

ENGINEERED WOODLANDS: FOR PASTURES, SHELTER, TIMBER & CARBON

Engineered Woodlands are wide-spaced tree plantings engineered to integrate traditional agriculture with income-producing trees.

Benefits

1. Livestock and pasture shelter
2. Better habitat for biodiversity
3. Improved soil nutrient cycling and water use efficiency
4. Income from timber and carbon credits.

Key features

- Designed to produce multiple income streams from both the traditional agriculture as well as the trees.
- The use of entire paddocks for tree establishment minimises fencing costs, and substantially reduces establishment costs (see Box 2).
- Agricultural activity can continue between belts once trees are sufficiently established (within 1-2 years).
- Rows are established at spacings to suit machinery, pasture and stock management, and are aligned to maximise microclimate benefits.
- Only the very best suitable species and establishment techniques are used to maximise timber growth, carbon sequestration and to ensure livestock can be re-introduced into the paddocks as quickly as possible.
- Weed control is a critical success factor!

Box 1: Estimated economic benefits from shelter in a contour-planted engineered woodland

The economic benefits from shelter in a contour planted engineered woodland in the New England was estimated by David Thompson, a resource economist with the Centre for Agricultural and Regional Economics, as part of a study undertaken during the Land Water Wool Project.

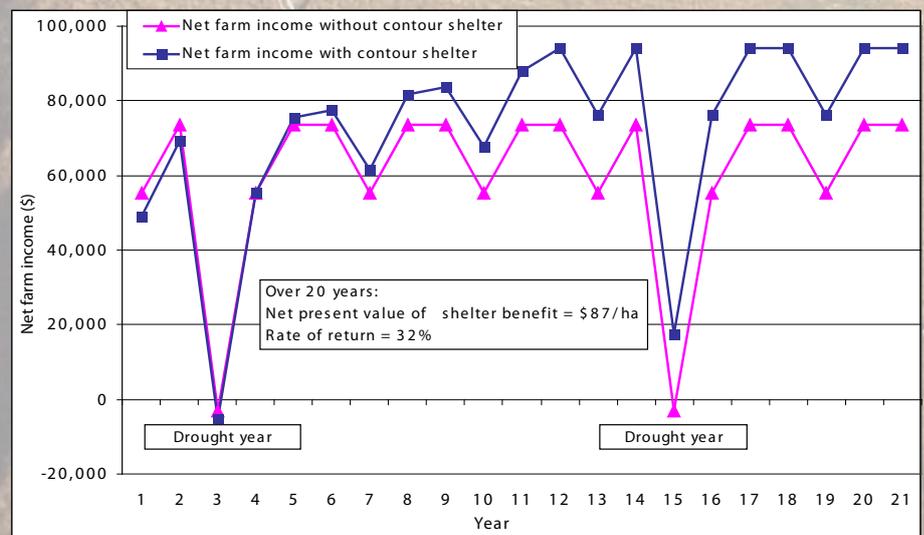
The study assumed costs of \$421/ha for tree establishment and included benefits of a 50% reduction in sheep death rates (for young and adult sheep) and an improvement in lambing rates from 80% to 90%. It was assumed stock were excluded from the tree plantings during the establishment year, and gradually re-introduced in year 2 and increased until normal carrying capacity was resumed 5-6 years post-planting. Because of the staged nature of the tree planting, it was assumed

it was possible to maintain overall farm stocking rates by moving stock to other paddocks while trees established.

These parameters were run through a hypothetical Northern Tablelands farm model assuming a 10 year development period for an engineered woodland tree cover of 11% across the farm (about 15 ha planted annually for 10 years). The benefits for improved lambing and death rates were phased in over the development period. No timber returns were included in the model.

Results of the analysis are summarised in Figure 1 and indicate a substantial return on investment in shelter as a result of higher lambing rates, lower deaths and therefore increased sales of surplus ewe and wether hoggets.

Figure 1. (source "Economics and the Environment: not mutually exclusive!" Land, Water & Wool Northern Tablelands Project Fact Sheet 8).



Background photo - An oblique aerial photo of the engineered woodland in "Top Sugarloaf" at Jon and Vicky Taylor's property 'The Hill'. Photo by Michael Taylor.

A Case Study

Jon and Vicki Taylor and their family have pioneered engineered woodlands on their properties "The Hill" and "East Oaks" at Kentucky NSW. The wide-spaced contour plantings established in whole paddocks have covered between 10% and 15% of each paddock without loss in livestock carrying capacity!

'Top Sugarloaf' (left) and 'Reserve' (right) paddocks - two of the earliest engineered woodlands established by the Taylors. Source www.imagery.maps © Dept Lands.



Below left and right - Parts of 'The Hill' & "East Oaks" showing some of the layouts trialled over the years. The wide-spaced contour plantings (engineered woodlands) are probably the Taylor's favourite design because of the more comprehensive shade and shelter they provide and the much lower establishment costs per hectare. Source www.imagery.maps © Dept Lands.



Box 2. Cost Comparison between a traditional Landcare shelterbelt and an Engineered Woodland in a 20 ha paddock

Cost items	Shelterbelt on southern and western paddock boundaries	Engineered woodland across the paddock, double row every 50 m
Fencing	900m x \$5/m* = \$4500	\$0
Seedlings establishment @ \$2.63 [#]	\$5260	\$8416
Total	\$9760	\$8416
Effective sheltered area	Maybe 50% of paddock = 10 ha	Whole paddock = 20 ha
Cost/area sheltered	\$976/ha	\$421/ha ^A

* materials and labour

approximate costs include ripping, spraying, bed preparation and seedlings.

^A Please note that there may well be additional opportunity costs associated with paddock management (e.g. fodder cropping, shepherding stock, labour and materials for strip grazing, or reduced grazing access) during the establishment phase of an engineered woodland.



Above: Shelter belt planting - 900 m x 15 m wide = 1.35 ha @ 1500 stems/ha = approximately 2000 seedlings



Above: Contoured engineered woodland - double row every 50 m, seedlings every 2.5m along rows = approximately 3200 seedlings.

More information

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- View www.nio.com.au (use the forestry links)