SOUTHERN AGROFORESTRY FIELD DAY  
- a field day for farmers, foresters and land-use managers

Run Sheet
Wednesday 29th August 2018
10:00am to 2:30pm

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>10:00</td>
<td>Registration &amp; coffee etc</td>
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<tr>
<td>10:15</td>
<td>Introduction to field day &amp; brief introductions:</td>
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<tr>
<td></td>
<td>- Dr Martin Moroni, Manager Business Development, Private Forests</td>
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<tr>
<td>10:30 – 11:15</td>
<td>Dr Daniel Mendham to talk about the research findings of the agroforestry programme</td>
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<td></td>
<td>- Followed by:</td>
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<td></td>
<td>- Dr Martin Moroni to talk about carbon initiatives to establish trees</td>
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<tr>
<td>11:15 – 11:30</td>
<td>Intermission &amp; a talk from University of Tasmania</td>
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<tr>
<td>11:30 – 11:50</td>
<td>David Bower to talk about the efficient and effectives methods of establishing trees</td>
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<tr>
<td>11:50 – 12:00</td>
<td>Re-group &amp; questions</td>
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<tr>
<td></td>
<td>Directions to York Plains</td>
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<tr>
<td>12:00 – 12:30</td>
<td>Travel to York Plains</td>
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<tr>
<td>12:30 – 1:00</td>
<td>Light lunch at shearing shed</td>
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<tr>
<td>1:00 – 1:15</td>
<td>Dr Aysha Fleming, Research Scientist, CSIRO - fun &amp; games!!</td>
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<tr>
<td>1:15 – 2:00</td>
<td>Introduction to Henric Nicholas and the family property:</td>
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<td></td>
<td>- Brief history from Henric: and</td>
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<td></td>
<td>- Informal chats about the anecdotal benefits of trees in agriculture</td>
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<tr>
<td>2:00 -2:30</td>
<td>Any more questions?</td>
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<tr>
<td></td>
<td>Summary &amp; goodbye</td>
</tr>
</tbody>
</table>

Directions and location map for York House, Sorrell Springs Road, York Plains - see over
Stop 2 of the Southern Agroforestry Field Day will be at York House, Headlams Road, Sorrell Springs Road, York Plains

Directions:
1. Turn left onto Midlands highway for approximately 39km
2. Turn right onto York Plains road for 6.5km
3. Turn left onto Sorrell Springs Road for 1km
4. Keep right to continue onto Headlams road for 1km
5. Park adjacent to shearing shed

Please phone Rob on 0418 550 209 if you have any problems
SOUTHERN AGROFORESTRY FIELD DAY
- a field day for farmers, foresters and land-use managers

Wednesday 29th August 2018

www.pft.tas.gov.au
Stop 1: Mount Vernon Estate, 3001 Midland Highway, Kempton
The pine blocks, stock haven and windbreaks on Mount Vernon at Kempton were planted in 1995 as a collaboration of a Joint Venture between the landowner and Norske Skog; plus input on plantation location, design and structure from Private Forests Tasmania.

The network of pine blocks, stock haven and windbreaks are clearly evident on the Western side of the Midlands highway at Kempton.

The property is characterised by extensive alluvial flats that range from clays and sands to water-worn gravels. The upper terraces and mid-slopes commonly contain deep duplex soil of sandy loam to clay loam surface over a brown/dark brown sandy clay to heavy clay.

These pines have survived some dry years, since planting the sites yearly rainfall has averaged just 450mm with the driest year receiving only 270mm and the wettest year nearly 600mm.
During December of last year growth data was gathered from across the plantings. The average volume was 246 m³ of wood per hectare; the windbreak was thinned in 2010 with a mixture of selective and middle row as an outrow. However, previous measurements indicate a mean annual increment (MAI) of about 12 m³ per hectare per year.

