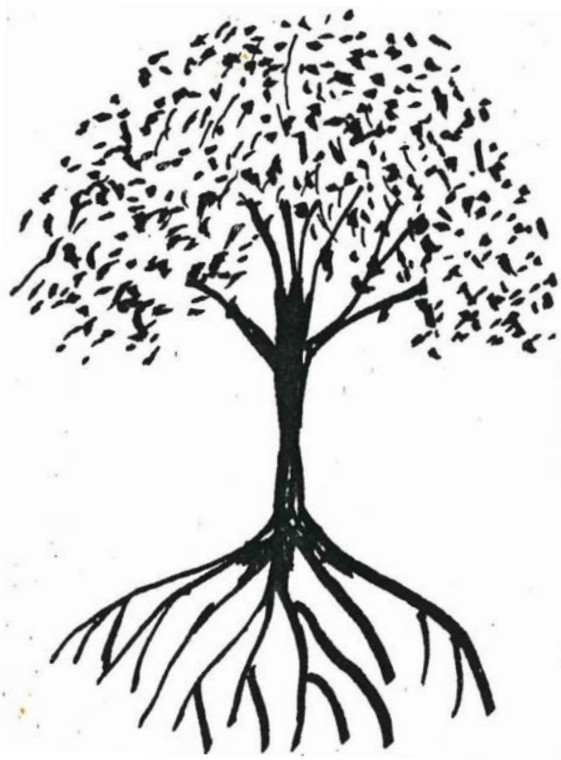
TREES FOR THE FUTURE



A Discussion on Pine Plantations, Native Forests and Farm Tree Planting.

by

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February 1984

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The clearance of healthy state forest in order to establish pine plantations is coming to an end because an awareness of the manifold values of these forests has grown. However the current alternative of putting pines on repurchased farmlands is not without problems and this programme is meeting with widespread opposition throughout prospective areas of the south west.

Reasons for this opposition include:

*the loss of good agricultural lands

*the increased fire hazard posed by pine plantations

*the rampant weed growth that has gone largely unchecked on repurchased farmlands (e.g. blackberry, variegated thistle,double gee etc.)

*the loss of neighbours - so important to rural living - and of social amenities through depopulation

*a widespread aesthetic dislike of pine plantations as they are seen as ecological deserts.

The current programme is causing social conflicts which can only be expected to intensify as competition between land uses in the south west increases. It is time for a critical review of the merits of the pine plantations policy.

This paper argues that:

1. There are serious doubts to be raised about the economic viability of the pine plantation programme because of a glut of pines is predicted for Australasia.

2. An intensive silvicultural programme in the jarrah and marri forests, combined with better utilisation techniques, could dramatically alleviate the projected fall-off of both hardwood timber supplies and of jobs in the hardwood timber industry.

3. Pine plantations need to be subject to more careful planning. Prime agricultural lands should be zoned as unsuitable for pines. Plantations should be designed to include species other than pine in order to provide

vegetative fire breaks to protect rural population and provide most efficient site usage.

4. The main thrust of government support for tree planting in W.A. should be in the form of massive effort to foster the use of trees in farm design. If tree farming were to be established here as a standard aspect of farm productivity, as it is in other places, then not only could future timber supplies be assured, but also the intractable issues of salinity, soil erosion and decreased agricultural productivity would at last be tackled. This option would achieve far more and cost much less than the present policy of buying land for pines.

THE DUBIOUS ECONOMIC VIABILITY OF PINES

The Predicted Glut

For many years the Bureau of Agricultural Economics has been warning that too many pines were being planted in Australia.(1)

The Senate Standing Committee on Trade and Commerce in their 1981 report on "Australia's Forestry and Forests Products Industries" expressed concern that the current levels of plantation establishment threatened the continued viability of the plantation programme.(2)

Subsequently the Fraser Government suspended Commonwealth financial assistance for the establishment of softwood plantations by the States.

The Self-Suffiency Argument

The timber industry has optimistically welcomed such overplanting with the contention that any resource surplus could be exported. However the facts seem to point the other way, the local market could well be flooded with cheaper imported pine in the future. This has already happened recently.

