

C) F 913(941)
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SOME PRINCIPLES GOVERNING LAND USE IN HIGHER RAINFALL AREAS
with special reference to Land Use in Western Australia

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By A.C. Harris, B.Sc.
Conservator of Forests.

The higher rainfall areas of temperate Australia (say, over 25" per year) comprise most of the land capable of growing forest of economic significance for timber production. Australia is relatively poorly provided with good natural forest, and large areas of good forest country have been alienated for land settlement. Today, only 22 million acres of dedicated State Forest remain, plus some 6 million acres of reserves of more or less low productivity. On the other hand, very large areas are available to agriculture, in all its forms, and much of it is still far from properly developed and used. Practically all our major agricultural products provide exportable surpluses, and most of these exports are supported by subsidies in some form or another. On the other hand, we are importing 25% of our timber usage, and this can be expected to increase, with population expected to double itself by 2000 A.D. Timber imports are a serious item in our chronic problem of overseas monetary balances. The thesis is advanced that we need to devote more attention to conserving existing forests, expanding them by pine plantations at a greater rate, and that forestry has a strong claim to the major land use in our higher rainfall areas. The suggestion is advanced that except in relatively fertile pockets, agriculture has not been really economic in much of the high rainfall area, especially in W.A., and that it has been responsible for serious flooding, soil erosion, and tremendous destruction of timber assets in other States.

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During the past 500 years the tide of European immigration and colonisation has flowed over South and North America, Africa, Australia and New Zealand, showing the same pattern of wasteful exploitation and even destruction of the virgin land and natural resources. A complete absence of land use planning was only to be expected in the circumstances. By the time the need for such planning becomes obvious, in far too many cases serious damage has been done and patterns of development have arisen which hinder a sound and logical approach aimed at repairing the damage. The more obvious facts are too well known to need stressing, but there are many aspects which are not so well realised.

Some of the main principles which should be recognised in planning of land use generally are as follows :-

1. Existing natural resources should be protected and conserved before it is too late, and hasty, ill-considered use of them should be stopped. Such resources include water, forests, soil, and areas with aesthetic values such as natural parks and wildlife areas.

The value of forests as protectors of the water resources, which rise in the higher rainfall areas, must be given full recognition. Many of these higher rainfall areas are also hilly to mountainous and agricultural pursuits lead to serious soil erosion and possibly loss of soil fertility. The disastrous effects of floods and the more insidious silting of reservoirs must be taken more into consideration than has been the case in the past. The forest must be considered as a renewable national asset, not as a mine.

2. Existing natural resources should not be destroyed or converted until a close and impartial examination of all aspects reveals a clear case for substitution of another form of land use, and that there is no more suitable alternative.

The natural forest, as a going concern which it has cost nothing to establish and relatively little to maintain, is far more valuable over large areas than the agriculture which many would like to see substituted for it. The natural forest is usually uneven-aged and when cut through is by no means cut out, as a considerable proportion of the remaining crop will be in immature age classes which will benefit by the thinning and go on to mature at relatively low expense.

3. It is desirable to be self-contained for main primary products (food, timber, fuel) insofar as they can be economically produced at home. This is especially true for bulky products which involve much shipping space and heavy transport costs.
4. It is desirable to produce bulky products close to major markets or consumer industries within the country to avoid freight costs.

When it is realised that a pine plantation may produce 10-12 tons of timber product per acre per year on good sites, the importance of having such producing areas as close as possible to the market needs no stressing and it will readily be seen that quite high prices can be paid for developed land for pine plantations. This has occurred in Victoria, where Australian Paper Manufacturers have paid high prices for dairy land within 20 miles of their major paper pulp plant, and similarly in Tasmania, Associated Paper & Pulp Manufacturers (1) have been acquiring good developed agricultural land for pine growing close to its plant. Poor coastal sands near Perth can be used for *Pinus pinaster*, in spite of lower growth rates, because of proximity to markets, but this may not be economic further away. Again, *Pinus radiata* plantations in the W.A. South West close to the Karri forests are desirable for provision of softwood long fibre

pulp for blending with short fibred eucalypt pulp in the paper industry which must come there in time.

There is often a feeling that forestry should be relegated to poor land, but it pays best on good land, well situated, in the same way as any other crop.

5. Sound land use involves seeking for industrial balance to diversify sources of income and guard against price slumps in one or two major crops, especially in a primarily agricultural economy.