<table>
<thead>
<tr>
<th>Stand variable</th>
<th>Mt Vernon – belt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latitude (°)</td>
<td>-42.51</td>
</tr>
<tr>
<td>Longitude (°)</td>
<td>147.18</td>
</tr>
<tr>
<td>Year planted</td>
<td>1995</td>
</tr>
<tr>
<td>Row spacing (m)</td>
<td>2.4</td>
</tr>
<tr>
<td>Tree spacing (m)</td>
<td>3.2</td>
</tr>
<tr>
<td>Initial stand density (tree ha⁻¹)</td>
<td>1320</td>
</tr>
<tr>
<td>Year measured</td>
<td>2017</td>
</tr>
<tr>
<td>Number of rows</td>
<td>7a</td>
</tr>
<tr>
<td>Belt width (m)</td>
<td>16.2</td>
</tr>
<tr>
<td>Stand density (trees ha⁻¹)</td>
<td>972 (80)</td>
</tr>
<tr>
<td>Mean DBH (cm)</td>
<td>22.7 (0.6)</td>
</tr>
<tr>
<td>Mean height (m)</td>
<td>14.6 (1.3)</td>
</tr>
<tr>
<td>Stand volume (m³ ha⁻¹)</td>
<td>246.1 (19.4)</td>
</tr>
<tr>
<td>Basal area (m² ha⁻¹)</td>
<td>49.3 (2.8)</td>
</tr>
</tbody>
</table>

Stop 2: York House, Headlams Road, Sorrell Springs Road, York Plains

The pine, cypress and native species windbreaks around York House have been planted progressively by the Nicholas family to provide much-needed shelter for the property. To quote Henric:

“You cannot fatten anything without the shelter given by the trees”.

The network of pine, cypress and native species windbreaks on York House and neighbouring properties provide the shelter that is essential to operate a viable agribusiness.

The property is characterised by lower slopes with deep uniform black to dark grey clays. The mid-slopes commonly contain deep duplex soil of loamy sand to clay loam surface over a yellow/brown clay. Upper slopes have a thin (approx. 35m) of brown-yellow sand over Triassic sandstone. The black clays and frequent frosts mean that the lower lying areas are better suited to native species, with pines further up the slopes.

The average long-term rainfall is approximately 550mm per year.
At a Glance
Owner: Damian Burbury
Property Size: 1,600 hectares
Enterprise: Grazing / Pastoral - not irrigated
Rainfall: 520 mm (average)
Soil types: Duplex soils - sandy loams / light clays

Background
The Burbury family recognised the benefits of trees to their farming enterprise many years ago. Initially Damian’s father started the process to integrate trees into their farm and now Damian has continued to establish shelterbelts primarily to provide shelter for the pasture and the livestock which is particularly useful for lambing ewes and freshly shorn sheep.

Damian says…
“Luckily my father had the foresight to plant the shelterbelts around the farm; they provide shelter from the hot and dry in the summer, and the cold and wet in the winter for both pasture and livestock. However, in order to get really good results in the harsh Midland conditions, it is essential to get the tree establishment correct”.

Bowsden property, near Mud Walls Rd, 2013 prior to roadside shelterbelt planting

Bowsden property, near Mud Walls Rd, 2016 after roadside planting using Private Forests Tasmania’s mound plough
Doing it right - site preparation:

Weed control is the most significant work you can do. It is likely to determine the success or failure of most projects. Provide a weed free zone at least 1.0-1.5m in diameter around the tree, or a strip 1.5-2.0m wide along the planting mound.

Cultivate the soil

- Disc or rotary hoe strips (1.8m wide) when soils are dry and at least 3 weeks after spraying weeds.
- Ideally, rip and mound planting lines over summer or autumn.
- The soil should be dry or slightly moist but not wet.
- Mound spacing should be 3m to 4m centres. (You may need to allow for vehicle access).
- Steep slopes, soil type and soil and water conservation needs may limit cultivation to ripping only, spot cultivation or no mechanical cultivation.

Weed control after cultivation

- Keep cultivated soil weed free for two growing seasons after planting.
- After cultivation, one or more knockdown applications may be required before planting, depending on germination of weed seeds.
- Application of residual herbicides before planting will inhibit the germination of most weeds for 6 to 9 months.
- Applying herbicides after trees are planted is both difficult and costly.