New Zealand has been planting pine on a far greater scale than anywhere in Australia with the intention of developing a major export industry. So far their plan has not materialised. In an effort to support the growth of an export market the N.Z. Government is presently paying the shipping costs for transporting pine overseas, to Australia and elsewhere. By 2011 New Zealand will have to find a market for between six and seven times the pine it is currently exporting.(3)

At a recent A.G.M. of the Australian Forest Development Institute the guest speaker, Mr. Alf Leslie, who recently returned from F.A.O. Rome spoke on future world trends in forestry. He suggested that it will be very hard for Australia to compete in timber export markets alongside the big suppliers such as Brazil, and that New Zealand regards Australia as the natural market for its softwoods.(4)

Similarly at the 1984 Agricultural Outlook Conference, the Bureau of Agricultural Economics confirmed that Australia should expect continued competition from New Zealand to meet domestic timber requirements. It also

predicted that Australia is unlikely to become a competitive exporter of softwood sawn timber in the 1990's.(5)

The competition from New Zealand has recently forced South Australia to try to sell more of its pine in W.A. To help achieve this the S.A. Government gave a $50 transport subsidy per cubic metre of timber exported. The dumping of pine in Australia by New Zealand and the subsequent dumping in W.A. by South Australia left our local industry with little choice but to reduce production which created widespread unemployment in the pine districts. This happened more than a year ago. The westward flow of timber was exacerbated by the economic downturn and by the salvage operations in pine plantations destroyed by the Ash Wednesday fires. Now the local industry is recovering somewhat.

However this chain of events shows that the Nullarbor did not prove to be an impassable barrier in terms of timber flow. Despite the distance W.A. is still the closest market for eastern states timber.

The W.A. Forests Department advocates the concept of timber self sufficiency, claiming support from various committees of enquiry.(6) Yet one such supporter, the 1981 Senate Standing Committee on Trade and Commerce, noted that support for the concept,

> "may be irrelevant inasmuch as recent rates of plantation establishment have exceeded the estimated levels required to achieve it..... <u>These findings have led the committee to express concern for the propriety of public expenditure in future softwood plantation development</u>"(7)

Can W.A. Grow Pines at a Profit?

Given the huge expansion of New Zealand's supply and the overplanting of Eastern States' pines it is quite possible that this state will be unable to grow pine as cheaply as it could buy it. Pine timber must be harvested within some fifty years of planting or else it will start to degrade. So it will be a buyers market.

Yet it is necessary to fetch premium prices for pine timber if W.A. State plantations are to make a profit.(8)

Costs to the government include the initial purchase price of the land, payment of rates, fencing, firebreaks, ground preparation, seedling establishment, weed control, fire control, fertilisation and regular pruning. Tangible returns do not eventuate for atleast 25 years.

In the early days of the pine programme the Forests Department simply refused to pay rates, were extremely lax about weed control and largely ignored shared responsibility with neighbours for boundary fencing. As a gradual response to community pressure the Department is now paying local shire rates and partially accepting the neighbourhood responsibilities which go along with land ownership in the rural community. However this is causing large increases in its pine management budget.

To give some indication of the scale of these costs, it was estimated by a local A.P.B. officer that the current annual cost of a programme to control blackberries and variegated thistles merely around the edges of pine plantations in the Donnybrook-Balingup area alone would approach dollars one quarter million. This programme needs to be repeated each year for at lease a decade before these weeds could be overcome, and even then constant follow-up will be necessary.

CLEARING NATIVE FORESTS FOR PINES

Establishment of pines is especially costly when the Department buys forested blocks. Not only is the initial ground preparation cost very high because the bush must be bulldozed, but also there is the recurrent cost of poisoning the native regrowth which strongly competes with the young pines.

There is great irony in the fact that the value of the native timber in 25 years time may greatly exceed that of the softwood. No attempt is made when the Department buys a bush block to determine its potential hardwood value in 25 years time and then to add this value as a cost of growing the pine. Were this done the economics would not be attractive.

It recently became government policy (with regard to the Donnybrook-Sunklands project) that no productive State Forest should be cleared for pines. The same clear argument applies equally well to native forest on freehold land. There is an urgent need to extend the policy immediately because excellent Jarrah is bulldozed now. There should be no more clearing of any productive native forest for pines, regardless of the legal standing of the land involved.

