaning their wealth is tied up in land. A farmer who wished to invest in trees, as a superannuation fund for example, could use his or her land as equity in an investment scheme with an off-farm investor who provides the funds to establish the trees.

The proportion of the investment which each partner owns can be determined by the value of their inputs. Alternatively, a landowner may establish trees but wish to sell them before they reach harvesting age.

Forestry Rights legislation would give landholders and investors the opportunity to trade a forest resource before it is ready for harvest. Landholders would then have the opportunity of selling the resource to alleviate fluctuations in farm income, or retain the trees after selling the farm.

Forestry Rights legislation is an issue that Western Australia must address if we are to realise the potential for private Australian investment in farm forestry. "Tree tenure" may be a better term to describe the concept, as it is about separating ownership of trees from land.

¹ A "profit à prendre" may be described as "a right to enter on the land of another and take therefrom some part of its substance or produce".

The New Zealand Forestry Exchange

The New Zealand Forestry Exchange Ltd was established in mid-1994 to become a focal point for buyers and sellers of small immature forests in New Zealand.

With most of the recent forest plantings going on to farmland and outside the corporates, about 30 per cent of the total plantation forest resource is now outside the corporates. Strategic analysis of the returns from the primary sector in NZ suggests a continuing move from grazing to forestry on the hill country.

The Forestry Exchange is actively promoting forestry to personal investment advisers as an important component of developed investment portfolios. Although the Forestry Exchange is still in its infancy, interest has grown rapidly, with 18 forests sold for a total of NZ\$10 million in the early months of 1995.

Farm forestry research and extension

Farm forestry extension and research in New Zealand are centred around the activities of the New Zealand Forest Research Institute (NZFRI) and the NZFFA. NZFRI is one of the Crown Research Institutes (CRIs) and has its major centre at Rotorua (North Island) and a branch at Rangiora (South Island).

Seven research cooperatives have been set up:

Eucalypt Management

Eucalypt Breeding

Douglas Fir

Stand Growth Modelling

Radiata Pine Breeding

Forest Site Management

Forest and Farm Plantation Management

Radiata pine breeding is particularly well advanced; for example, farm growers can access physiologically aged clonal cuttings which are well suited to high fertility sites. This is important to avoid "speed wobble" and produce wood of satisfactory density. Such material is not available in Western Australia.

Although most funding is provided by the Government agency FORST, which provides funds for all CRIs, the research cooperatives are also funded by the contributions of members. These include industry, farm foresters, NZFFA and other organisations. Victorian agroforestry workers are among them. Contributions are levied in proportion to likely benefit to the individual or organisation.

Research in forestry is not short term. Although there are some benefits from short term research projects, much of the research involved in forestry is long term and the results of research expenditure may not be seen for many years.

Much of the information generated by this research is included in the computer models STANDPAK and AGROFORESTRY ESTATE MODEL. The annual license fee for individuals to use the latter is \$400. The estate model is seen by some to rival FARMTREE, which is being developed in Victoria with commonwealth funding and is under test in WA.

Extension

Most farm forestry extension is handled through the NZFFA's local branches and farm forestry consultants. There are about 150 farm forestry consultants nationally. They have a close relationship with the NZFRI and usually charge \$30 to \$70 per hour. NZFFA provides brochures on farm forestry.

Field days are often addressed by NZFRI and Ministry of Forestry staff at the request of landholders and the NZFFA. Key landholders involved with field days and hosting visitors can be paid up to \$100 per half day by those attending.

Farm forestry organisations in both New Zealand and Victoria appreciate the importance of community involvement in demonstrating the benefits of farm forestry. They have realised that the voluntary individual input at a local level in tree establishment should be supported and encouraged. To lighten the burden of voluntary participation, key farmers and others who offer their time and farms for extension work should be reimbursed for their loss of income.

Farm forestry in Victoria

We were able to see at first hand some of the results of National Farm Forestry Program projects in the Otways and North East regions. The integrated plantings on the Reid, Stewart and Washusen properties in particular are excellent demonstrations of how to address both market and environmental requirements. David Rush and Ian Elder showed us fine examples of silvicultural technique and eucalypt species comparisons.

The North-East of Victoria has been the recipient of substantial research and development funding for agroforestry, as this region is part of the Murray Darling basin, with its huge and nationally recognised salinity problems. The activities of the Benalla Landcare Farm Forestry Group are well documented in Australian Forest Grower (Summer 1994/95 edition), which also highlights the importance of species selection.