Mound ploughs for farm tractors are available for hire from Private Forests Tasmania.

Key information:
Tractor - minimum 75hp, preferably 85-100 hp to be provided by landowner.
Mound Plough on trailer gross weight 1,600kg (1.6 tonnes).
Hire from PFT

Contact Us
Private Forests Tasmania
30 Patrick Street
HOBART TAS 7000
(03) 6165 4073
admin@pft.tas.gov.au
Visit us on the web at www.pft.tas.gov.au
Shelter improves Lucerne yield

‘Woorak’ - Epping Forest, Northern Midlands

Introduction
Round bales of Lucerne hay that had been dropped in a paddock in the Northern Midlands in the lee and outside of the lee of a N/S belt of *pinus radiata* were measured. The baling started close to the tree line and followed a zig-zag pattern from tree line to furthest part of the paddock away from the tree line. Thus, the bales are likely to be close to the point where their hay was grown, especially in relation to the trees.

At a Glance
Owner: Daniel Fish
Study Size: 12.5 hectare paddock
Enterprise: Livestock (sheep) and cropping
Rainfall: 550 mm (long term annual rainfall)
Soil types: Brown Chromosol: sandy loam over heavy clay

Summary
Lucerne hay yields were estimated to have increased by up to 300% due to reduced wind speeds in the lee of a pine shelter belt. This equated to over $1,000 of additional benefit across the sheltered area of the paddock (about $147/ha).

Value of Shelter
While there are several assumptions surrounding the assessment of the shelter benefit to the Lucerne hay production in this case, if a new hay bale value of $80/bale is assumed, and the bale density is assumed to accurately reflect the effects of shelter, then the net benefit of shelter is around an extra $147/ha for this harvest, or $1,133 across the sheltered 7.7ha of the paddock.

Bale density in the sheltered verses unsheltered area

Wind
The wind at the site for Spring 2017 (the growing season for Lucerne) was measured in a nearby paddock, where the agroforestry research project has an automatic continuously monitoring weather station. The results from the wind monitoring clearly show that the vast majority of the wind comes from the NW and NNW (50% of all wind), another 9% of the wind originated from the north, and 7% from the WNW. All other directions contributed to 5% or less of the total wind over this time period.
**Conclusions**

There was a much greater bale density in the sheltered area compared to the unsheltered area of the paddock with a 3-fold increase in bale density in the sheltered area, and an estimated value of the shelter to the hay production of over $1,000.

The results are an indication of the benefits of shelter but do not form a definitive assessment of the shelter effect on hay production. This is because it was a one-off measure and uncontrolled factors such as baler path and how far the hay was moved from the point of growing to the point of bale drop introduce uncertainty. In the more productive areas, the bales would be dropped close to the point of hay production, but in the sparse areas, bales may be some distance from their hay source.

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**Locations of the hay bales as dropped**

Dropped 16 November 2017. The red arrow represents the average predominant wind direction (between NW and NNW), in relation to the top end of the belt. Bales to the south of the line are in the portion of the paddock.

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**Hay bale locations**

The locations of each bale were assessed and plotted. An arrow showing the sheltered and unsheltered parts of the paddock is drawn with approximately 7.7ha in the sheltered zone (64% of paddock area), and 5.3ha (36%) in the unsheltered zone, to the north of the shelter line. A total of 20 bales were in the sheltered zone (17% of the hay). This equates to 2.6 bales of hay/ha in the sheltered zone and 0.75 bales of hay/ha in the unsheltered zone, or more than 3-fold the hay production (on an area basis) in the sheltered zone.

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**Wind rose at ‘Woorak’ for most of Spring 2017, up to the week before harvest (Sept 1st to Nov 9th)**
Agroforestry improves enterprise income

Introduction

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.

At a Glance

- Owner: Family owned
- Study Size: 25ha paddock
- Enterprise: Dryland and irrigated mixed farming
- Rainfall: 550—600mm per year
- Soil types: Brown Chromosol

Summary

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.