Also to be considered is what happens to the land after the pines have been removed. Rehabilitation costs are not counted in pine economics either. One problem is the stumps. More serious is the soil impoverishment. Pines are very heavy feeders, they need more phosphate than native trees. Nobody knows how the soil in W.A. will support a second crop. Obviously massive fertilisation will be necessary. In South Australia, second rotation experience has shown slowed growth rates. Traditionally farming practice employs the concept of crop rotation to overcome this problem.

So will it be worth it when the final balance sheet is drawn up? The timber industry and the Forests Department are optimistic. Independent analysts are predicting a glut. Nobody really knows. Few would have predicted in the early seventies that there would be price-cutting of oil in the early eighties.

However one thing is sure - the risk is enormous. Faulty economics or one bad fire could mean a financial disaster for the pine programme. There are other, safer, options and it is to these that we shall now turn our attention.

INCREASING HARDWOOD SUPPLY

The reason why the Forests Department is establishing pine plantations is in order to make up for the increasing shortfall of native hardwoods. Substituting softwoods for the traditional timbers is only one of the options which can alleviate the decline in hardwood supplies.

When estimating our future pine "needs" the Department has assumed there will be no change in log standards, no significant changes in sawmill technology and no change in hardwood markets.(9) Yet as native hardwoods become increasingly scarce it would be very suprising if these factors did not change. Moreover the Government could take the lead and actually foster such changes through royalty manipulations, and by using efficiency of timber recovery as a consideration when issuing timber permits and licenses.

Too much emphasis is being put on softwoods whilst alternative options for the hardwood industry are not being pursued with the vigor they deserve. The alternatives require urgent consideration before all available gobernment resources are invested in the establishment of pines. The bulk of informed opinion as to the likely state of the international timber supply situation in the early 21st century is that there will be a shortage of hardwood and a regional oversupply of softwood.(10) It would to make economic sense for the state to plan accordingly.

We could increase hardwood supplies by:

1. Thinning the Jarrah Forest

   Despite the charter of the Forests Department, little work has been undertaken to help increase future jarrah supply. Proper silvicultural management of the jarrah is now overdue by decades. Where the big jarrah trees were removed for logging in many cases the tree has grown back again from the stump. This is called coppice growth. It can be seen throughout the forest. The problem with coppicing is that often the tree puts up three or four fresh shoots. These need to be thinned back to a single leader to encourage the regrowth of a large trunk. If this is done milleable timber will be available much sooner. Also new seedlings need to be selectively culled.

   In 1984 the first attempt to rehabilitate jarrah is being undertaken by the Forests Department. This important initiative is being supported by

subsidized labour from the Commonwealth Employment Programme. This form of work is emminently suitable for the C.E.P. scheme because it requires little capital per workplace created, nor does it need skilled workers. The Department estimates that from 2020, an extra 50,000 cubic metres per year of jarrah will become available because of this work.

If this programme were given full priority and expanded greatly the gap between projected hardwood supply and timber demand could be closed much sooner. Virtually all cutover forest needs such rehabilitation work and the sooner the better, otherwise much of the growth goes into unusable thinnings.

This rehabilitation work costs far less, hectare for hectare, than the cost of establishing and tending pine plantations.

2. Encouraging the Use of Bush Poles

The rehabilitation of the jarrah forest will make available an enormous quantity of young pole material. We need a sales promotion of this type of bush timber as a substitute for sawn timber for those uses where milled timber is not necessary. Already the market is showing a liking for treated pine poles, for in many situations the natural "rustic look" is very attractive. How much better if people could use jarrah poles for fencing, pergolas and other landscaping, especially as native timber does not need treatment with arsenic.

Such bush poles are stronger than sawn-timber or equivalent cross-section. Building codes need changing to allow greater use of this cheaper, readily available material.

3. Developing the Composite Technique

With the increasing appreciation of jarrah as a cabinet timber, the furniture industry is finding that it cannot secure enough large pieces of jarrah to meet its needs. Instead it is commonly resorting to using composite laminated pieces of jarrah.

According to Forests Department sources there is enough millable jarrah in the forests to keep up with all community needs.(11) The problem is that it is to be found in short lengths in longer logs which have some degraded parts. If these short lengths were cut out and glued together

to make laminated composite lengths we could continue relying on State Forests for much of our timber needs.

