Tree Planting Advice and Sales

Trees may be purchased from Forests Department nurseries at Hamel, Phone 097/33 1271 and Narrogin.
A price list with information about types of trees, is available from Forests Department offices early each year. The following brochures in the Tree Care Series are also available from the Forests Department.

- More Trees Please
- Trees for Rural Areas – "The Wheatbelt."
- Trees for Rural Areas – "South West."
- Raising Trees for Farms.

Information

Extension offices of the Forests Department have further information about matters covered in this brochure. These offices are at:

- Como 09/367 6333
- Bunbury 097/25 4300
- Manjimup 097/71 1412
- Narrogin 098/81 1444

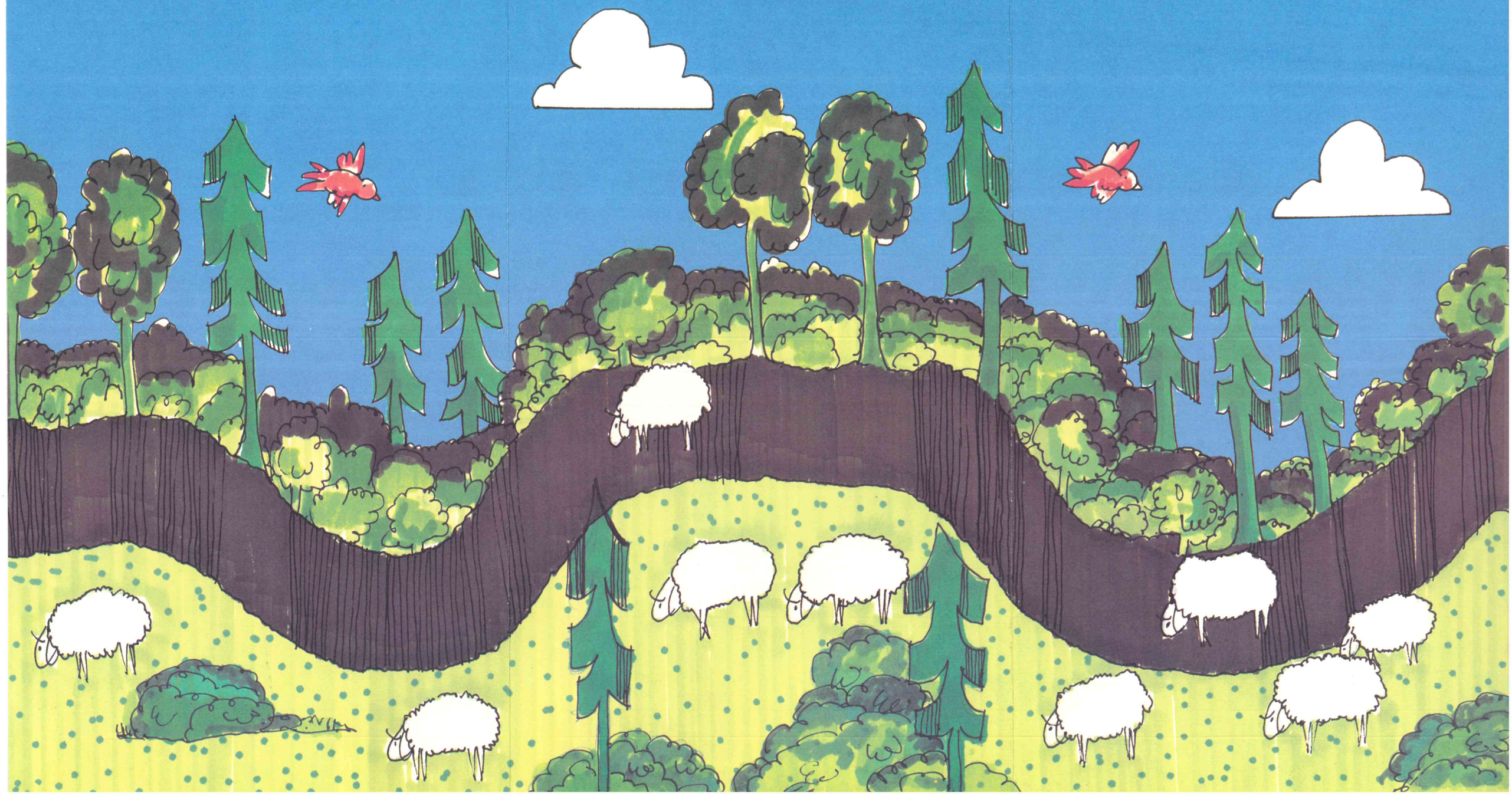
Written by Richard Moore for B. J. Beggs, Conservator of Forests.
April 1983.

Agroforestry

the integration of trees and farming

This brochure outlines agroforestry; what it is, the various types and likely benefits.

Tree Care Series



What is Agroforestry?

"Agroforestry" is a term used in a broad sense to cover a wide spectrum of approaches for integrating trees with farming. Types of agroforestry range from a fully integrated system such as grazing under widely spaced pine trees to strategically placed belts of trees around paddocks for shelter and protection.