How profitable is 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 of agroforestry systems are typically around 8%.
- Enterprises with agroforestry were more profitable that agriculture only or forestry only enterprises.
- Benefit:cost rations were highly variable, but generally greater than one, ranging from 1.3—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.

Optimising Returns

- Design the configuration of the trees to maximise shelter benefits.
- Choose species with low market uncertainty.
- Minimising harvest and logistics 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.

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 the shelter belt equate to around 19% because of the direct and indirect benefits that the trees convey.

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Acknowledgements
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Introduction
Formosa is one of four Tasmanian properties where the benefits of treed shelterbelts on pasture growth and the environment are being measured by Private Forests Tasmania, CSIRO and the University of Tasmania. During the spring of 2017, stock were excluded from the Formosa paddock, and pasture was measured and mapped across the paddock, from sheltered to unsheltered areas, using a GrassMaster Pro pasture biomass meter.

Site Description
The paddock is 500 x 500m, with a north/south oriented shelterbelt of Pinus radiata on the windward western edge. The 5-row shelterbelt was planted in 2001 and was 17 year old at the time of measurement with trees approximately 15m tall and 24cm diameter at breast height. The shelterbelt contains around 250 m$^3$/ha of wood. The porosity of the belt is around 30%. The paddock was sown with a cocksfoot and clover mix in the autumn of 2015 and the pasture at the time of the study was 2 years old and relatively uniform. The paddock is flat and level and has minimal variation in soils (based on an EM38 map).

Summary
Pasture productivity in Spring 2017 was on average 30% higher in the sheltered half of a paddock compared to the unsheltered half. A Pinus radiata shelterbelt occupied approximately 1 ha of the paddock (4%), but induced a 15% increase in pasture growth over the remaining 24 ha, and effectively increased the pasture production to the equivalent of a 29 ha paddock. The impact of shelter on gross margin is likely to be around $63/ha, or $1500 in total across the paddock. Any financial benefits for stock survival, carbon and forest products are in addition to this.

"Trees are an integral part of what we do. Future farm planning includes agroforestry"

- John Heard, ‘Formosa’ Farm Manager

The 17-year old, unmanaged, multi-row Pine shelterbelt viewed from the South. The net paddock area is around 25 ha (500 x 500 m) with the belt occupying around 1 ha on the western edge. Photo credit: Arthur Lyons, Private Forests Tasmania
Pasture Measurements
The paddock was grazed down to a relatively uniform starting point in the autumn and winter of 2017, and stock were excluded from the paddock in mid-August. The pasture was allowed to grow for around 7 weeks until early October. Pasture biomass was measured on October 3rd, 2017. A total of 7 transects running perpendicular from the shelterbelt were established across the paddock. Measurements were taken every 10 m along each transect.

Wind
The wind at the site for spring 2017 was measured directly in an open unsheltered part of the paddock, where an automatic weather station continuously monitored wind direction and speed. The vast majority of the wind came from the NW and NNW (50% of all wind), another 9% of the wind came from the north, and 6% from the SE (Fig. 2). All other directions contributed to 5% or less of the total wind over this time period. The shelterbelt was close to perpendicular to the bulk of the wind and reduced wind speed on average by around 50% over the sheltered half of the paddock.

Value of Shelter
Shelter lifted overall pasture production of the 24 ha paddock by approximately 15%, equivalent to the increase in hay yield, and/or the stock that can be carried on the paddock. If the gross margin of the grazing enterprise is $420/ha, and the increase of 15% productivity translated directly into gross margin, this would be increased by 15%, or around $63/ha, or an additional $1,512 over the 24 ha of the pasture. This effect is in addition to shelter benefits of increased stock survival and weight gain, as well as returns from wood sales when the shelterbelt is harvested, income from selling carbon credits associated with the net carbon increase from changing land use from pasture to trees, and increased land value.