At present this technique is considered "uneconomic". However with the increasing shortage of hardwood this attitude could change, as it already has in the furniture industry.

4. Reducing Wastage

The hardwood timber industry in W.A. has been undergoing a period of restructuring, characterised by the concentration of production into a few larger mill units in order to achieve economies of scale.

Whilst this process is efficient in dollars returned to the company involved, it does not lead to an efficient use of a scarce resource. An automatic mill needs a fairly standardised raw material and turns out standard sized pieces of timber. This means greater wastage both in the bush and at the mill. The operation does not have the flexibility to cut each log according to its greatest potential.

Changes in technology and mill design can reduce this unnecessary waste, as the recent example of Quinninup shows. Quinninup mill was closed down in November 1982 as part of a major "rationalisation" process of a large milling company. The mill and townsite were sold as a potential tourist complex. However when the new owners examined their situation carefully they decided there was more to be made from timber than from tourists. By altering the technology they have gained a higher recovery rate of timber along with lower running costs. Quinninup mill recently reopened and is operating successfully, albeit on a smaller scale. This is perhaps the first new style mill of Western Australia.

There are some small operators still left from earlier days in W.A. who have managed to survive the 'get-big' syndrome, despite higher overheads, through a greater conversion rate of sawn timber. These mills also provide relatively more jobs.

A further means of streching the resource could be by allowing more portable mills to operate out in the forest. These have the potential to make a preliminary breakdown of logs which would otherwise be uneconomic to transport to a central mill.

Given the scarcity of both timber and jobs in the timber industry there should be government incentives to encourage such restructuring.

5. Utilising the Marri Resource

Some years ago one of the original foresters of the Western Australian Department wrote a paper entitled, "Marri - The Tree of the Future".(12) This idea, however, has never been taken up, and still today the Marri or Redgum is considered a "weed" species by foresters and the timber industry alike.

One reason for this poor reputation is that in W.A. the exceptional quality of virgin jarrah and Karri have made the industry spoilt and unaccustomed to working a less straightforward resource. Comparable timber to Marri finds ready acceptance amongst eastern states millers.

The other factor which has discouraged the widespread acceptance of Marri is that the old trees encountered in the original forest are frequently riddled with gum pockets which cause 'shakes' in the timber. Few timber men are aware that, by contrast, young regrowth Marri is generally free of defects. This is particularly true of trees grown in situations which have been protected from hot fires. For example one miller has reported excellent milling from a regrowth stand of Marri in a paddock.

If Marri were to be managed in a plantation situation the trees would be as different from the old forest specimens, as a quick grown pine is from an unpruned over-matured radiata tree. It is a sad irony, therefore, that the vigorous redgum regrowth to be found in those pine plantations which were formerly bush is repeatedly poisoned because the suckers are outgrowing the young pines.

Throughout the South-West there is an immense quantity of Marri which could be considered as a prospective resource. Old forest trees would be suitable for the composite technique outlined above. Young trees could be grown in plantations. The timber is an attractive pale colour, and works comparatively easily for a hardwood.

If we were to make the effort to increase our hardwood timber availability, the need for investment in softwood plantations would be greatly diminished. Of course it will always be desirable to produce a

certain quantity of pine for those timber needs for which the native hardwoods are unsuited.

Yet generally speaking it would be better to give preference to native forest because:

*native forest has conservation value

*it is cheaper to use our present forest to full capacity than to buy land for pines.

*pine plantations compete with agriculture for the most valuable farming land in W.A.

*native forests can survive bush fires and pose less danger to local communities.

THE PLANNING OF PLANTATIONS

At present the process of choosing locations for further pine plantations is somewhat haphazard, depending largely on which blocks of land come into the market when and on their proximity to other plantations. Understandably the Department finds it more convenient to manage their pines if they are concentrated into particular localities. Yet much of the friction between the Forests Department and the rural community could be eased if the establishment of new radiata plantations was required to follow certain long-term planning guidelines.

Land Zoning for Intensive Agriculture

One considerable source of resentment against the development of pine plantations is that the Forest Department is establishing its pines on land which in many cases has the potential to be prime food producing country.

There is only a restricted area of the South-West which is potentially suitable for intensive farming, such as horticulture, dairying and orchards. Intensive farming requires good quality soil and plentiful water. Areas which do have these qualities are extremely important for the future development of agriculture in W.A. It is very poor land-use management to allow such country to be put under pines, because tree plantations can be grown successfully on poorer land which cannot be intensively farmed.

