Sheep farmers:
Increase your productivity

How? Shelter! Shelter! Shelter!

The value of shelterbelts in raising agricultural productivity have been demonstrated in Australia potentially increasing profit of grazing sheep by at least 15%

*(*Source: Linden (2015*) Profitable biodiversity assets)*

Strategically placed shelterbelts have many farm productivity benefits:

- protecting livestock from cold winds, rain, frost or heat stress in summer
- helping prevent soil erosion, nutrient loss and salinity
- conserving soil moisture, which extends the pasture growing season
- reducing bio-security hazards to stock from neighbouring land
- providing firewood, posts, timber, fodder, honey and homes for insect eating birds
- acting as a firebreak
- increasing medium to long-term land values

Shelterbelts can be:

- Trees and shrubs: filter and reduce wind force while allowing some air movement. The height of the shelterbelt determines the size of the sheltered area; taller trees protect a greater area.
- Grassed shelters: (see figure 2) reduce wind chill.
- Hedge shelters: north-south facing hedges offer the best protection.
- A tree only shelterbelt: provides shade on hot days and will reduce some wind chill but is not as effective as trees and shrubs.
- A single tree in a paddock: creates adequate shade on hot days but will not reduce wind chill.

Figure 1

Shelter benefits:

- Ewes exposed to 32+°C after joining have a 40.7% fertilisation success
- Heat stress reduces conception rates in sheep. Refer to figures shown below

Breed	Sheltered (marked per ewe lambed)	Unsheltered (marked per ewe lambed)	Difference Extra Lambs/100 ewes
Merino	126%	102%	24
Coopworth	157%	139%	18

- ✓ Sheltered sheep showed a 31% increase in wool production and a 21% increase in live-weight in a five year trial.
- ✓ In shorn sheep, shelter that reduced wind speed by 50% reduced energy losses by 20% and increased live-weight by 30%.
- ✓ For sheep and lambs, the greatest benefits of shade are for days over 32°C and high wind-chill days.
- ✓ Shelter increases pasture growth by 10% and sheep require 10% less pasture to maintain body heat in cold conditions when shelter is available. The combined effect of these benefits is expected to generate on average an extra $0.93/DSE per year.
- ✓ Heat load reduction on ewes at joining and lambing results in lambs with faster growth rates and more wool during their first 16 months of life. Heat stress reduces wool growth by reducing feed intake.
- ✓ Cold stress reduces live-weight gain by 6kg in sheep and depresses wool growth by 25%, while heat stress reduces wool growth by reducing feed intake.
- ✓ Sheltered off-shear wethers require only 1/3 the supplementary feed as unsheltered stock.
- ✓ Heat stress is detrimental to ram fertility, ovulation rate and conception in ewes and foetal development.

Figure 2

For information about potential incentives to plant trees and shrubs for shelterbelts contact the Goulburn Broken CMA on 5822 7700 or via our website www.gbcma.vic.gov.au

References:

Linden (2015) *Profitable biodiversity assets – making $ from the shade and shelter on your property*.

Thwaits (1967) *Embryo mortality in the heat stressed ewe I. The influence of breed* J Reprod Fertil August 1, 1967 **14** 5-14

Dutt (1964) *Detrimental effects of high ambient temperature on fertility and early embryo survival in sheep*. Int. J Biometeorology

The Economic benefits of native shelter belts report by Basalt to Bay Network issue 3/2015

Economic Development, Jobs, Transport and Resources website http://agriculture.vic.gov.au/agriculture/farm-management/soil-and-water/erosion/shelterbelts-for-control-of-wind-erosion

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Increase your profits

Shelterbelt designs

A well-considered property plan ensures objectives including landscape integrity, biodiversity, and agriculture are considered. Many cost effective digital mapping programs can be downloaded from the internet and used with appropriate data to complete a farm map as the basis for development of whole farm plan.

The location of a shelterbelt is influenced by considering all site features such as: property infrastructure, prevailing seasonal winds, soil type, problem areas of erosion and salinity, remnant vegetation, use of non-arable areas and other on-site specific features. It is therefore important to specifically design the shelterbelt to suit the required purposes / benefits.

Below: Grassed shelter

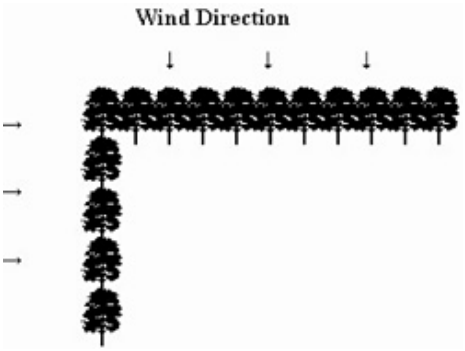
Below: Permeable shelterbelts of trees and shrubs

In the Goulburn Broken catchment, plant shelterbelts and windbreaks running north-south.

Right angled windbreaks provide protection from a range of wind directions.

During summer, shelterbelts protect crops and pastures from severe evapotranspiration, wind and soil erosion; such situations benefit from a grid of shelterbelts using north-south and east-west orientations.

An "L" shaped permeable shelter belt with trees and shrubs provides shade for stock at different times of day and protection from winds from all directions and prevents permanent shading of pasture, exposing all areas to sun at different times of the day.



Generally the protected area equals the length of the belt x height of shelterbelt x 10. Minimum length should be 10 times the height (tallest tree). Therefore a 25m high tree should create a shelterbelt 250m long.

Effective locations are high in the landscape (ridge-line) producing the greatest area of protection.

Planting on contour lines should be avoided as localised frosts can result.

References:

Linden (2015) Profitable biodiversity assets – making $ from the shade and shelter on your property.
Whole Farm Planning courses are available on request from DEDJTR Benalla offices.
EverGraze Shelter Investment Tool www.evergraze.com.au/library-content/shelter-investment-tool/
The Economic benefits of native shelter belts report by Basalt to Bay Network issue 3/2015
Economic Development, Jobs, Transport and Resources website http://agriculture.vic.gov.au/agriculture/farm-management/soil-and-water/erosion/shelterbelts-for-control-of-wind-erosion

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