Conclusions
The shelter belt at Formosa has conveyed a substantial benefit to the pasture production across the paddock, with 30% more pasture in the sheltered half of the paddock. One hectare of trees effectively increase the production of pasture from the paddock to the equivalent of a 29 ha unsheltered paddock. If this increase in pasture growth translated directly to the gross margin, it increased the net returns to the farmer from the paddock by around $1500. This is in addition to other benefits that the trees can provide, including timber production, carbon, biodiversity and amenity.

Acknowledgements
Daniel Mendham¹, Martin Moroni², Dale Worledge¹, David Bower², and Arthur Lyons²
¹CSIRO Land and Water (email: Daniel.Mendham@csiro.au), ²Private Forests Tasmania
(email: Martin.Moroni@pft.tas.gov.au)

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How to earn Carbon Credits for establishing shelterbelts and new plantations

Carbon credits (ACCUs Australian Carbon Credit Units) were made available from Federal Government’s Emission Reduction Fund (ERF) via reverse auctions.

- Average price at last auction $12 per tonne of CO₂ stored/abated.
- No more auctions planned, but Clean Energy Regulator fund still has 250 million and could support more auctions.
- Approach likely to change in the future.
- Carbon project developers / aggregators trade ACCUs awarded from past auctions and can participate in future auctions. Some can access carbon credits from other sources.

Carbon Project developers / aggregators seek projects under two forestry methods to generate abatement and payment. Carbon stocks are estimated by the Federal Governments carbon accounting tool (model) FullCAM and no onground/inventory measurements are used.

**Method 1 - Short rotation plantation conversion to long rotation plantation**
- Conversion at mid or end rotation.
- Must be second rotation to be eligible in Tasmania.
- *E. globulus* and/or *E. nitens* converted to *P. radiate*.
- Difference in carbon stocks between the short and long rotation paid out in 10 equal instalments over 10 years.
- Funding potential approximately 1-2 thousand dollars per ha in total.

**Method 2 - New plantation establishment**
- Eligible areas must not have supported trees in the 7 years before tree establishment.
- Long and short rotation plantations are eligible.
- Must satisfy plantation water interception concerns where rainfall is >600 mm/year.
  - Department of Primary Industries, Parks, Water and Environment (DPIPWE) have a draft procedure with the ERF which has been successfully applied in Tasmania.
- 1-3 thousand dollars per hectare in total.
- Carbon credits paid as trees grow.
- Cover much of the establishment costs.
- GREAT OPPORTUNITY FOR AGROFORESTY (and new plantations).

**Carbon project developers / aggregators operating in Tasmania**

**WeAct Pty Ltd** (Carbon project developer / aggregator)
Vivek Dugar | M 0427 324 541 | E arjan@weact.com.au
www.weact.com.au

**CO₂ Australia** (Carbon project developer)
James Bullinski | T (03) 9928 5111 | M 0419 391 160 | E james.bullinski@co2australia.com.au
www.co2australia.com.au

**Climate Friendly Pty Ltd** (Carbon project developer)
Zoe Ryan | T (03) 5348 5561 | M 0439 001 631 | E Zoe.Ryan@climatefriendly.com
www.climatefriendly.com
Timber Belts
Design and Management Considerations

When designing shelterbelts and shelterbelt systems for the farm there are a number of considerations, including:-

- Matching species to site (and potential markets).
- Orientation.
- Number of rows.
- Potential porosity of the belt.
- Potential height of the belt.
- Length of the shelterbelt.
- Maintaining ‘ground to crown’ shelter.
- Spacing between belts in the system of farm shelter.
- Fencing cost - probably the most significant cost in establishing belts of trees.

When designing shelterbelts (systems) there are a number of additional considerations

- If shelter is the only consideration, adequate shelter can be achieved through successful establishment and management of 2 rows of *Pinus radiata* or similar.
- In harsher environments we would recommend at least 3 rows in order to maintain the integrity of the belt should the odd tree be blown over or break off at some point on the stem.
- If 4 or more rows are planted then trees in the inner rows will eventually become suppressed, due to competition with neighbouring trees for resources - light, water and nutrients. Such belts will require management.
- Replacing shelterbelts at the end of their useful life or after harvest. Whilst possible to plant shelterbelts over a short period of time, it is not advisable to harvest (clearfall) them over a short period. Some planning is required.

