Wind-proof your farm: Increasing farm productivity with shelterbelts

FACT SHEET 2018

The benefits of shelterbelts

Research has shown the beneficial effects of shelterbelts on farm productivity.

The main benefits for landholders in southern Australia are:

1. **Young lambs with shelter have a greater survival rate than those without.**
   - » Shelterbelts can increase survival of young lambs in their first 48 hours from 84% to 93% for single lambs (Bird et al, 1984).
   - » The increase in survival is even larger for twins, where shelterbelts have been shown to increase survival from 56% to 78% (Bird et al, 1984).
   - » The bottom line $: For a flock of 2,000 ewes where half have a single lamb and half have twins, these percentages mean an extra 530 lambs surviving per year!
2. **Shelterbelts can reduce water loss in pasture plants particularly in spring and summer, which extends growing conditions.**
   - » Although there can be a loss of productivity close to a shelterbelt, gains in productivity have been shown in plant production at a distance of 2-18 times the height of the shelterbelt into the paddock.
   - » This positive effect is due to wind speed reduction and temperature modification resulting from the shelterbelt.

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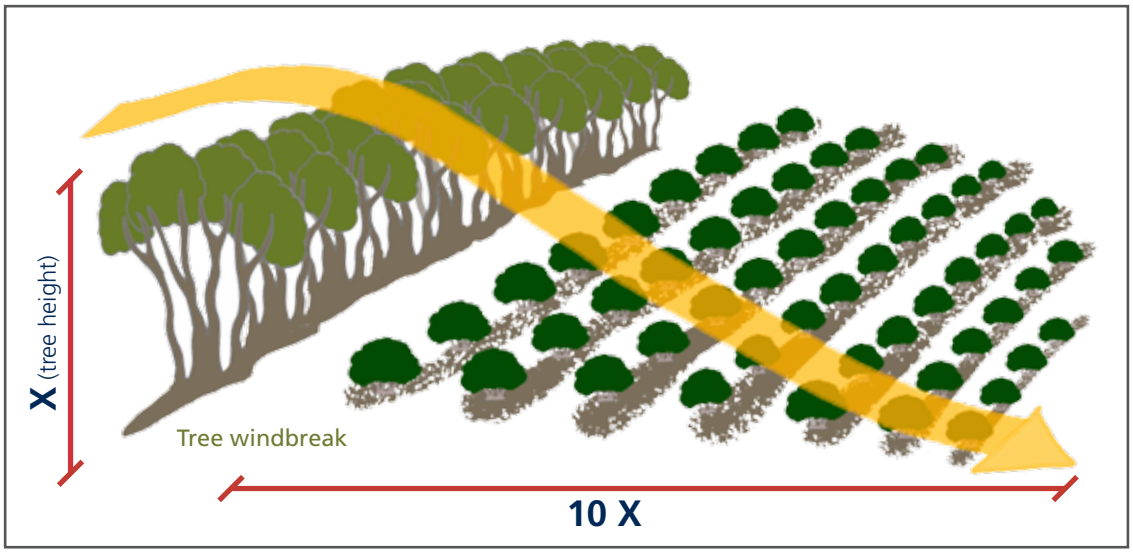

Figure 1. Protection offered by shelterbelts.
(adapted from the Goolwa to Wellington Local Action Planning Association Inc. Shelterbelt factsheet)

3. **Shelterbelts provide biosecurity benefits, including the provision of habitat to beneficial insects (e.g. pollinators and predatory insects) and provide a natural barrier to fungal spores transported by wind.**
   - » Other biosecurity benefits include a reduction in the spread of weeds from one paddock to another, and preventing nose-to-nose contact between stock in different paddocks, which assists in disease control.