The integration of trees and farming is not new as it has been practised for 1000s of years, however, it is only recently that the importance of agroforestry has been reassessed.

Why Agroforestry?

In high rainfall areas of the South West (900-1400 mm per year), tree growth is rapid and increasing numbers of farmers are seeing trees as a way of diversifying their income by producing timber and other products.

Agroforestry has a role to play in controlling stream salinity in catchment areas. The majority of catchments supplying water to the metropolitan area and other centres, fall within the medium rainfall area of the South West (600-900mm per year). However soils within this zone contain high levels of salt. Where significant areas of forest have been cleared, such as in the catchment of the Wellington Dam, salinity problems have developed. Research aims to determine the extent to which plantings of trees can reverse the trend of increasing salinity.

Agroforestry can provide protection for soils susceptible to erosion as well as shelter for stock and crops. Within the wheat belt (300-600mm rainfall per year) in particular, the combination of light sandy soils, overstocking in late summer and strong winds has caused severe wind erosion on many farms in recent years. Trees are effective at controlling erosion and at the same time can produce a range of useful products.

Timber for use on the farm, such as posts, poles and firewood, is an important product from an agroforestry area. While trees can also produce nuts, fodder, fruit and honey, strips of vegetation retained around paddocks can be managed to produce dry native flowers for commercial sale. Less tangible benefits such as encouraging bird species, and enhanced aesthetics, can be important too.

Types of Agroforestry

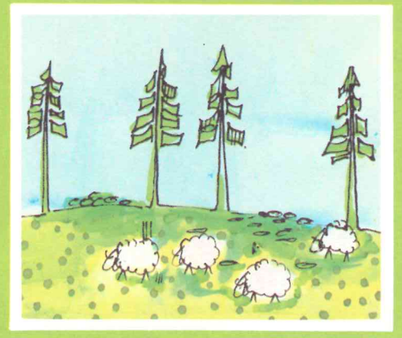
There are many ways of integrating trees and farming. The appropriate form of agroforestry will depend on a number of factors, including; the type of land, the rainfall, the requirements of the farm, distance from markets, and the interests of the farmer.

For example, a farmer in a high rainfall area has a steep corner on his farm that is pastured but erodes easily following cultivation. The farmer considers that widely spaced timber trees with grazing underneath would improve the stability and lift the productivity of the area. On the other hand, a farmer in the wheatbelt has a paddock with light soils that are tending to blow. The farmer also likes the idea of producing his own posts and firewood for use on the farm. He plans to establish a system of windbreaks to meet these two requirements.

Wide Spaced Trees and Grazing

This type of agroforestry involves the integration of trees and grazing. The combination of trees, pasture and grazing is possibly more productive than either trees on their own or pasture and grazing alone. The fact that clover produces nitrogen, which can boost tree growth, and that trees provide shade and shelter for stock and pasture suggests that there might be mutual advantages in this system.

To let in light for pastures, trees are widely spaced and pruned to at least 6 metres. Grazing is carried out throughout the rotation. The amount of grazing is determined by the density of the trees and the height of pruning. As the trees grow, the size of their crowns increase and pasture tends to be shaded out. Therefore, thinning is necessary from time to time. Thinnings are heaviest during the first six years when the aim is to cull out the poorer formed trees. During the second half of the rotation, thinnings can be sold as sawlogs.



Under this system, trees require careful tending during the formative years (age 3 to 10) to produce high quality timber and to minimise debris. The objective of pruning is to maximise the volume of knot free timber. This is achieved by pruning frequently (preferably annually) to 55% of tree height.

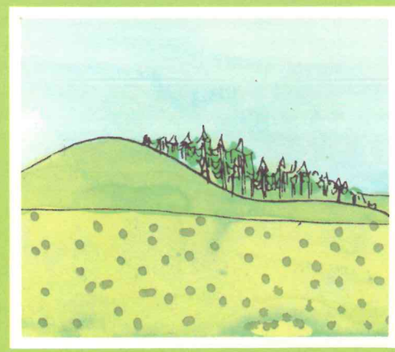
Such a pruning regime removes branches before they become excessively large and ensures that the size of the low quality knotty section in the centre of the tree is kept as small as possible. Debris from thinnings and prunings cover pasture and mulching or removal of debris may be desirable.

This form of agroforestry is being tried mainly in higher rainfall areas where timber growth rates are high and markets are relatively close by. *Pinus radiata* is the main species that has been tried. *Pinus pinaster* is also satisfactory but is better suited to very dry and infertile sites.

Woodlots

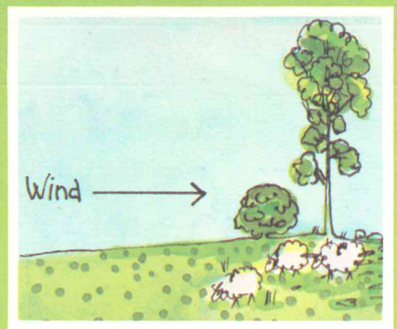
Woodlots are a type of agroforestry in the sense that they can be integrated with the overall management of a farm. For example, woodlots can be positioned on land that has the potential to erode, or on soil that is unsuitable for good pasture and crops. In addition woodlots can provide shelter for livestock, such as newly shorn sheep during bad weather. Woodlots are usually dense and managed as a small plantation to produce timber.

