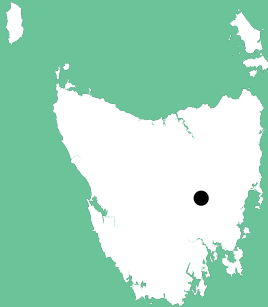


4. Agroforestry improves enterprise income

Formosa, Cressy - When timber and non-timber values are accounted for, carefully integrating trees into agricultural landscapes can be a profitable and attractive option with strongly competitive internal rates of return.



AT A GLANCE

Owner	Family owned
Property name	Formosa
Location	Cressy, Northern Tasmania
Property size	773.8 ha
Enterprise	Dryland and irrigated mixed farming
Rainfall	592mm
Soil type	Brown chromosol
Forested area	1 ha

KEY POINTS

- Agroforestry can bring positive economic returns for whole farm enterprises.
- Internal rates of return on this particular shelterbelt equate to around 19% due to the direct and indirect benefits.

Agroforestry improves enterprise income

Agroforestry is the incorporation of woody perennial vegetation into agricultural systems. Agroforestry often involves planting commercial forestry species for harvest, but also includes planting stream-side buffers, shelter belts of native species or even species that produce high-value products for harvest, such as energy, fruits, nuts, oils and honey. The benefits of agroforestry to the farming enterprise include diversification, increasing overall productivity and improving the sustainability and resilience of farm systems. Trees integrated into agricultural systems have many benefits to other parts of the farming enterprise that are rarely accounted for in farm balance sheets so we: Quantified and integrated the direct and indirect benefits of trees to the farming system. Sought to understand the most profitable configurations of trees on farms. Explored farmer motivations and barriers to adoption of trees on farms. Demonstrated a strong economic argument to include trees in agricultural landscapes.



How to optimise returns

- Design the configuration of the trees to maximise shelter benefits.
- Choose species with low market uncertainty.
- Minimising harvest and logistic costs by ensuring sufficient scale of resource.
- Integrate the value of co-benefits into decision making e.g. shelter, carbon.
- Develop systems that generate returns earlier.

Determining the profitability of agroforestry

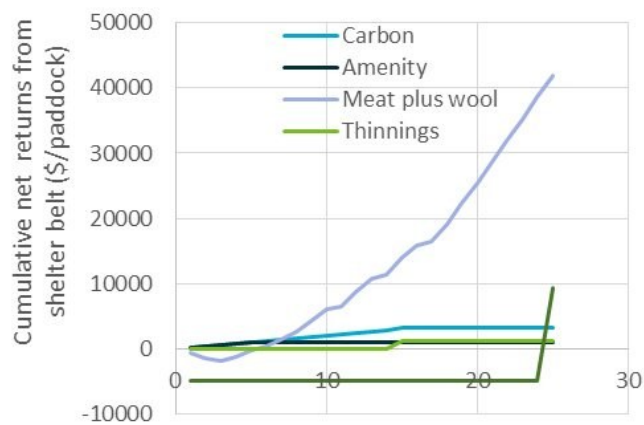
Agroforestry is often perceived to be unprofitable or associated with high opportunity costs forming a significant barrier to adoption. However, there is a paucity of financial analyses examining the profitability of agroforestry systems in Australia. Published case studies in a range of farming systems across southern Australia (livestock, cropping, dairy) indicate that agroforestry is a profitable option.

- Internal rates of return on agroforestry systems are typically around 8%.
- Enterprises with agroforestry were more profitable than agriculture only or forestry only enterprises.
- Benefit: cost ratios were highly variable but generally greater than one, ranging from 1.3 to 17.4.

Accounting for the co-benefits: “why wouldn’t you plant trees?”

Explicit recognition of co-benefits is important for understanding the full value of agroforestry. Shade and shelter for stock, for reducing mortality and stress in hot and cold weather.

- Shelter for crop and pasture production. Carbon that can be traded in carbon markets.
- Co-products such as biomass thinnings/prunings, oils, and honey can generate extra income.
- Improved amenity and land values, typically by 4 to 15%.
- Specialty timbers can be profitable. However, longer rotation lengths (and discount times), and greater market uncertainty may require more proactive commitment from farmers.
- Increases biodiversity and sustainability, managed water flows and reduced wind and water erosion.



Modelled net cumulative returns from a 1ha *P. radiata* shelter belt in 25ha pasture paddock at Cressy

Gross returns over 25 years were calculated to be \$56,560 as follows:

- Tree harvest (age 25): \$14,300.
- Shelter benefits for meat and wool production: \$42,007.
- Carbon sequestration: \$3,090.
- Amenity/land value: \$1,000

After accounting for the establishment costs of around \$6,000/ha, the internal rate of return was 19%.

Plantation assumptions: wood price of \$40/m³, fencing costs of \$7/metre, establishment costs of \$1.80 per seedling, plus site prep and weed control costs of \$375/ha.

Pasture assumptions: A self-replacing flock of sheet producing wool and meat, stocked at 18 DSE, with feed costs of \$300/tonne, wool prices of \$16-\$18/kg and sheep sale values of \$85-\$119/head.

Shelter assumptions: shelter benefits on pasture production were 60% of those measured at Formosa and reduction in livestock mortality of 50%.

In brief

- Agroforestry can bring positive economic returns to the whole farm enterprise.
- A case study shelter belt on Formosa conveyed shelter values (including pasture production and reduced mortality) exceeding the value of the timber by 2-3 fold.
- Internal rates of return on shelter belt equate to around 19% because of the direct and indirect benefits that the trees convey.

Acknowledgements

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