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# BRUSHWOOD ECONOMICS

Brushwood (*Melaleuca* species) is already being widely planted in Western Australia on marginal, water-gaining sites. While this is an emerging industry for the State and there is still much research that is required, this brochure aims to assist land managers in making a decision on whether to incorporate plantation Brushwood into their farming system. One of the benefits of a Brushwood plantation is that it is a perennial and once planted, can be coppiced many times. It also assists in managing groundwater on these and adjoining sites, protecting land from salinity.

Brushwood fencing is becoming increasingly popular as a natural alternative to steel and Hardieboard. Currently the majority of the Brush used for the fencing comes from natural stands in the Eastern States with the majority of the fencing panels also being manufactured there. With the likelihood of the building of a Brushwood fencing panel factory in Western Australia and increasing restrictions on the cutting of wild Brush there is an opportunity to grow plantation Brush on land in Western Australia, providing a productive use for currently marginal land and diversification of income for land managers.

There are still many uncertainties regarding the Brushwood industry which include:

- Determining which are the most suitable *Melaleuca* species for various sites;
- Establishing which are the most suitable plantation species for the manufacture of quality Brushwood fencing;
- Harvest rotations for each species and site have yet to be established;
- Establishment and management techniques are still being refined; and
- The price per tonne for the raw material is still uncertain and may change over time.

As with any industry careful planning is required so that a continuous supply of quality Brush can be supplied for processing. Growers need to be aware that if all land suitable for growing Brush is planted to Brush then supply will quickly outstrip demand to the extent that not all Brush will be purchased until further markets can be developed. Currently there are between 700 and 800 hectares of Brush in the Avon region, with a further 170 hectares being planted in 2007 of seedlings subsidised by the Avon Catchment Council. Current estimates are that to keep two panel machines operating full time, 2,500 hectares will need to be planted which will be harvested on a five to seven year rotation. Growth rates further east are anticipated to be slower than in the western parts of the region.

There are many possible scenarios and unknowns, therefore for the purposes of this analysis a conservative yield per hectare has been used. The analysis compares the likely returns from two harvesting scenarios; a seven year and a five year harvest cycle. The Farm Forestry Toolbox can also be used by entering your own figures and creating your own scenarios. Free copies of the Toolbox can be obtained by contacting AVONGRO.

For management techniques, species and site selection and plantation design, contact your regional Farm Forestry Development Officer, contacts on the back of this brochure.

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W E S T E R N A U S T R A L I A

## Overview

This analysis compares several management regimes:

1. Annual broadacre cropping system, using a continuous wheat rotation for simplicity; and
2. Plantation Brushwood, revenue from a range of harvest scenarios.

### The following assumptions were consistent throughout:

- Discount rate: 7% (annual percentage decline in value of today's money)
- Rotation: 21 years
- All figures were calculated on a per hectare basis
- Land value was not considered in the calculations
- Landowner's time not included in the costings
- Depreciation on machinery has not been factored into the calculations
- Carbon values and comparisons have not been included
- Cost of fencing to exclude has not been considered in this analysis
- The economic and environmental benefits to the groundwater table of growing a perennial species

### Scale of enterprise and industry:

- Costs of landowner's time and machinery should be added if the Brushwood enterprise reduces earning from that time and machinery in any other uses.
- Assumptions about returns may not be valid if industry growth outstrips demand or if conducted at a small scale (e.g. less than 2 to 5ha).

## Input cost comparisons (per hectare)

Wheat - input costs			Brushwood - establishment costs		
	Year 1	Year 2		Year 1	Year 2
<b>Undiscounted figures</b>			<b>Undiscounted figures</b>		
Seed and seed treatment	- \$16	- \$16	Site preparation	- \$150	
Fertiliser and freight (nutrient replacement)	- \$80	- \$84	Pest control	- \$40	- \$40
Chemicals	- \$23	- \$23	Weed control	- \$120	- \$100
Spray and fertiliser application	- \$16	- \$16	Seedlings	- \$1,080	
Contractors - seeding	- \$30	- \$30	Plant seedlings	- \$120	
Contractors - harvest	- \$40	- \$40	Re-planting contingency (10%)		- \$108
<b>TOTALS (per hectare)</b>	<b>- \$205</b>	<b>- \$209</b>	<b>TOTALS (per hectare)</b>	<b>- \$1,510</b>	<b>- \$248</b>