Currently peaches are being picked in Balingup one morning and are on sale in Singapore and Hong Kong the next day. The potential for the expansion of such lucrative export markets to South-East Asia should not be jeopardised by the pine plantations. This could easily happen because potential agricultural development in W.A. is limited by the restricted availability of good water and fertile soils. Salinization of land and water supplies is further curtailing agricultural potential.

Some Shire Councils have already put restrictions on the development of pine plantations in areas designated as "intensive rural". This category encompasses all the land which is already being farmed intensively, such as the orchards along the Preston River around Donnybrook. It is a matter of urgent priority that this system of land-zoning should be extended so that pine plantations (and all other less productive land-uses) are also excluded from areas which are not yet supporting intensive agriculture but have the potential to do so in the future. Good farming country is rare in Western

Australia, we must plan its use more carefully.(13)

To place greater restrictions on the development of pine plantations may seem at first sight to threaten the growth of jobs in rural areas. Protecting the best land for intensive farming will not remove job opportunities because;

*farming creates more jobs than forestry (14)

*intensive farming creates lots more jobs than forestry

*if too many pines are grown the glut will threaten the pine industry itself.

Designing Plantations to Increase Fire Safety

The Forests Department of Western Australia has developed the art of fire protection to a level unparalleled anywhere in Australia. Its concern for the safety of rural people and for the protection of timber resources deserves recognition. It is fortunate that this is so, because growing pine plantations in a Mediterranean type of climate like ours is an extremely dangerous pursuit. Pines are particularly flammable for two reasons; one is that the condensed volume of material in the plantations means more fuel for fires, the other reason is that the pine genus have a very high content of turpentines - that is why pines smell of resin on hot summer days.

The Forests Department do an excellent job of reducing the fire risk which the pine plantations pose. This includes well maintained fire breaks and aerial surveillance, even the practice of agro-forestry was introduced in order to make the pine plantations less of a fire risk. Yet all the Department's efforts cannot change the flammability of the pines as trees.

If timber plantations were to be diversified to include tree species other than pine they could be designed to be much less flammable. Many valuable timber producing tree species burn only reluctantly. If strategic corridors of such trees were incorporated into plantations, fire behaviour would be more controllable. It would be particularly valuable to plant low flammability timber species on hilltops, ridges and along natural fire breaks such as creeks.

To diversify plantation species to reduce the fire hazard could offer extra advantages too:

*Healthy growth - diversity helps reduce insect pests and disease.

*Different timbers would provide for different specialised end uses, for instance fine grained cabinet timbers or packaging material.

*More diverse landscape and ecological habitat.

*Design should be diversified to fit the soil and topography. For instance pines do not like moist flats and gullies but many timber species will thrive in such places.

*Other species have better potential for integration with agriculture.

Examples of trees with low flammability which have timber producing potential in W.A. include Poplars (for both wet and dry sites), Oaks, Tasmanian Blackwood and Spotted Gum (Eucalyptus maculata).

TREE FARMING

What sad irony it is that at the present moment in W.A.'s history the farmer and the forester are in conflict over the spread of pine plantations - given their parallel problems. Foresters need to boost timber supplies whilst farmers are facing declining farm productivity because of overclearing, the solution in both cases is more TREES. Instead of engaging in conflict farmers and foresters should be busy planting trees together for their mutual benefit.

There is a popular myth amongst the W.A. public service that farmers do not like trees.(15) This was certainly true of the older generation of farmers, who had grown up nearer the times when clearing the land had broken many a back. However, in the past decade attitudes amongst farmers with regards to putting trees back onto farms has profoundly changed. Now some "new pioneers" are investing a lot of their farming efforts into replanting trees (16) whilst many more farmers - perhaps the majority - would consider using more trees in farm management but they do not know how to go about it, and more significantly they are not in the financial position to outlay the capital costs.

Rising costs, particularly of the land itself, is rapidly making straightforward grazing an uneconomic pattern of farming. Most farmers have been obliged to intensify their operations in order to earn a living. They are putting in new orchards, growing vegetables, dairying or growing grain crops.