In Western Australia, where agricultural production is such a predominating part of the overall economy, the importance of timber production, which is third only to wool and wheat in value, should need no stressing. It gives an important industrial balance in rural areas.

6. It is desirable to integrate land use as far as possible, particularly in the case of forestry, water supply, and agriculture. This may involve some interference with so-called "rights" of private property and is usually resisted in new countries, but has long been accepted in Europe.

There will be found areas of good natural forest on private property which should, if possible, be retained in forest. There will also still be found areas within the forests which can be released for development, but in a country so deficient in forest, some preference should be accorded to forestry where the forester can advance reasonable grounds for retaining such land. In the Old World there is quite a strict control over private forests by the State, and not merely from the aspects of timber production, but of protection of all resources. The public conscience in Australia must soon get around to demanding that a land holder shall not be free to do just whatever he likes with his land if it involves damage to the soil, water and streams, to the detriment of other sections of the community. In the United Kingdom in the last few decades there has been a tremendous advance in the resurrection of declining agricultural districts by integration with forestry operations,

which has raised the general prosperity and social amenities of these areas very considerably.

7. The desirability of having industries, other than those based on agriculture, in country towns to broaden employment possibilities and cater for those not interested in agriculture.

It is often lost sight of that no everyone who desires to live and be employed in the country wishes to engage in agriculture, and it is desirable, in conjunction with integration of agriculture and forestry, to diversify employment in country towns by establishing and maintaining typical forest industries such as sawmilling, pulp and paper, and hardboard, tannin extraction, chipboard, plywood production, and other allied industries. This also has advantages for the rural community, in that these products are available at their back door without the cost of freight, which has become such a serious item in today's costs.

By and large, Australia has no shortage of land suitable for the widest possible range of agricultural pursuits, and a tremendous area of its alienated land is very inadequately developed. But it is extremely deficient in forests and water supplies, both of which are associated with land situated in the higher rainfall areas. Australia never was a country well endowed with forests of commercial value, and large areas of the original good forestry country have been alienated for land settlement.

Today only 22 million acres of dedicated State Forests remain in Australia, plus some 6 million acres of reserves of more or less low productivity. One-third of all timber produced in Australia today comes from alienated timber land not likely to be protected or developed for perpetual yield forestry. This is a serious state of affairs. Even at this early stage in Australian history we are importing upwards of 25% of our timber requirements, whereas we have, and will continue to have, exportable surpluses in all major agricultural products such as wheat, wool, meat, sugar, fruit, etc. etc. It requires only a casual survey of the position to realise that Australia is never likely to be short of food production of all types, and in the most important primary products will always have exportable surpluses.

An analysis of the timber position, however, is far from reassuring. Turnbull (2), in a recent detailed survey of Australian timber requirements by the year 2000 A.D., after making many allowances for a somewhat gradual fall in per capita consumption of sawn timber products, but increase in other forms of wood use, finds that Australia, in 2000 A.D., will have an increased demand of the order of 50% more saw log material and 400%-600% in material for other uses, such as paper pulp, hardboard, plywood, etc. Rodger (3), in a ~~some~~ somewhat more recent survey, arrived at a similar conclusion with regard to saw log material and foresees a shortage in 2000 A.D. equal to $3\frac{1}{4}$ times the total saw log consumption of Western Australia's present timber industry. As it is not possible to expand the natural forest area materially or to quickly increase the production from that area, Rodger considers that the current Australian pine planting rate of approximately 20,000 acres annually should be raised to approximately 33,000 acres annually. Timber imports are, and will remain, one of the most serious items in Australia's chronic problem of overseas trade balances and timber is one of the few import saving crops which can be rapidly expanded in Australia.

Now the only land on which commercial forestry can be practised satisfactorily is in the higher rainfall areas with 25" or more of rainfall per annum. Consequently, it is necessary to preserve for forests, both natural and plantation, as much of the higher rainfall areas as possible and it may be necessary to look closely at the use which is being made in all States of much of the higher rainfall area by agricultural and pastoral users. In N.S.W., at Tumut, the Government is buying back 50,000 acres of grazed timber lands to establish one of the biggest pine afforestation projects in Australia. The economics of this project are clearly superior to any previous or likely other use of that land.