Agroforestry appears to be gaining rapid acceptance among Victorian landowners. Agroforestry is a term used to describe commercial tree growing activities which are carefully integrated into the farm to meet the particular requirements of the landholder. Agroforestry systems are therefore very diverse, as their systems depend upon the local environment and the objectives of individual landholders.

Visitors from the International Centre for Research in Agroforestry (ICRAF) in Kenya accompanied us in the Otways. They explained that agroforestry systems are proving to be more sustainable than other land uses in many parts of the world.

Farm forestry can be seen as one component of an agroforestry system. Each farm forest also forms part of the wood resource for a regional forest industry. The level and scale of integration can vary, but a farm forest must be designed to suit both the land management system and processors' requirements.

The National Farm Forestry Program (NFFP) was reviewed at a two day workshop in Victoria in March 1995, attended by 27 from Victoria, four from SA, three from NSW, and a representative of the Commonwealth Department of Primary Industries and Energy (DPIE), which funds the NFFP. The following extracts from the summary of that workshop give an insight into directions being taken and proposed.

Regional field-based Farm Forestry Projects have:

- established many new farm forestry demonstration sites ranging from individual plantings on farms to total catchment demonstrations,
- set up farmer-based networks,
- held field days, workshops and national and regional training courses, and
- produced information in a variety of forms.

A number of detailed market-based investigations have been undertaken and employment opportunities created.

Regional projects identified the following future directions for NFFP:

1. Produce high quality wood products
2. Add value on the farm
3. Develop industry plans at National, State and local (regional) levels
4. Link data-bases and land suitability mapping systems
5. Develop domestic and export markets
6. Facilitate grower cooperatives
7. Tap labour markets
8. Enhance education, extension, training, inventory and research programs
9. Encourage new forestry investment opportunities

Victorian Agroforestry Networks

Victorian farm foresters are well organised and supported. There are now nine regional Agroforestry Networks in Victoria, as well as the Victorian Chapter of Australian Forest Growers (AFG). AFG has primarily been a forum for owners and managers of broad scale plantations, but has much to offer farm foresters who wish to get to know the industry better and exchange ideas on growing and marketing commercial trees.

The regional agroforestry networks each provide copy for "Agroforestry News", a quarterly newsletter first issued in January 1991. "Agroforestry News" is produced by the Agroforestry Extension Subcommittee and is mailed to over 3,000 landholders. There appears to be an effective flow of information and ideas within and between the regional networks. The National Farm Forestry Program workshop in March 1995 suggested expansion of coverage to include networks in other States.

There is substantial cross-membership of landcare groups and agroforestry networks. The "Potter" demonstration farms are said to have given many farmers a clearer vision of the potential for agroforestry.

Despite the successful development of these networks, a recent survey of Victorian landholders, described in Australian Forest Grower (Summer 1994/95 edition), showed that only 18 per cent of landholders had a strong interest in commercial forestry. A high proportion of respondents required financial support (75 per cent), management support (95 per cent) and marketing support (95 per cent).

Cooperatives

Forestry cooperatives in Australia originated in Victoria. The North-East Timber Cooperative, led by Bob Paterson, a former national president of AFG, was set up in about 1985. It has 36 members who own between 4 ha and 100 ha of forest each, totalling a resource of 1,200 ha.

The Gippsland Wood Producers Cooperative is relatively new, having about 25 members, and most of its work has been done by volunteers, notably Max Speedy. The Cooperative is already selling wood.

In Tasmania, the North-West and North-East Timbergrowers Cooperatives respectively have helped small growers to export logs to Korea as well as supplying other wood markets. Information from

Tasmanian private foresters was readily shared with interested Western Australian forest owners. Tasmanian farm forestry consists mainly of private plantations and managed native forests. Ross Henderson, a National Councillor of AFG, was a leading figure in the development of the first cooperative.

The visit to Victoria has strengthened our belief that the development of grass-roots organisations of farm foresters is a cost effective way to stimulate the development of farm forestry. Funding the employment of committed local farm foresters to run demonstrations and field days appears to have been very worthwhile.

Farm forestry for catchment protection

The successful development of farm forestry has often been based on attempts to manage soil conservation on a catchment basis. New Zealand has focused mainly on highly productive exotic species (such as *Pinus radiata*), which have been the key to the financial appeal of farm forestry.

Likewise, the concept of timberbelts originated in New Zealand, where shelter is needed by agricultural crops and livestock from high winds in exposed areas such as the Canterbury Plains. Timberbelts are shelterbelts where silvicultural management is used to greatly enhance the value of the timber grown.