Farming with trees is another way that farmers can boost the productivity of their land. If farmers plant trees which have a significant fodder use as well as timber value they begin to reap financial benefit after a few years. If they plant trees which have timber value only it takes many years before they receive a return. Either way they are required to make a substantial

effort in terms of their time and money in order to establish large number of young trees.

<u>Farmers in New Zealand, Tasmania and Victoria can all receive government aid to plant trees on their farms. Why is no equivalent aid scheme available for W.A. farmers?</u>

If the answer is that the community cannot afford it, we must in turn ask if the community can afford to sit back and watch declining agricultural yields and increasing salinity? Last year alone it was estimated that erosion and salt cost W.A. $93 million in lost production.

What are the advantages of farmers planting trees instead of relying on public plantations?

*It will cost the State less.

*More trees will be planted in drier inland areas where they are really needed, instead of pines competing for the best farmlands in the State.

*Farmers have a greater flexibility to use blocks for a mixture of purposes - trees on poorer, steeper country and arable farming on the flats. This is more efficient land use.

*The scale of tree establishment would be greatly increased. Mass planting is necessary if we are to effecitively combat the salinity problem.

Every effort is needed to provide farmers with incentives to plant trees whether they be as private farm forestry or shelterbelts. Measures could include taxation relief, long term loans, subsidies on non labour expenditure incurred and field days and demonstrations.

<u>Pines do not make the best farm trees</u>

One reason why farmers and foresters are not integrating their aims as willingly as they might otherwise do is that pine trees are not the best trees to choose if one wishes to incorporate trees into farming.

So far the concept of agro-forestry has been developed primarily as a means for the Forests Department to reduce fire fuel in pine plantations. Farmers have also been told that more trees on their farms will have an overall effect on helping the salinity problem. Timber production takes many years to realize a profit. All these are "good" reasons for planting trees - but none of them offer any short-term tangible benefit for the individual farmer faced with the hard work of managing his land to support a family living.

Tree Farming Is a Practical Solution

Under the annual system of agriculture practised in Western Australia there is little valuable stock fodder in the paddocks from late summer to early winter and the livestock need to be handfed hay or grain which was harvested and stored from the spring flush. This is both expensive and time consuming and the whole system is very vulnerable to the vagaries of the weather. Late or irregular rains can spell disaster.

Because trees have far deeper root systems than pasture grasses they grow on through the dry weather of summer. Certain trees have very palatable and highly nutritious leaves and/or seeds. If they are grown on parts of the farm they will help the farmer to produce fodder all year round to feed his stock. That is why tree farming is described as a perennial system of agriculture.

Many good fodder trees also produce useful timber, these include some natives. Eucalypt species and pines do not produce useful stock food. All trees help farm production at a more general level by providing stock shelter and reducing wind erosion, water logging and salinity.

Promising Species for Tree Farming

One example of a potentially useful tree is the Paulownia. These are now much used in the wheat growing areas of inland China where wind erosion was particularly severe. Wide spaced planting was employed and wheat harvested in between the rows. Because of the shelter from wind, wheat yields were found to rise by some 20%. This tree is reportedly the world's fastest growing hardwood with the trees reaching millable size in 8-10 years. The timber has an attractive grain and is suitable for furniture as well as building work. The foliage is a useful stock food and livestock could make use of the fallen autumn leaves when there is little else left in the paddocks to eat. Because the tree is deep rooting and decidous it allows pasture or crops to grow in the winter whilst in the summer growing period it would pump out the deeper ground water which would otherwise move into waterways where it would create water logging and salt problems. Paulownias have a temperature tolerance of $-18^{o}C$ to $40^{o}C$ and have some salt tolerance.

Then there are the poplars, the leaves of which are more nutritious than lucerne. These can grow timber faster than pine and there are even types which will grow in salty gullies in desert conditions

There are the mighty oaks - surprisingly fast growers in W.A. conditions which drop enormous crops of fat rich acorns just as the weather turns cold and the stock need the warmth.

There are the nitrogen fixing wattles, some of which can produce excellent timber as well as producing foliage and seed as nutritious as tree luceme.

Casuarinas, which also fix nitrogen, can grow speciality timbers in quick time as well as producing fodder and excellent firewood.

River banksias are another palatable tree producing a fast growing speciality timber.