When considering timber production from belts:-

- Trees in the outside rows of a belt are the fattest, most heavily branched, shortest with poorest form.
- If you wish to produce high value timber products
  - Prune as many trees as is practical in the outer row on the leeward side.
  - Windward side trees may need to be sacrificed in order to provide ongoing shelter?
- Management may include fertilizer application - a close pass with agricultural ‘super spreader’ may be all that is required. Most sites are deficient in Boron, Copper and / or Potassium. Some are deficient in Phosphorous and few are deficient in Nitrogen.
- Even trees experiencing the effects of competition will grow in height. The most crucial management is thinning the stand to release trees and increase log diameter.
- Thinning systems involve removing complete rows of trees (‘outrows’) in order to allow harvesting and forwarding equipment to access the belt/stand.
- Standard systems are third row or fifth row outrow. Fifth row outrow systems are most common.
- Fence designs should be developed with future harvesting in mind. Ends of belts and probably fences on the leeward side should be designed to be taken down during harvesting operations.
- Wood harvested during first thinning is often low grade - young wood, small diameter and often of poor form.
A question of Scale

- A 1,000m, 3 row shelterbelt is about 1ha in area, and hence, a 1,000 m, 10 row belt is about 3.4ha in area.
- Moving large pieces of machinery is a fixed cost and could easily exceed $2,000.
- 10ha is considered to be a minimum economic area.
- It takes quite a significant shelterbelt system to create 10ha of timber.
- Consider establishing a combination of shelterbelts and woodlots in order to create scale.
- Scale can also be created by groups of neighbouring landowners establishing shelterbelts and woodlots of a similar age.

The need to thin a plantation and products from plantation thinning

- Planting densities of most shelterbelt and woodlot plantings are in the range of 1,000 to 1,400 stems per hectare (sph).
- In belts of trees greater than 3 rows wide there comes a point where trees occupy the site and begin to compete with one another for light, water and nutrients. Trees in inner rows become suppressed and diameter growth is restricted.
- If belts or stands are unmanaged, some trees will die as the stand eventually ‘self-thins’.
- On sites of lower productivity the ideal time to thin occurs before the trees have reached merchantable size, posing a dilemma for plantation managers. Waste thinning is not generally favoured by landowners.
- Any given site has a capacity to grow a limited volume of wood. Spread over a smaller number of trees the individual diameters will be larger.
- Thinning ‘releases’ remaining trees allowing them to grow in diameter.
- The target log diameter for pruned trees is 60cm, whilst the target diameter for unpruned logs is a minimum 45cm. This will be achieved at final stand densities around 200 to 400 sph.

Products

- Thinning generally produces low grade products – the wood is young, the trees are small and are usually culls (suppressed trees of poorer form).
- Recent export markets have been very favourable with products down to 12cm small end diameter (SED).
- Major domestic products are treated pine posts for trees over 15 years old.
- There are limited domestic markets for pulpwood, when back carted to Norske Skog. Pulpwood can be merchantable down to 10cm SED.

PFT Staff members are happy to provide advice.

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Private Forests Tasmania, 30 Patrick Street, Hobart TAS 7000
Phone: (03) 6165 4073 | Mobile: 0418 550 209 | Email: rob.smith@pft.tas.gov.au

David Bower | Private Forest Advisor
Private Forests Tasmania, State Government Offices, 171 Westbury Road, Prospect TAS 7250
Phone: (03) 6777 2713 | Mobile: 0417 014 241 | Email: david.bower@pft.tas.gov.au
1. **Order stock and fence the block.**

   **Protect your trees, control the game**
   
   ...sheep and cattle just the same.
   
   - Allocate resources (time and money) for tree establishment project in farm budget.
     Consider appointing a project manager (professional or anointed family member).
   - Plan ahead and **order seedlings 1 year ahead of time**.
     Select appropriate species for the site.
   - Calculate the area and number of seedlings required and tell the nursery when you expect to collect your seedlings.
     ...use a GPS if available.
   - **Fence the area to exclude livestock and other browsing animals.**
     Shooting or poisoning may also be necessary.