### Wheat regime, base assumptions:

- Site/soil quality is optimum for this regime
- Seed and seed treatment cost is \$16 per hectare
- The fertiliser cost was calculated using a replacement value of kilos per hectare of nutrients removed from the soil per tonne; (P-3, K-4, N-23), total cost of \$75 (year one)
- Fertiliser cartage was \$24 per tonne
- Fertiliser and chemical application costs were \$4 per application. The analysis assumed two chemical and two fertiliser applications at a cost of \$16 per hectare
- Fees and levies costed at \$55 per hectare per year
- Contractors were employed for seeding and harvest at a cost of \$30 for seeding and \$40 for harvest
- The per hectare cost of replacing machinery was assumed to be unaffected by the area of wheat

### Brushwood regime, base assumptions:

- Site/soil quality is optimum for this regime
- Seedlings: 3,000 per hectare purchased at 36cents each
- Seedling cost can be reduced with increase in scale
- Allow for 10% seedling infill
- Replacing nutrients removed in crops - estimated @ \$50/ hectare over 21 years
- Some annual maintenance may be required (ie maintain fire breaks, control pests)
- Establishment costs can be reduced by direct seeding, consult your revegetation advisor for more information on techniques and costs
- The stand can be repeatedly harvested on a coppice cycle

## Projected returns

Returns over 21 years (per hectare) - first harvest at year seven						
	\$200 per tonne (10 tonnes/ha)		\$300 per tonne (10 tonnes/ha)		\$200 per tonne (15 tonnes/ha)	
	Harvest every five years*	Harvest every seven years*	Harvest every five years*	Harvest every seven years*	Harvest every five years*	Harvest every seven years*
<b>Undiscounted figures</b>						
Income	\$6,000	\$4,000	\$12,000	\$6,000	\$9,000	\$6,000
Less all costs	-\$1,760	-\$1,760	-\$1,760	-\$1,760	-\$1,760	-\$1,760
Total benefits minus costs	\$4,240	\$2,240	\$10,240	\$4,240	\$7,240	\$4,240
<b>Discounted figures</b>						
Income	\$2,770	\$2,020	\$5,530	\$3,030	\$4,150	\$3,030
Less all costs	-\$1,740	-\$1,740	-\$1,740	-\$1,740	-\$1,740	-\$1,740
<b>NPV, 21 year project</b>	<b>\$1,030</b>	<b>\$280</b>	<b>\$3,790</b>	<b>\$1,290</b>	<b>\$2,410</b>	<b>\$1,290</b>

\* The returns are higher when harvesting every five years as opposed to every seven as more harvests can be carried out during the twenty one year project.