The main management tasks are thinning and pruning.



Windbreaks

Windbreaks are belts or blocks of trees designed primarily to provide shade or shelter. However windbreaks are dynamic and can be managed for firewood or poles by thinning out. With appropriate selection of tree species, honey and stock fodder can alsc be products of a windbreak. In an established windbreak, grazing may become part of management. The illustrations below depict two types of windbreaks. There are many other possible designs.



Strategically placed blocks

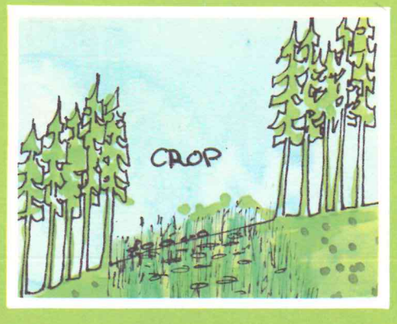
Narrow belts around paddocks

Strips of Trees and Grazing

This type of agroforestry involves strips of trees with interstrip areas of pasture. The system is attractive because it enables cropping to continue between the strips of trees. Also thinning and pruning debris remains within the strip of trees and doesn't cover the pasture.

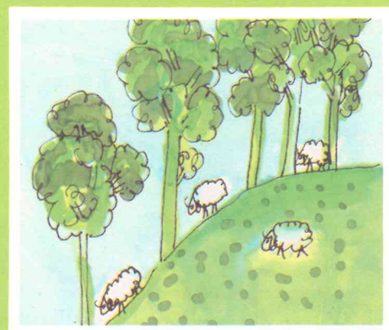
The desired width of pastured land between the strips of trees will depend on the type of farming. Where cropping is the main aim and trees are required primarily to help control wind erosion, strips could be 200 metres or more apart. On the other hand, if the objective is to grow substantial amounts of timber with some pasture then the strips could be as close as 20 metres apart.

Generally it is considered that the strip of trees should contain 3-5 rows as this width should make it possible for all trees to tap nitrogen produced by clover and to receive phosphate fertilizer. If mechanical thinning is envisaged a five row strip is an advantage as this is the number of rows that current machines thin in one pass.



Pasture under Native Forest

Grazing stock under native forest has been practised since the first settlers arrived 150 years ago. In recent years a few farmers have demonstrated that good pasture can be established and managed under native trees.



The forest is burnt prior to spreading clover seed and superphosphate. To maintain pasture, the grass and leaves must be burnt about every second year and dressings of fertilizer applied. The main advantage of the system is that for relatively little outlay, bush land can produce returns from grazing. This technique may be especially useful on steep slopes where erosion is a potential problem. As the price of jarrah timber rises farmers may see value in tending the trees; removing the poorer ones allows the remaining trees to grow faster.

Species for Agroforestry

Where timber production is the aim there are numerous *Pinus* and *Eucalyptus* species to choose from. *Pinus radiata* is a particularly versatile species due to its rapid growth and quality timber. The Oaks *(Quercus)* and Walnuts *(Juglans)* are examples of attractive exotic genera that produce high quality timber. Fodder trees with potential include the Carob *(Ceratonia siliqua)* and Tree Lucerne *(Cytisus proliferus)*. The range of species tested under agroforestry is limited and there are many others to try.

Economic considerations

Timber is a form of primary produce and if sold is taxed in the usual way. However, a timber crop has flexibility with regard to timing of sale. For example, thinnings can be carried out in years when income from other sources on the farm is low.

Tending of trees, mainly pruning and thinning, can enable more efficient use of farm labour as the work can be done during the quiet times of the year. Another important feature of agroforestry projects where timber is the aim, is the long time lag between initial expenditure and returns. However this disadvantage is offset to some degree by one of the main advantages of agroforestry, that there are a number of on-going benefits, such as returns from grazing under trees and control of soil erosion.

It is suggested that anybody who is contemplating growing trees for timber should determine, distance to the nearest mills, likely transport costs and the price for delivered logs. An alternative option that should also be considered is the possibility and cost of having a spot-mill come in and saw the logs on site.

Further Reading

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McKinnell, F.H. and Batini, F. (1978). "Agroforestry trials in the South-West." Forest Focus No. 20.

Moore, R.W. (1982). "Managing a radiata pine agroforestry area in Western Australia." Paper presented to A.F.D.I. Conference, Mt. Gambier, April 1982, (limited distribution).

Shedley, P. (1982). "Supply and demand for forest products in Western Australia. Paper presented to Agricultural Department seminar, "Trees, Forests and Agriculture," Mt. Barker, September 1982, (limited distribution).

Overall, "Grazing Trees on Australian Farms" would be the best value text. It is a comprehensive book on the use of trees for ornament, shade, shelter and timber production in the coastal and table land areas of temperate Australia. For drier areas, Hall (1972) is recommended.