Australia, from end to end, shows countless examples of the overall uneconomic nature of agriculture, in the higher rainfall, heavily forested areas, except in relatively limited highly fertile areas, or under special conditions. The Strzelecki and Otway ranges of Victoria provide some of the most awful examples of prime forest destruction and eventual abandonment by agriculture, but they have parallels in other States. The Group settlements of W.A. in the 1920's resulted in the destruction of forests (see photo) which today would have yielded approximately £75 million worth of sawn timber (equal to 6 years total output of the W.A. sawmill industry), and very few successful farms have resulted. Some £9 million (equals £36 million in today's money) were spent in doing this, and much of it has had to be written off.



THE HIGH COST OF FARMING

Schapper (4) in his survey of dairy farming in the forest regions of the South West of W.A., shows the unsuitability of those forest areas for dairying. Apart from the appalling timber wastage, the need for 4 to 5 acres per cow, using $1\frac{1}{2}$ cwts. of superphosphate per acre per year (about 7 cwt. annually per cow), for an average lactation period of only 6.9 months, and the high cost of land clearing and subsequent maintenance, must throw grave doubt on the economics of such agricultural development.

It is not surprising to find, therefore, that in the "settled" area between Busselton, Margaret River and Augusta, of some 280,000 acres privately held, only 80,000 acres is developed after 35 to 40 years, and a lot of that development is meagre - ringbarking going back to scrub.

In 1951, the Farmers' Union of W.A. set up a Committee of Enquiry on the South West farming areas, which stated "the nett income, in every case investigated, was found to be remarkably low, and in no case did it exceed the basic wage. In most cases it was notably below the basic wage." (Quoted by Schapper).

Some \$16 million (equals probably £60 million today) was expended in the 1920's on Group and Soldier settlement schemes in heavily timbered areas, and mainly written off in one way or another.

In 1958, a study by the Timber Industry of certain South West forest districts where "farming" is considered by some people to be the major worthwhile activity, showed that 351 "farmers" or their sons were actually employed full time in the sawmills or by the Forestry Department and without such employment would have been forced to abandon their farms. The timber industry in one important district draws 25% of its labour from "farmers"; as a result of forest destruction in this district, the timber industry is now petering out rapidly, to the horror of local interests who have pleaded with the Forests Department to keep it going (they do not say what with), because of what will happen to the district if mills close. At the same time, the same local interests are clamouring for the release of more of that district's small remaining forest estate for farming.

From "The West Australian" of 16th October, 1958, we learned how 100 dairymen had recently walked off their farms. Denmark, W.A., once a big timber district, now has only a remnant timber industry. Out of 63,000 acres of alienated land, in the Denmark district, only 13,000 acres were developed

in 1958, and much of that development was meagre or going backward. Local interests there continue to press for the alienation of more forest land.

Lane-Poole (5), 33 years ago in a Presidential address to A.N.Z.A.A.S., exposed the fallacy of much of the land settlement in high rainfall forest regions, and Jacobs (6) in another Presidential address to A.N.Z.A.A.S. (1957) has pointed out that land settlement schemes were at times the result of "political pressure from country towns and other interests which made a temporary profit out of subsidised settlers, irrespective of whether the settlers succeeded or failed in the long run."

But the problem is still with us! Trees have no votes, and only the development of other powerful industrial interests, based on the forest (such as paper pulp, hardboard, chipboard, etc.) can support the sawmilling and other timber interests to stem the pressure for further forest destruction. The W.A. timber industry is now well awake to its peril, and organising its forces for resistance.

The forest industry remains probably the only unsubsidised and unprotected industry in W.A. Even wool is subsidised by low rail freights on superphosphate, and close examination will reveal some form of subsidy in all agricultural pursuits. Enormous sums have been written off on land development in the high rainfall forested areas and the losses are being carried in many cases by the State. Rail freights on timber are very much higher than on most agricultural produce. We destroy the basic resource of the timber industry to produce subsidised butter, in its place. Then we have the picture of our traditional timber trade with New Zealand seriously curtailed, because that country cuts its imports of our hardwoods, since it cannot sell us its cheap butter.

To many people, the only development is farm development. Yet the men grouped in a sawmill, cutting on a sustained yield basis, are using the same land quite as effectively as if it was cut up amongst them into individual farms, assuming that it was all suitable for farms, which it is not. A number of large South West mill towns operating on a sustained yield basis show average figures of 1 man per 400 acres - the minimum size recommended for a dairy farm. Pemberton mill's cutting area employs directly 290 men (1 man for each 250 acres) on a sustained yield basis, and even at that the forest potential is not yet fully used. That must await pulp and other supplementary industries based on the forest.