2. **Spray before you cultivate**

   Then spray again, use simazine and glyphosate

   **Weed control 101 - Pre cultivation**

   Spray weeds in the spring before the year of planting or keep site grazed to prevent seed set in weeds.

   Ensure **weeds are sprayed at least 3 months prior to ploughing to allow root release.** This is essential on ex-pasture sites.

   **Weed control 201 – Pre plant**

   Before planting, **knock down any newly germinated weed seedlings and apply residual herbicide** in order to prevent weed seeds germinating in the season after planting.

   Most nurseries grow to order. Your trees will take at least 6 - 8 months to germinate and grow to size.

   Order seedlings 10 – 12 months ahead of planting.
Even the best fences require maintenance.
Rip, or rip and mound the site if possible, whilst soil is dry (Summer or Autumn).

Allow soil to ‘settle’ prior to planting. Note, some sites will be better spot cultivated or not cultivated if soil and water conservation measures dictate.
3. **In moist soil plant your trees.**

   **Late in winter, to avoid the freeze.**

   **Weed control 201 – Pre plant**

   Knock down any newly germinated weed seedlings and apply residual herbicide in order to prevent weed seeds germinating in the season after planting.

   Plant seedlings in late winter or early spring when soil is moist.

   - Smudging cloddy mounds and applying residual herbicide in one operation.
   - Smudging creates good tilth, makes planting easier and improves effectiveness of herbicides.
4. Monitor, control each weed.

....Two years freedom is what they need.
Weed control 301- Post Plant

Control weeds around the seedlings for at least 2 years after planting, mulching or spot spraying with appropriate herbicide can be effective.

Some 40% growth loss in first year due to weed competition.

Leaving site preparation to the last minute.
- A problem arising 2 months after planting
5. **Manage, and measure growth.**

*Commit to this, just take the oath.*

- Fill in misses as soon as practical.
- Manage pests.
- Measure tree growth on a regular basis.
- Prune and thin to produce high value timber products.
- Seek advice.
Calendar of Events for Tree Establishment Projects in 2019

Note: Ideally, operations such as seed collection, ordering of either seed or seedlings, and even initial weed control and cultivation, may be better undertaken prior to January in the year of establishment

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<td>Pre cultivation spray</td>
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<td>Planting</td>
<td>Order Seedlings</td>
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<td>Plant when soil is moist</td>
<td>Apply fertiliser if required</td>
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**Trees to Thrive, Just do the Five**

1. **Order stock and fence the block.**
   Protect your trees, control the game.
   ...Sheep and cattle just the same.

2. **Spray before you cultivate.**
   Then spray again; with simazine and glyphosate.

3. **In moist soil plant the trees.**
   Late in winter to avoid the freeze.

4. **Monitor, and control each weed**
   ....Two years’ freedom is what they need.

5. **Manage, and measure growth.**
   Commit to this, Just take the oath.

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Trees on farms projects

Lifting farm gate profit through high value agroforestry

Headline results from the first year of pasture trials and interviews with 44 farmers and advisors in Tasmania.

Introduction

- Trees integrated into agricultural systems benefit many other parts of farming enterprises that are rarely accounted for.
- This research aims to increase farm enterprise profitability, through:
  - Quantifying and integrating the direct and indirect economic benefits of trees.
  - Understanding farmer motivations and barriers to adoption of trees on farms.
  - Promoting adoption of profitable trees in configurations that will increase farm profitability.

Trees improve pasture production

At the most advanced field site of Formosa, near Cressy in Tasmania, pasture growth across 80% of the paddock is improved by as much as 15% (equating to an additional 3.8 kg dry pasture biomass/ha/day) in the peak season of autumn and up to 6% in other seasons. Both wind speed and evaporation are substantially reduced irrespective of season.

