

Designing and locating shelterbelts on your dairy farm

Shelterbelts Fact Sheet 1

This Fact Sheet has been developed as part of the *Profitable Dairying in a Carbon Constrained Future* project.

It is one in a series of resources developed to profile practices that profitably reduce greenhouse gas emissions from dairy farm systems, embedded in the context of every-day farm management decisions.

The Australian dairy industry has committed to reducing greenhouse gas emissions intensity.

Shelterbelts can enhance productivity on farm by keeping cows comfortable and allowing them to put their energy into milk production. They also provide opportunity for sequestration of carbon on farm and consequently contribute to the efforts of reducing emissions on dairy farms.

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Tips for designing and locating shelterbelts

- Understand the purpose of the shelterbelt – shade, shelter, habitat etc.
- Use your whole farm plan to help locate the best positions for shelterbelts.
- Consider length and width of your shelterbelt.
- Choose species to provide adequate density for protection requirements.
- Visit a nearby farm and learn from another landholders trials and errors.

What are shelterbelts?

A shelterbelt is a plantation made up of one or more rows of trees or shrubs with the aim of providing

shelter from the wind and/or shade from the sun. Shelterbelts can enhance productivity on farm by keeping cows comfortable and allowing them to put their energy into milk production. They also provide valuable habitat for wildlife and contribute to the overall landscape value of the dairy farm.

Why have shelterbelts on dairy farms?

- > Increase milk production, feed availability and herd fertility by keeping cows comfortable
- > Protect stock in extreme events such as heat waves, wind storms and cold weather
- > Provide habitat for wildlife and biological control agents for pasture and crop pests
- > Protect the soil from erosion and salinity
- > Extend the pasture growing season by reducing water loss by shading or reducing wind speed
- > Boundary plantings can offer biosecurity, minimising stock contact and blocking weed movement
- > Improve the farm work place and increase medium to long term land values.



Australian research has found...

- > Sheltered areas have up to 17% estimated increase in dairy milk production
- > On a 27°C day, unsheltered cows have 26% less milk production than shaded stock
- > Milk yields are depressed by cold at a rate of up to 1.34kg per day (4% fat-corrected milk)
- > Over (approx.40-60 years) the lifetime of fencing and shelterbelt; total dairy production will increase by 30% (20% improved pasture growth, 10% improved milk production), and \$150/ha of sheltered pasture
- > Heat stress can markedly reduce stock fertility, milk production and increase mortality of calves
- > The use of trees can reduce heat load (summer) in cows by 50% and heat loss in winter, and is more cost-effective than using electricity-driven sprinklers and fans while absorbing carbon dioxide.

How do shelterbelts work?

Well-designed shelterbelts break the force of the wind, offering shelter to stock in cold conditions and shade on sunny days.

The first step in designing a shelterbelt is to consider what you want it to achieve. The purpose will determine the type of shelterbelt to plant.

Shelterbelts can have a negative impact on farm productivity if they are not appropriately designed and are not easy to move if they are placed in the wrong spot.

What to consider when locating shelterbelts on dairy farms

1. Location of shelterbelts

Use a whole farm plan to map out the best location for shelterbelts.

The location of a shelterbelt should consider placement of infrastructure, prevailing seasonal winds, problem areas of erosion and salinity, remnant vegetation, non-productive areas and fencing and revegetation of waterways.

Tree belts located on tops of ridges or other high points in the landscape provide shelter over larger areas than those planted along gullies and other low points. The ideal tree belt will be oriented at right angles to the prevailing problem wind.

2. Height and length of the shelterbelt

The height of the shelterbelt determines the size of the sheltered area. Taller trees protect a greater area. Using the tallest suitable shelter species in at least one row of the belt will increase the eventual area over which a windbreak is effective.

Longer windbreaks are more effective than short ones. Wind will flow around the ends of a shelterbelt and increase turbulence. The length of a windbreak combined with its height determines the extent of the protected area. For maximum efficiency the uninterrupted length of the windbreak should be at least 10 times its height.



Photo: A dense belt of trees with taller species in the inner rows and understorey towards the edges ensures wind protection for stock*

3. Width and density of the shelterbelts

Gaps within a windbreak reduce its effectiveness resulting in an increase in wind speed due to the wind accelerating as it funnels through the gap within the shelterbelt. Aim for an even density from the ground level to the top of the shelterbelt using shrubs and ground cover species as well as taller species. Species with dense foliage, having more rows or spacing plants closer together can increase windbreak density.

Shelterbelts of 2-4 rows can provide significant benefits while not requiring large areas of land to be removed from productivity. Use taller species together with shrub species that provide shelter lower down.

Rows should be spaced 2 to 4 metres apart and allow space between the first row of plants and the fence to prevent stock from grazing on the plants.

4. Species Selection

The species selected for your shelterbelt should provide the height, growth rate and density characteristics suitable for your needs.

Talk to farmers in your area who have successfully established shelterbelts they can be a wealth of knowledge. Landcare networks and local nurseries will also provide species lists for you to consider.

5. Other considerations

- > An “L” shaped shelterbelt 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
- > Remember to place gate access into your shelterbelts to allow access for maintenance including weed control
- > Tree planting and shelterbelt design can fall to the bottom of the list on a busy dairy farm. The job can be contracted out to a local nursery.



Photo: Careful planning can create a number of sheltered paddocks ensuring cattle are comfortable throughout the grazing rotation*

For more information

[Basalt to Bay \(2014\) Economic Benefits of Native Shelter Belts](#)

[Agriculture Victoria – Shelterbelt design](#)

[Murrumbidgee Landcare Incorporated guide – Establishing shelterbelts on your farm](#)

[Dairy Climate Toolkit](#)

Acknowledgments

*Photos – supplied by Gillian Hayman

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