The mill town avoids the long mileage of roads to individual farms, school bus transport, telephone systems, and many of the costs and disabilities not readily apparent in a more widely scattered farm development of the same area.

The case for land development is often based on results achieved in the most fertile locations, all selected with unerring eye, by the pioneer settlers. These conditions cannot be found on most of the other land in the same district which they carefully avoided. The author well remembers being sent, in 1927, to run surveys and make assessments of timber on land earmarked for Group settlement. Over considerable areas it was difficult to make a survey waddy stand up without building a small pile of ironstone boulders around it! The old settlers held all the good spots in the district. But they were foremost in pressing for development of the land they had long ago rejected.

In W.A., with only 700,000 people, possessing one of the best hardwood forest belts in Australia, and one operated for some decades now on a sustained yield basis, we can at present export some timber. By 1970 A.D., with 1 million people, this export will cease or have to be balanced by imports. Thereafter, unless we can raise our forest productivity we shall be an overall importer of timber, with a usage by 2000 A.D., at least double our present production. In the light of this position, conservation of all the suitable natural forest, supplemented by extensive pine planting is imperative. At best, W.A. can hope to retain 4.5 million acres for forestry, to balance our huge actual and potential agricultural development.

The practice of any forest management and protection only goes back some 40 years in W.A., and that applies to most States as well. Our W.A. forests had by then suffered some 100 years of uncontrolled fire, wasteful exploitation, and complete lack of attention to reforestation.

If their productivity is now impaired, it is by reason of shameful treatment and it is not the fault of the forest. The managed forests of the future will be more productive than those of the past, but due to past maltreatment, the rehabilitation of much of this forest will take time. Nevertheless, the present value of production of the W.A. natural forest per acre over broad areas and under sustained yield, is quite as high as that of agriculture on the same soil types but with less outlay, and our forest is as yet far from being as fully used as it is in the more populous States.

Supplementing the sawmilling industry, paper-pulp, hardboard, chipboard, plywood, and the charcoal-iron industry, have all a big part to play in the future economy of the W.A. forest.

The following figures compiled in 1958 from the Government Statistician's publications, show the approximate areas within rainfall zones in W.A. -

Area with 10" or more rainfall	104 million acres
" " 12" " "	72 " "
" " 25" " "	16 " "
Area of State Forest (actual and potential)	4.5 " "

Of the 72 million acres receiving 12" and over of rainfall, not more than one-third is recorded as developed.

There is little doubt that much of the W.A. area receiving between 10" and 12" rainfall (32 million acres) is also capable of great expansion, given adequate stock water, which may have to be provided by dams, and the desalting of ground water supplies. Apart from the natural fodders, this country will in most years grow prolific crops of oats on the fertile soils which characterise the region. In the old workings of the Goldfields Woodline, oats spilled from the chaff fed to draught horses, has been perpetuating itself luxuriantly for 40 years past in a 10" rainfall.

An attempt to plan land use broadly, with respect to the remaining Crown lands in W.A., led to the formation in 1953 of a State Land Utilisation Committee to advise the Government.

The personnel of this Committee was -

- Lands Department (1) - Surveyor General.
- Department of Agriculture - Director of Agriculture.
- (2) Soil Conservation Commissioner.
- Public Works Department (1) - Hydraulic Engineer.
- Forests Department (1) - Conservator of Forests.
- Treasury (1) - Economics Research Officer.

Attention was directed primarily to the Crown land in higher rainfall areas. Based on air photo surveys, correlated with ground checks, good forest areas were selected

for dedication as State Forests or Timber Reserves, and considerable areas of sparsely timbered country recommended for release for land settlement. Its work has not yet been completed, although the major part has been covered.

The plain fact is that there is ample land for agricultural development in W.A., without invading the forest any further. The high true cost of converting our good forest land into farms makes it a doubtful economic proposition. Along the South coast, from Busselton to Albany, outside the forest country there are still large areas of sparsely timbered high-rainfall Crown land and large areas of undeveloped private land available for agricultural development for meat and wool. The State needs to build new resources, not destroy existing ones.

However, current taxation provisions may encourage the alienation and destruction of an existing forest resource, when they make possible clearing, which is strictly uneconomic, by using money naturally seeking to avoid taxation of the order of 10/- or more in the £1, thus halving the high cost of the operation, especially when Crown lands can be bought for a fraction of the price demanded for similar undeveloped private land in the vicinity.

The high employment potential of pine plantations has been demonstrated clearly in New Zealand and in South Australia on a large scale - 1 family per 30 acres approximately is the figure given in South Australia.