Farmers have relatively narrow perceptions of agroforestry

Most farmers thought of monoculture plantations for commercial harvest when talking about agroforestry, rather than other configurations of trees on farms such as along riparian areas or in shelter belts. However, our field studies demonstrated that trees can add significant value to other parts of the farm enterprise, as well as through direct returns from harvest, if they are located appropriately.

Support for trees is high

Trees were highly valued as part of the landscape by farmers and a number of benefits of trees on farms were recognised by farmers.

"Philosophically I think that growing trees is the most sustainable thing that we can do. Trees are incredibly valuable.”  
(Interview 7)

Farmer perceived benefits of trees

- Shelter
- Biodiversity
- Aesthetics
- Direct economic benefits
- Restoration
- Other benefits such as privacy, security and property value
**Encouraging farmer engagement in establishing trees**

The most common opportunities to encourage more planting of trees by farmers include:

- Support farmers to plan their tree plantings to match their objectives (we are currently working on some ideas to address this).
- Investment strategies to help manage upfront costs such as fencing.
- Produce positive success stories about agroforestry to counteract the negative perceptions of MIS failings.
- Reduce costs and risks by networking and cooperative arrangements (shared machinery, skill networks).
- Simplify market information and potential market opportunities.
- Raise awareness of the multiple benefits of trees and how to maximise returns from these benefit streams.
- Develop policy and cohesion across primary industries and support organisations to work together and promote trees.

**Three main views of trees on farms**

Farmers interviewed by the project can be grouped into 3 broad categories:

1. Those who see trees as a valuable component of the farm in all types of farming enterprises.
2. Those who see trees as not being valuable enough to justify the cost of planning, planting, management and use of prime land.
3. Those who see trees as being vital beyond the farm scale and essential to have on farm regardless of cost or economic return.

Most respondents fell into Category 1, suggesting that a ‘hearts and minds’ approach to encouraging trees on farms (for economic and social, as well as environmental imperatives) will encourage greater adoption by farmers. Understanding farmer motivations helps us to tailor recommendations, based on individual objectives.

**Next phase of the research**

We are also progressing the economic modelling and field work components of the project to quantify and integrate the benefits of different configurations of trees on farms. Additionally, up to 50 interviews will be conducted with farmers and advisors in Victoria in 2018. The outcomes will aim to motivate farmers to plant more trees in such a way as to allow them to increase their farm gate profit.

**How to find out more**

We welcome comments, questions or suggestions!

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Using ‘natural capital accounting’ to build a business case for planting trees on farms

What is the project about?

Natural capital accounting (NCA) provides information on stocks and flows of natural resources and services in physical or monetary terms. NCA provides a useful framework for assessing the value of stands of trees and shrubs (e.g. shelterbelts), based on the services that they provide at the farm scale.

Services provided by trees and shrubs may include: shelter for crops or livestock, erosion control, carbon sequestration, improved amenity, wood products, and habitat for beneficial birds or insects. Trees and shrubs may also deliver ‘disservices’ (e.g. habitat for pests).

This project uses the NCA framework to assess services (benefits) and disservices (costs) associated with different types of shelterbelts. This information can be used to inform bio-economic models, and ultimately improve farm decision-making.

How can landholders get involved?

Field experiments will be carried out to explore how different types of shelterbelts compare in terms of: how much shelter they provide, and how they influence the presence of beneficial and pest insects. Researchers are looking for farms in the Tasmanian midlands that contain either radiata pine shelterbelts, eucalyptus nitens shelterbelts, or mixed native species shelterbelts next to conventional pasture. Site access will be coordinated with each landholder in accordance with their individual requirements, and findings will be shared with participating landholders at their request.

Researchers are also looking for landholders and farm managers who may be willing to participate in a short survey. This survey is designed to measure the extent to which landholders and farm managers value different types of services that trees and shrubs provide at the farm scale. The survey is targeted towards any landholder or manager of a commercial farm that incorporates trees or shrubs in some way (e.g. shelterbelts, paddock trees, woodlots, or remnant vegetation). If you are interested in participating, please contact Zara Marais on the details provided below.

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