Developing a Programme

The development of tree farming using such trees has the potential to transform both forestry and agricultural practice and to resolve all of the most serious environmental and land- use problems facing the south-western part of W.A.

Such positive potential poses a marked contrast with the negative effects of the clearing bans. The latter created great resentment and actually precipitated much unnecessary clearing in other areas in anticipation of the bans spreading. If the tens of millions of dollars which were paid in compensation had been spent instead on funding a tree planting program more progress could have been made on preventing salt enchroachment.

A programme is needed to demonstrate the potential of tree-farming by setting up trials throughout the farming areas. The Forests Department set up many arboreta in the wheat belt decades ago to test the performance of various tree species. These plots are now providing useful guidance for today's tree planters. Similar plots are now needed for a new range of trees. Such plots do not need to attain a great age to be useful as the pattern of early growth would indicate a great deal about a tree's suitability for this environment. The most important information is whether the tree can establish itself.

Collectors need to be dispatched to other countries with similar environments to bring back promising propagation material. The Forests Department did this successfully with pinus pinaster, sending Mr. Dick Perry to Portugal to collect seed from superior trees which showed promise of growing well in W.A.

Many more improved strains of potentially useful trees need to be introduced and put to the test.

Farms need to be chosen in every rural area as trial models for tree farming. Rural unemployed could be given jobs helping to establish these farming models.

This work would stimulate the growing interest amongst farmers in such trees and were farmers to adopt them with the enthusiasm they deserve we would see trees being established at a rate far beyond that which the Forests Department could achieve on its own. Of course farmers cannot manage this on their own either - they need guidance and technical assistance from the Forests Department.

Such activity augers a major new role for the Forests Department - to initiate a new form of multiple-use forestry on farmland. In fact in many cases the other effects of the farm trees may outweigh their timber value.

Such social forestry offers immense benefits for the future of all West Australians. It is time to green the West.

Notes

1. See R.F.Treadwell "Australian Softwood Plantation Requirements" in Quarterly Review of Agricultural Economics 31(1),Jan. 1978.
2. Report by the Senate Standing Committee on Trade and Commerce, Australian Government Publishing Service, Canberra, 1981 p.33.
3. Janet Stephenson, People and Pines. Industrial Forestry in New Zealand (Ecumenical Secretariat on Development ,Auckland, 1981) p.14 .
4. Australian Forest Grower,December 1983, p.3.
5. Elders Weekly, February 2 1984, p.15.
6. Future Timber Supplies for Western Australia (Forests Department, Western Australia, February 1984) p.18.
7. Senate Standing Committee on Trade and Commerce ,op.cit. (our emphasis)
8. The only economic feasibility study which has been released about W.A. pine plantations ; D.W.G.Treloar, A Feasibility Study Concerning The Lease of Manjimup Farmalnd for Pine Forests (abridged) (Forests Dept. ,W.A.,Feb. 1984), does not examine the profitability of the plantations per.se.. Moreover it follows the Department in assuming that the real price of pine will hold. It underestimates the cost of purchasing land (at $1000 p.ha.), neither does it allow for the full cost of proper weed control. However even using such favourable data, the report suggests there is no real incentive for farmers to lease out land for pines unless they are prepared to lease their entire farm and seek employment elsewhere. See sections 12 and 15.
9. Future Timber Supplies for Western Australia, op.cit., p. 11.
10. Personal Communication from Forests Department, W.A..
11. Personal Communication
12. D.H.Perry "Eucalyptus Calophylla - The Tree of the Future" in Forest Notes, Vol.3, No.2, June 1965.
13. Perhaps this could be one of the first tasks of the proposed new Department of Urban and Rural Planning. See The Report of the Task Force on Land Resource Management in Western Australia, (Dept. of Premier and Cabinet, Western Australia, Jan. 1984).
14. Treloar tentatively agrees. op.cit. pp. 30-31.
15. At a field day to demonstrate reforestation in the Wellington Dam catchment area in 1983, on of the Dept. of Agriculture personell showing farmers a trial plot of tree lucerne began his talk with the

quip, "Don't worry these are not trees, they are giant clover plants !".

16. See Caring for Young Trees (Australian Broadcasting Corporation, Sydney ,1983) This book contains the results of the A.B.C. T.V.'s 'Countrywide' programme National Tree Care Award.