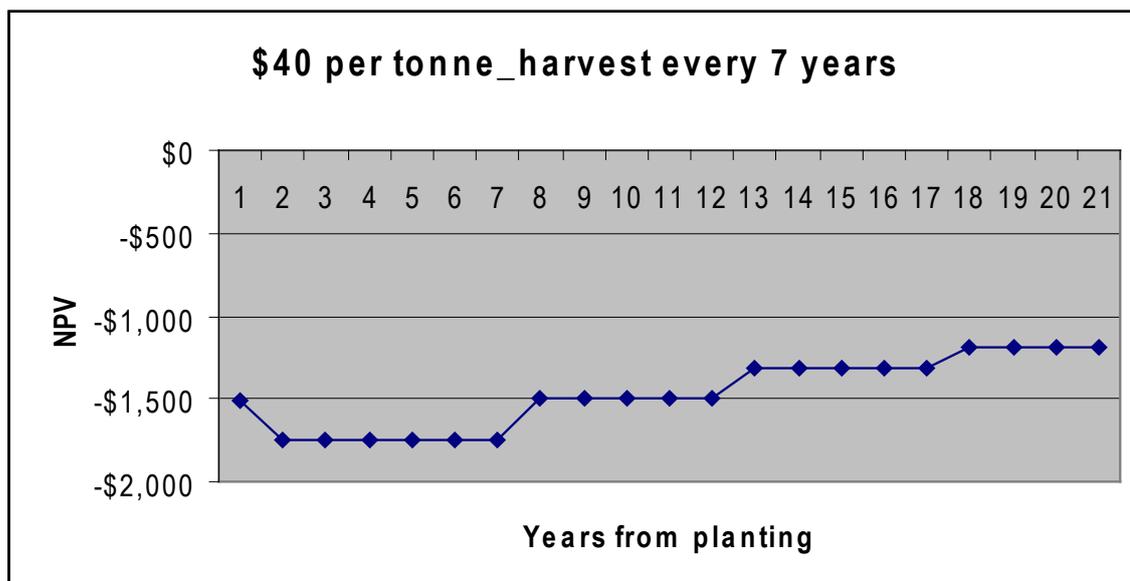
Returns for wheat over 21 years (per hectare)		
Wheat regime		
<b>Undiscounted figures</b>		<b>Assumptions:</b>
Income	\$9,350	• <b>Wheat:</b> The wheat yield was 2.2t/ha, it increased by 2% annually to account for technology and variety advances
Less all costs	-\$4,470	• <b>Wheat:</b> price for wheat used here is \$220/tonne (Free On Board) with production increasing over time
Total benefits minus costs	\$4,880	• <b>Wheat:</b> requires adequate growing season rainfall
		• <b>Brushwood:</b> the initial harvest will be at year seven and have a lower yield than subsequent harvests
		• <b>Brushwood:</b> harvest will be either at five or seven year intervals dependant on the site
		• <b>Brushwood:</b> harvest costs to the farmer are nil
<b>Discounted figures</b>		• <b>Brushwood:</b> 10 tonne/hectare yield
Income	\$4,600	• <b>Brushwood:</b> will benefit from rainfall any time during the year
Less all costs	-\$2,360	
<b>NPV, 21 year project</b>	<b>\$2,240</b>	<b>Note:</b> Currently there are not enough mature Brushwood plantations established to confirm this information

With an industry as young as this it is extremely difficult to estimate returns and financial viability. While it seems that a mechanical harvester will be coming to the Avon during 2007 and that a Brushwood panel manufacturing factory will be erected soon afterwards, until this local harvesting and processing is proven returns of a twenty one year project can only be conjecture. Yields per hectare will be dependant on the site conditions, the species chosen and rainfall. Gate price to the farmer is estimated to be \$200 per tonne however this analysis compares this to a potential \$300 per tonne to show the types of variabilities that price can bring into the equation. It is also uncertain as to the length of time until the first and then subsequent harvests so this analysis assumes that the first harvest will be at year seven and then compares further coppicing at years five and seven. All of these variables will have a significant impact on the financial viability of the project.

However it should be recognised that the environmental benefits have not been factored into the equations in that Brush will likely be planted on water-gaining sites at risk of going saline should no action be taken.

**Current situation**

Currently some farmers are receiving \$40 per tonne on a seven year rotation. Not taking the environmental benefits into account, based on this price the Net Present Value (NPV) of a Brushwood project would be **-\$1,200** over a twenty one year project and so will never be financially viable. For the Brushwood industry to be truly commercially viable it is vital that mechanical harvesting takes place, that there is local value-adding and processing and that farmers receive a reasonable amount per tonne for the raw product. It will also be imperative not to create an oversupply of Brush which would also decrease the value of Brush in general.



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**Definitions:**

- *Discounted Cash flow* - A method of assessing the value of an investment based on predicted cash flows 'discounted' to take account of the reducing value of money over time.
- *NPV* - The Net Present Value of an investment project is the present value of the net cash flows.



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**Disclaimer**

The details provided in this information sheet have been collated from the best available information at the time of writing. Please check with a reputable revegetation advisor prior to making any decisions based on the information presented here.