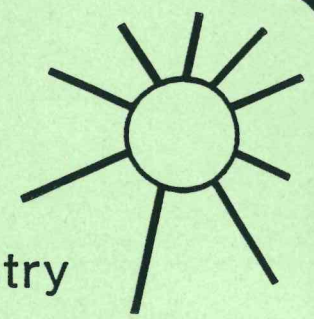
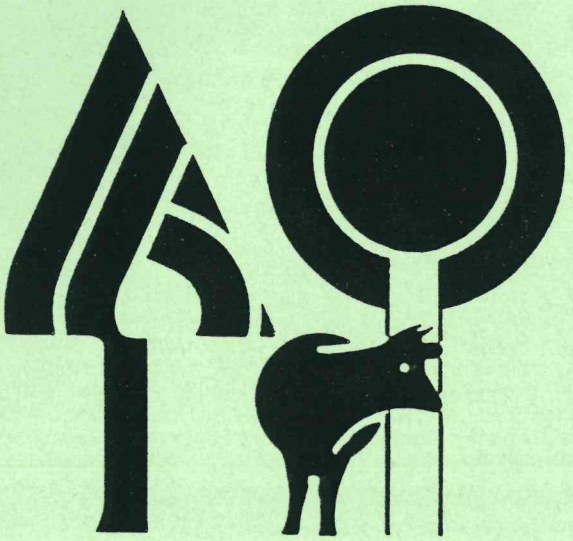
Agroforestry Update



Newsletter for Agroforestry

Researchers and Practitioners



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"FARM TREES FOR PRODUCTIVITY AND PROFIT"
THE THIRD AGROFORESTRY CONFERENCE, MORWELL, VICTORIA APRIL 1989

by David Bicknell
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Esperance, Western Australia

This conference demonstrated not only the groundswell acceptance of the role of trees on farms, but also the move by relevant government departments and farmer bodies.

Many informative papers were given, and several encouraging case histories given by landowners. In general, I thought the willingness to use trees for productivity and profit has outstripped the quantitative information available from reliable sources. It is up to the relevant advisers and researchers to make this information accessible or to start collecting the data.

When the first tide of tree planting enthusiasm ebbs, information will be needed to calculate profitability or productivity gains. Many landowners are waiting and willing to be convinced.

Keynote Papers

"Agroforestry for productivity" was given by Geoff Anderson of CSIRO, Floreat Western Australia. The following is a summary of the paper.

Agroforestry has been defined as the management of land for increased nett social benefit by the simultaneous production of farm and forest products. This includes direct products (such as timber and fodder) and indirect products (such as shelter and lowering of watertables).

In effect, agroforestry is an umbrella definition that can include:

1. Integrating timber and livestock production.

2. Growing tree plantations on farms to reduce waterlogging, lower groundwater levels and/or produce timber for sale or on-farm use.

3. Tree shelterbelts.

4. Fodder trees and other uses.

Integrating Timber and Livestock

Advanced, wide-spaced pine agroforestry trials in Western Australia have shown a nett productivity increase.

Extrapolation of the available data gives combined production of between 118 per cent to 135 per cent of pure agriculture or pure forestry situations. This productivity gain is because the two components are not totally in competition. Extra benefits from the pines are the feed value of pine foliage, and some evidence of better livestock health and performance from consuming pine foliage.

Trees for Waterlogging and Salinity Control

The Western Australian Water Authority has been monitoring piezometers on reforested and agroforestry sites in Western Australia and have data to indicate the extent and rate of drawdown of groundwaters relative to the area planted to trees. (The relationship between actual crown cover and drawdown is a good fit - DB.)

On the sites cited, substantial drawdown was achieved within 10 years with 40 per cent of the landscape replanted.

Dense plantations occupying 70 per cent of the slope reduced groundwater by 2.0 m in eight years, compared to pine agroforestry (averaging 150 trees per hectare) occupying 85 per cent of the cleared slope giving 1.2 m drawdown. There appears to be some flexibility in the positioning of trees, density and species to give a desired result. Having pasture only led to a rise in the watertable.

Growing Trees for Shelter

Shelter benefits are available directly to livestock, crops and pastures, and to reduce soil erosion. Livestock can benefit from a more equable temperature (removal of wind chill factors) in energy requirements and survival during adverse conditions (lambing and shearing).

Crops and pastures are protected from sandblasting and desiccating winds.