In the late 1950s and 1960s, a response to the boom in wool prices was considerable clearing of land for agricultural development. This resulted in the blanket clearing of catchments including steep, highly erodible hillsides. After the market fell in the late 1970s much of this land reverted to gorse and woody weeds. Whether the land was intensively managed or left idle, the combination of high rainfall, steep slope and, in places, dispersible subsoils, led to severe problems of land slippage and tunnel erosion in some areas of New Zealand.

The Resource Management Act of 1991 (RMA) is the key to the recent change in catchment management in New Zealand. The purpose of the Act is to "*achieve sustainable management of natural resources while protecting the life-supporting capacity of air, water, soil and ecosystems*". The RMA is reactive rather than proactive. Instead of *prescribing* appropriate land use for any given parcel of land, the RMA is "effects based" legislation designed to *enable* economically efficient land use if its environmental effects are acceptable.

If a landholder's activity degrades some environmental quality, it is the landholder's responsibility to rectify the problem.

The RMA is administered and interpreted by Regional Councils (e.g. Auckland Regional Council, Waikato Regional Council). Smaller District Councils may also make their own interpretation of the Act within their own planning requirements. There is flexibility in the interpretation of the Act, which explains why farm foresters at the conference found some inconsistencies between regions.

If a landholder intends to clear 5 ha or more, a Resource Management Consent (RMC) is required. This RMC is administered by the Regional Council. It is of concern to some farm foresters that while a RMC may give consent to *plant* trees, it does not necessarily guarantee consent to *harvest* the trees 30 years later.

'Right to harvest' is an issue of perhaps even greater importance in Western Australia, and needs to be considered carefully in the evolution of legislation to provide for protection of soil, water and landscape resources.

Catchment protection is also a major issue in the Otways and Warrenbayne districts of Victoria, as it is in Western Australia.

Where rising water tables need to be addressed, planted trees may need to be well dispersed over recharge areas as well as around discharge sites. Timber yields in widely-spaced agroforestry formats will be largely driven by utilising water which would otherwise become recharge.



Clonal propagation of *P. radiata* at Tasman Forestry Complex.

Forestry technology - breeding and silviculture

The best results in any plantation are achieved by planting the best trees. Although top quality stock may cost more, the long term benefits can far outweigh the initial costs.

Clonal forestry is a relatively easy, cheap and effective way of rapidly increasing tree quality when the scale of planting is large. This was evident at the Tasman Forestry Complex, where a relatively modest-sized laboratory produces 2 million high quality plantable trees per year.

Clonal forestry should obtain material from at least 20 provenances to ensure good genetic variation.

The use of physiologically aged cuttings will be important with *Pinus radiata* in the medium and high rainfall areas of Western Australia where widely-spaced agroforestry layouts are adopted.

Due to the long term nature of tree breeding there is an immediate need to investigate a breeding program in WA to cater for farm forestry needs.

Core target species would be *Eucalyptus maculata*, *E. globulus*, *P. radiata* and *P. pinaster*. Other species will need further evaluation.

Where clonal material from trees with good form is not available, close planting is favoured within the rows, although rows may be widely spaced.

'Crowning out' was raised in Victoria as an issue where belts are comprised of multiple rows. If a eucalypt has a competing neighbour tree on one side but not on the other, it could have unevenly distributed tension wood (external), leading to increased problems due to end splitting of the log after harvest. A suggested solution was single-row belts for sawlog production.

Experienced farm foresters in New Zealand and Victoria stressed the importance of pruning the butt log. The difference in value between the pruned and unpruned logs is widening.

It will be important for WA farmers to gain silvicultural skills in order to achieve the best returns from farm forestry, unless these skills are employed from off the farm.



Richard Davies-Colley (left), the leading N.Z. miller of eucalypts, discusses the eucalypts grown on Moore's farm at Rotorua.

Marketing, processing and handling

New Zealand's farm foresters are supplying the market developed by the major forest companies. In addition to this they are developing markets of their own for high value products from a variety of species.

The dramatic rise in prices for export logs in about 1990, due to a short term squeeze on global timber supplies, focused growers' attention on international trading. Prices have since stabilised and farm foresters' emphasis is on quality, not quantity.

It appears that there is a reasonably competitive market for farm-grown logs in New Zealand. The presence of substantial plantation resources and the relatively high yields tend to reduce the distance between mills.