4. **Shelterbelts provide important landscape and biodiversity benefits.**
   - » Shelterbelts can be strategically placed to assist in the control of salinity.
   - » If planted along drainage lines and creeks there is potential to reduce erosion and increase water quality.
   - » Strategically placed shelterbelts can reduce topsoil loss from wind erosion.
   - » If they consist of remnant or planted native vegetation, they can support a diverse array of native birds and beneficial insects, and provide habitat for native wildlife (Johnson and Beck, 1988; Shibu, 2009). It also contributes to maintaining both on-farm and landscape scale biodiversity (Yahner, 1983).

Unsheltered paddocks are less productive

Wind can have a negative effect on both livestock and pasture, affecting farm productivity.

Livestock exposed to cold winds and rain can suffer from hypothermia, leading to decreased weight gain, wool and milk production, and can lead to stock death. High winds also damage pasture by reducing growth in winter and increasing moisture loss in spring.

Exposure can be fatal for lambs

Research on Kangaroo Island found that winds as light as 8 km per hour, in combination with 0.25-5 mm of rain per day, significantly increase mortality in Merino and Corriedale lambs. Higher winds (24-56 km per hour) combined with more than 5 mm of rain per day increased lamb mortality in Merinos by over 50% (Obst and Day, 1968).

Newborn lambs are most at risk. Further research on Kangaroo Island found that in the first six hours after birth (critical post-birth period), lamb losses were 5–10% if there was no rain and wind was less than 8 km per hour. However when wind was greater than 18 km per hour and more than 1.5 mm of rain was received in the critical post-birth period, lamb losses could exceed 70% (Obst and Ellis, 1977). In 2012, lamb deaths from exposure made the headlines, and it was estimated that up to 15 million lambs are dying within 48 hours of birth in Australia every year (The Australian, 2012). This results in large financial losses to sheep producers each and every year.

Post-shearing is a time of risk

For 14 days after shearing, adult sheep can be at risk of hypothermia if exposed to cold winds and rain. Sudden adverse weather events and unseasonal cold weather are the main cause of stock losses post-shearing. In South-West Victoria for example, unseasonal cold weather in March 1983 caused around 30,000 sheep to perish when a storm resulted in wind speeds of 32 km per hour, rainfall of 42 mm and a temperature drop to 16°C (Bird et al, 1984).

Wind affected pastures

Research indicates that high wind speeds increase water loss through transpiration in grasses and clovers leading to a reduction in growth (Radcliffe, 1983). In extreme cases, damaging winds can cause physical damage to plants through mechanical agitation (Sturrock, 1981).

Designing effective shelterbelts

Consider the following things when designing a shelterbelt:

Where do your prevailing strong cold winds come from?

Consider where your cold prevailing winds come from during risk periods such as lambing and shearing. Data from the Bureau of Meteorology shows that at many locations on Kangaroo Island strong winds in May-July are often from a westerly or north-westerly direction. Therefore lambing paddocks could benefit from both north-south and east-west running shelterbelts to protect young lambs from cold winter winds. Always base your alignment on your local conditions and landscape.

What other benefits would you like to obtain from a shelterbelt?

Do you have areas where salinity is becoming a problem? Or do you have a creekline that is badly eroded? Try positioning shelterbelts to provide shelter for stock as well as other landscape services to get maximum benefit from your shelterbelt.

How can shelterbelts assist with livestock management?

Can you position fenced shelterbelts in locations that help to minimise contact between mobs of sheep to assist with biosecurity? Shelterbelts along property boundaries can assist to keep your stock away from neighbouring stock where management practices may differ.

How wide should a shelterbelt be?

Shelterbelts should be at least two rows of plants wide (12–24 metres). Try to avoid using only trees (canopy layer) in a shelterbelt, as a lack of an understory layer (medium to large shrubs) can result in tunnelling of wind through the trunks of trees. Shelterbelts that incorporate both a canopy layer and an understory layer are far more effective at providing shelter.

Wider shelterbelts can also be more effective at providing habitat for local wildlife and addressing erosion along drainage lines.

How tall should a shelterbelt be?