In the vicinity of Perth there are 13,500 acres of pine plantations, mainly on coastal sandplain, of which only 4,000 acres are old enough yet to provide thinnings. Yet from these thinnings 315 men were directly gaining a livelihood in 1958 -- 105 in the forest and 210 in small city mills, plywood operations, with a direct production attributable to this pine material alone, of £370,000 per annum.

Stewart (7) has dealt at length with Forestry as a Form of Land Use in W.A., especially in the case of pine plantations, and made out a clear case for the use of certain types of developed land.

In the South West (W.A.) land which has been developed for 40 years is passing back voluntarily to the Forests Department, at relatively cheap prices, for pine planting. This is good quality soil (dioritic in origin) but the problems of steepness, bracken, insect pests, rabbits,

stoniness, etc., are proving too much for the farmer to cope with. On this land, mean annual increments of 300 to 400 cubic feet and more, of wood per acre are being obtained, which is excellent by any standards. On top site quality dioritic soils, one *Pinus radiata* plantation at Mundaring has given a mean annual increment of 600 cu.ft. per acre per year, over a period of 37 years so far.

In certain key areas these pine plantations will turn "sleepy hollows" into hives of industry within 15 to 20 years. In the Blackwood Valley plantations (Nannup) started some years ago, 20,000 acres are expected to be yielding 120,000 loads (equals 6 million cubic feet) annually by the end of the first rotation (40 years), i.e., one-eighth of W.A.'s present log consumption, but probably half of this pine would be for paper pulp. Unfortunately, areas of this quality are very limited in W.A. and we cannot expect to find more than 40,000 acres of it.

Water Resources.

Our Hydraulic Engineers warn us that W.A. is short of drinking and irrigation water for the sustaining of a larger population than 2 million.

Most of our larger rivers rise in what is now the main agriculture belt, namely the Avon (Swan), Murray, Preston, Blackwood, Warren and Frankland, and cut their way through the forested belt to the ocean. Originally they were fresh streams - today they are all too salt for human consumption or irrigation, as a result of the clearing of the farmlands. It is not suggested that this could have been avoided, if the wheat belt and the State was to be developed, but the huge volume of saline water they carry spoils the fresh water feeder streams of the forests through which their gorges pass.

Today we have to rely on streams which rise purely in the narrow belt of forested higher rainfall country, and do not drain from the interior drier regions. Between Perth and Bunbury, these are from North to South, the Helena, Canning, Wungong, Serpentine, North and South Dandalup, Logue, Samson, Harvey and Collie rivers. From Bunbury, South and East around the coast we have not any important fresh water streams, except the minor Capel River, for nearly 150 miles until we reach the Donnelly River, a fine stream discharging on the coast South of Manjimup.

The mighty Warren is a doubtful proposition, but some of its Karri forest tributaries are excellent. The Gardner, Weld and Deep Rivers are fresh, being still protected by undisturbed forests on their catchments.

One of the most recent casualties is the Kent River, which was an important fresh stream until the most recent example of deforestation for War Service Land Settlement in the Rocky Gully region, where between 1946 and 1955 much Jarrah forest was levelled by bulldozers — far more effectively than the ringbarking of the 1920's.

The last stream, the Denmark River, appears to have been rescued only in the nick of time, from a similar fate, with the assistance of the State Land Utilisation Committee in 1955, which recommended the dedication as State Forest of all remaining timbered areas on the catchment.

Desalting will no doubt come in the future, for the most exacting and limited uses (human and stock consumption) but at a heavy price. For irrigation it may prove too costly, except in limited areas.

An interesting case illustrating the need for planning is provided by the Collie River, which supplies the Wellington Dam. This is the source of irrigation water for the coastal plain and more vital still, the Comprehensive Water Scheme supplying the important and extensive farmlands further East. Water supply authorities are already concerned about its rising salinity. This forested catchment has 700,000 acres, of which 230,000 acres (one-third) is already alienated, but of this only some 40,000 acres are yet developed. If ever this alienated land is all cleared, the problem would become serious indeed. Yet local interests are continually pressing for further alienations for farming of forested land on this catchment, particularly in that part of the catchment area most likely to cause a serious rise in salinity. A mighty public work could be put in jeopardy, but local interests regard conservation authorities merely as obstructionists.

It will be seen that the protection of the forests on their catchments, to safeguard our remaining unspoiled water supplies is a matter of prime importance to W.A.

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