The Port of Tauranga impressed us with the scale and efficiency of operations. A total of 3.6 million tonnes of forest products were exported in the year ending September 1994. This comprised 2.25 million tonnes as logs, 500,000 tonnes as sawn timber, 500,000 tonnes as wood pulp and newsprint, and the remainder as kraft, panel products, wood chips, tissue and cardboard.

There are up to 300,000 logs on the port at any one time. They are stored at the wharf for an average of four to six weeks, allowing time to accumulate volumes of certain grades large enough for shipment.

Each of about 2.8 million pieces handled in the last year was given a bar coded identification tag, with a record kept of its source forest, compartment, gang, loader, truck and delivery date.

Large log handling machinery and equipment, coupled with improving ship design, contribute to efficiency gains.

Eucalypt timber is recognised as a high quality appearance grade timber. A few people are milling and marketing eucalypts and one, Euqual Sawmills, is targeting the top end of the market. The effect on log prices has been dramatic, with an increase from firewood "takeaway" prices to \$200 plus per cubic metre.

Richard Davies-Colley, principal of Euqual Sawmills, is quoted as saying, "I believe there is no other genus which can outperform eucalypts for volume production, colour range, hardness, strength, natural visual beauty and durability. This is quality wood for top line, high priced end products. . . I believe that the tree we want to grow should have a six to ten metre clear bole, with a minimum small end diameter of 40 cm."

Richard Davies-Colley is in favour of widely spaced trees to allow for good crown development and increased stem diameter.

It is important to establish a base of commercial trees for which there is already a market. Other species can be planted but these should not displace trees which provide an assured income from an established market.

High recovery rates from milled timber improve the overall profitability and sustainability of the resource.

Case study farms

“Summerhill”, the property of David and Cloie Blackley, Te Puke.

David and Cloie Blackley purchased “Summerhill”, 374 ha of rolling hill country in a run-down condition in 1960. Annual rainfall is about 1600 mm. The slopes are mostly steep by Western Australian standards.

They have

1. planted pines on difficult (steep) country,
2. practised horticulture on flat and easy country, and
3. planted alternative species for erosion control, timber and aesthetics.

Early plantings of pine were carried out in 1963 under the New Zealand Forest Service Encouragement Scheme. The return from 56 hectares was \$684,825 in 1989. This was before the high prices of 1993/94, but already 61 per cent higher than the estimated return from grazing during that rotation. Second rotation pines are growing there now, half of which are under a joint venture with daughter Gabrielle (a landscape architect) and her husband.

During the early 1970s, the Blackleys established 30 ha of pine agroforest at 500 stems per hectare, which were harvested at age 18 years.

To address problems of landslips and better harmonise the landscape, several alternative species (including *Eucalyptus regnans*) were planted in the early 1980s.

All pruning and thinning work is done by contractors. The Blackleys believe the trees are leading them into the most suitable and sustainable land use for that property.

“Te Rakau” dairy farm of Ian and Robbie Moore, Rotorua.

Agroforestry on Ian and Robbie Moores’ farm consists mainly of single rows of radiata pine managed for timber production. Trees have been planted at 2.5 m apart in rows about 40 m apart. Silvicultural costs have been low and no management problems have been encountered.

Annual rainfall is about 1900 mm. The effective milking area of 116 ha includes the area of 15 ha planted in timberbelts. Together with the 33 ha leased, the property is carrying 425 milking cows. Dry stock are run on other land and all conserved fodder is also produced elsewhere.

Timberbelts are considered an ideal crop which in years to come will add diversity to the dairy farming enterprise and reduce exposure to unfavourable changes in agricultural markets.

The planting program is aimed at achieving a sustained minimum annual yield from the year 2006 of half a kilometre of felled timberbelt, which is equivalent to about 2 hectares of plantation. Using current prices this would be worth \$81,000 each year. Total costs of establishing and managing 500 metres of this pine timberbelt amount to only \$1,055.



David Blackley explains the plantings on part of ‘Summerhill’.

Ian and Robbie are convinced of the merits of using physiologically aged cuttings. These are less prone than seedlings to 'topple' (windthrow), have straighter stems and are almost free of malformation. Pruned Stand Certification will be invaluable as an independent reference for future buyers of pruned logs.

They have also established separately and jointly over 130 ha of plantations through joint ventures in the Rotorua region.

"Roydon Downs" property of Geoff, Gill, Heather, Sally and Alan Brann, Te Puke

Geoff Brann took on this block of 245 ha in 1963. The farm consists of short, steep sidings with flat tops and valley bottoms. It had run cattle and sheep for many years. Annual rainfall is between 1200 and 1500 mm, spread evenly throughout the year.