Nett gains from shelter are possible only if the shelter is well designed and managed.

Three shelter programmes are worthy of note:

- NSCP Shelterbelt Project in Esperance, Western Australia (see article in this Agroforestry Update).
- Victorian 'Sheephaven' programme, and
- Chinese 'Forest-net' technique.

Trees and Shrubs for Fodder

Many trees and shrubs have fodder potential, although few have been investigated in Australia. The available trees cover a wide range of soil and climatic requirements.

Tagasaste (in Southern Australia) is the best known and most widely planted fodder shrub. Management is still being investigated by farmers and researchers.

Conclusion

Trees are not totally competitive with crops and pastures - there is a degree of complementarity which is exploited in agroforestry.

Perhaps the greatest value of agroforestry, is that without trees, there must be serious doubts about the long term sustainability of agriculture.

"Agroforestry for profit" was given by Richard Moore of the Department of Conservation and Land Management, Busselton Western Australia. The following is a summary of the paper.

Economic analyses of agroforestry options have not been readily available until recently because reliable data from actual systems had not been collected. This paper examines the economics of widely spaced pines with livestock in the 500 to 700 mm rainfall zone; plantations of Eucalyptus globulus for producing chipwood and reducing land degradation; and timber from managed pine shelterbelts.

All these options have been shown to be profitable.

Widely Spaced Pine

This system is being considered in catchment areas for potable water. The benefits are from timber, improved agriculture, lowering of the watertable, and lessening of the salt load in public water supplies.

The analysis given only considered timber and agricultural returns and therefore understated the value.

Nett present values (NPVs) were strongly affected by the discount rate used - to be expected over a 30 year programme.

The analysis showed all the proposed agroforestry regimes having positive NPVs at discount rates up to 10 per cent.

Nett present values were greater with lower tree density (i.e. higher annual agricultural returns) at high discount rates (15%). At lower discount rates (5%), tree density has relatively little effect on nett present values.

Previous analyses have shown agroforestry to be at least as profitable as a pure agricultural system.

Plantations of Eucalyptus globulus

This system is also being encouraged on catchment areas. The Western Australian government is offering it as a sharefarming scheme, and paying annuities for use of the farmers' land.

Within the targeted areas, annuities range from $65 to $110 per hectare in 900 mm rainfall and poorer soils; $95 to $125 per hectare in 650-800 mm rainfall and sandy loams; $175 to $210 per hectare in the 1,100 mm rainfall and good quality loams.

These annuities compare well with grazing enterprises on the same sites. The annuities are CPI indexed, and there is a residual amount paid to the landowner after harvesting.

Factors favouring Eucalyptus globulus schemes are:

- little management needed after establishment;
- coppicing ability after harvesting;
- fairly secure market for hardwood chipping material;
- rapid initial growth and higher water use of this species.

Pine Shelterbelts

Analysis showed good NPVs over a range of discount rates and other likely values in a managed pine windbreak in the Esperance region of Western Australia.

The assumptions and values presented in the paper have been derived from measurement of mature unmanaged trees, and experience from other pine stands in Western Australia.

Nett present values were derived from timber returns and maximum shelter benefits of 10 per cent (potential increase in stocking rate).

The NPV was strongly affected by the timber yield of pruned trees, and by the amount spent on fencing.

(However, the same pine windbreaks used in permanent cropping systems give higher shelter benefits and do not require fencing. NPVs would be much higher for this system - DB).

Conclusion

Properly managed agroforestry is profitable. Farmers, as businessmen, need to have information on the financial effects of planting trees for the expected range of benefits.

CAROB PROJECT OF THE INTERNATIONAL TREE CROPS INSTITUTE

by Henry Esbenshade

This drought-resisting, dry country tree crop was first established in this country over one hundred years ago, primaraily for stock fodder, shade and shelter in rainfall zones as low as 250 mm. Twelve high yielding cultivars from Europe, North Africa and America were introduced into four States in 1981 to start the first phase of a variety trial programme. At this time, a co-operative project with CSIRO and the Agricultural Chemistry Centre (Western Australia) is analysing pod and seed gum contents of 29 promising new selections from Western Australia, South Australia and Victoria. The National Carob Gene Pool Programme intends to expand this work in the coming year, as well as start State Registers of carob locations much like in Western Australia where over 350 locations have been recorded to date.