The maximum height of the trees planted is important, as the higher the shelterbelt the greater distance it will protect. Therefore shelterbelts should incorporate tall trees. In general, a shelterbelt will reduce wind a distance of up to ten times the shelterbelt height (see figure 1).

Low maintenance shelterbelts

The easiest plants to use to establish a shelterbelt are often those that are locally native to your area. By planting Kangaroo Island species you will have a low maintenance shelterbelt that does not require additional watering during establishment and provides habitat for native wildlife such as pollinating insects and birds.

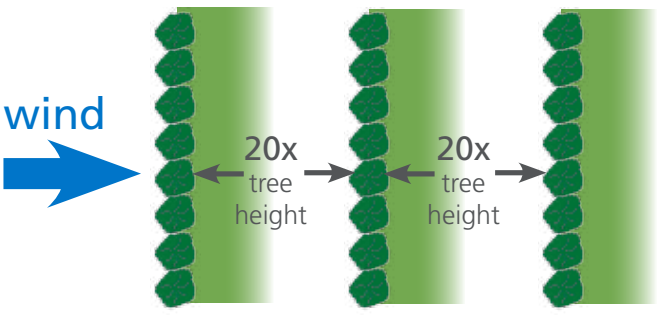

Figure 2.
Shelterbelt designed to give protection from a single predominant wind direction.

Figure 3.
Shelterbelt designed to give protection from three wind directions.

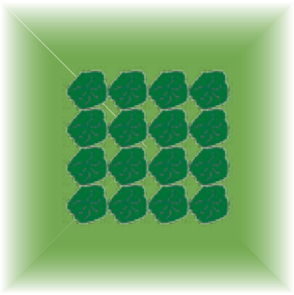

Figure 4.
Timberbelts can give shelter in all directions.

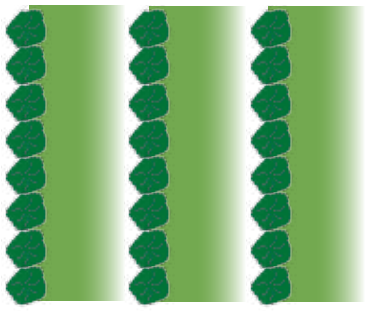

Figure 5.
Alley cropping.

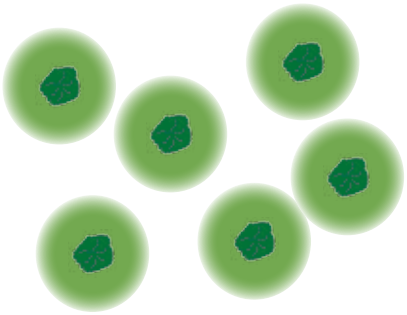

Figure 6.
Scattered trees.

How to source native seedlings for shelterbelts

An easy way to obtain Kangaroo Island native seedlings is to purchase them from the Kangaroo Island Native Plant Nursery. The nursery provides plants grown from seed collected on Kangaroo Island. Staff can provide tailored advice on which plants to choose based on your soil types and local climate. Contact details for the Kangaroo Island Native Plant Nursery are included at the end of this fact sheet.

If you would like to grow your own seedlings, organisations such as Trees for Life can assist you with getting started.

Further Resources

See the Bureau of Meteorology webpage on long-term climatic data and search for your nearest weather station:
http://www.bom.gov.au/climate/data/

For more information on shelterbelt design (i.e. widths, heights and orientation) the Agriculture Victoria website has some great information:
http://agriculture.vic.gov.au/agriculture/farm-management/soil-and-water/erosion/shelterbelt-design

Evergraze Shelter for lambing investment tool:
http://www.evergraze.com.au/library-content/shelter-investment-tool/

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For further information please contact Natural Resources Kangaroo Island

Phone (08) 8553 4444 Visit 37 Dauncey Street, Kingscote Web www.naturalresources.sa.gov.au/kangarooisland

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This project is jointly funded through Natural Resources Kangaroo Island and the Australian Government's National Landcare Program.

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