The bright yellow pumice soils have poor water holding capacity and are very prone to surface erosion. There was severe erosion along the creek in 1963, so the first half-hectare of radiata pine was planted.

Today, 110 ha are planted to radiata pine, along with 10 ha of *Cupressus lusitanica*, 5 ha of eucalypts, 5 ha for amenity and catchment protection, and 10 ha of native bush. A feature is the 26 year old stand of California redwood.

The Brann family have done most of their own planting, pruning and thinning. They have developed an excellent standard of silviculture, from a blend of advice and experience. Recent plantings on this outstanding property are at wider spacings, using

genetically improved tree stock and thereby drastically reducing workload and establishment costs.

"Bambra Agroforestry Farm" of Rowan and Claire Reid, Birregurra, Victoria

Rowan Reid is the Lecturer in Agroforestry at the School of Forestry, University of Melbourne. Rowan came to notice as a strong advocate of agroforestry in 1985 when he co-authored, with Geoff Wilson, the book "Agroforestry in Australia and New Zealand". Last year Rowan co-authored (with Andrew Stewart) another book "Agroforestry. Productive trees for shelter and land protection in the Otways".

Rowan and Claire bought this 40 ha property in a run down condition in 1987. They have established thousands of trees on it to protect the land and enhance its commercial productivity and appearance. Their Bambra Agroforestry Farm is now well-known as a demonstration farm, with high-pruned eucalypts and other species for specialty timbers, together with pine woodlots.

The Otways Agroforestry Network, in which Rowan and Andrew are leaders, is one of a dozen active regional networks in south-eastern Australia.

"Yan Yan Gurt West" of Andrew and Jill Stewart, Deans Marsh, Victoria

Andrew and Jill Stewart are fourth generation farmers on a 240 ha property which was cleared more than 80 years ago. Average annual rainfall is 725 mm and they run sheep and beef cattle.



Creekside timberbelt on Andrew and Jill Stewart's 'Yan Yan Gurt West' property.



Two-year-old 9-row bluegum timberbelts incorporated in the Stewarts' farm plan for shelter and wood production.

As a result of gully erosion and rising water tables they have planted a range of commercial species at a spacing of 5 m by 6 m, with indigenous understorey species, alongside the main gully which flows through their farm.

Commercial species have been located where harvesting will be practicable, and the whole area is fenced off from adjoining paddocks. Salt tolerant species such as Lake Albacutya provenance of river red gum (*Eucalyptus camaldulensis*) and Swamp Oak (*Casuarina glauca*) have been planted as a shelterbelt above the salt line to intercept lateral water flow.

On higher ground, 8 ha of 9-row bluegum timberbelts were established at 3m by 3 m spacing in 1992 by Treecorp for Midway Wood Products Pty Ltd (formed by a group of 18 sawmills) as a joint venture with the Stewarts. These are strategically located to separate land management units and provide shelter from wind, and are also protected by electric fencing.



Benalla Landcare Farm Forestry Group Field Day viewed break-of-slope plantings on Russell and Janine Washusen's farm.

**Property of Russell and Janine Washusen,
Warrenbayne, near Benalla, Victoria**

Russell Washusen is the farm forestry adviser employed by the Benalla Landcare Farm Forestry Group. Russell and Janine's farm is the site of a number of "break of slope" plantings of belts of eucalypts aimed at reducing groundwater recharge.

Up to 75 per cent of the cost has been covered by government grants. Radiata pine has been established alongside their main creek and is pruned to ensure knot-free logs are produced.

"Oak Valley" property of Ian Elder, managed by David and Jill Rush, Longwood, near Euroa, Victoria

Ian Elder, who is primarily a fine wool producer, has developed a strong interest in agroforestry/farm forestry over the last 10 years. Ian and David have established 4 ha of widely spaced radiata pine which have been pruned to 6 m for sawlogs and veneer timber.

More recently, they have established eucalypts and specialty species in timberbelts/shelterbelts over an area of 6 ha. A species and provenance comparison was planted in 1990 with eucalypts planted in single rows about 12 m apart, trees 1 m apart within the rows. Pruning is to prescription for radiata pine.

They plan to thin these stands for posts and rails. The single row should ensure good growth rates and freedom from butt sweep caused by crown shyness.

Their commitment to, and innovation in, farm forestry earned them the 1995 Stihl-AFG Private Forestry Award for Victoria.



High-pruned eucalypts in the trial planted at 'Oak Valley' in 1990.