

Farm trees for sustainable landscape management

Sustainable Landscape Management

Sustainable land management is the adoption of practices that allow the use of land to meet socioeconomic needs (agriculture, forestry, recreation, conservation), while ensuring that long-term ecological functions of the land are maintained or enhanced.

The integration of trees into the farming system is a popular practice which provides landholders an additional income while directly contributing to sustainable landscape management. Other benefits of this practice include creation of shade and shelter for livestock and crops, biodiversity conservation through use of native species, carbon sequestration and climate change mitigation.



Figure 1. Farm forestry integrated with grazing and native revegetation in the Mount Lofty Ranges, South Australia (source: PIRSA)

South Australia's landscapes are made up of the following three components:

1. built and natural environments including our forest plantations, infrastructure, rivers, and coastlines.
2. natural resources including land, soil, water, and native ecosystems
3. community values about interacting with the environment, and First Nations coconnection to country.

Farm-based forestry

Farm-based forestry involves establishing, maintaining, and harvesting a commercial crop of trees on land alongside agriculture or has previously been used for other forms of agriculture. Commercial crops are those that increase wood supply for the South Australian forestry industry by utilising the state's two main commercial species; radiata pine (*Pinus radiata*) and Tasmanian bluegum (*Eucalyptus globulus*). It presents an opportunity to increase South Australia's long-term wood supply while also meeting landscape management objectives.

Farm-based forestry can be implemented in many forms, including woodlots, wind breaks, block and alley plantings and wide-spaced tree plantings. Plantings are usually at a smaller scale than industrial plantations and wood production may not be the primary objective. Possible sources of income generation includes logs for sawn timber, posts and poles, pulp, firewood, biofuel, participation in carbon markets, and non-timber products such as honey production.

Contributions of Farm-based forestry to sustainable landscape management

Biodiversity conservation

Forests planted on degraded or deforested areas can significantly contribute to biodiversity conservation. Biodiversity goals are commonly served by preserving remnant native vegetation areas and re-establishing native vegetation where possible.

Eucalypt plantations can create and connect forest habitats while also mitigating the effects of climate change by acting as carbon sinks. In Australia, research has shown that Eucalypt plantation and shelterbelts, can support bird, bat, and insect biodiversity.

Soil management

In general, farm-based forestry can help to enhance and protect our soil resources by:

- protecting soils from wind and water erosion
- increasing soil organic matter
- fixing nitrogen and other nutrients in the soil by acting as hosts for essential microorganisms
- cycling nutrients through the soil

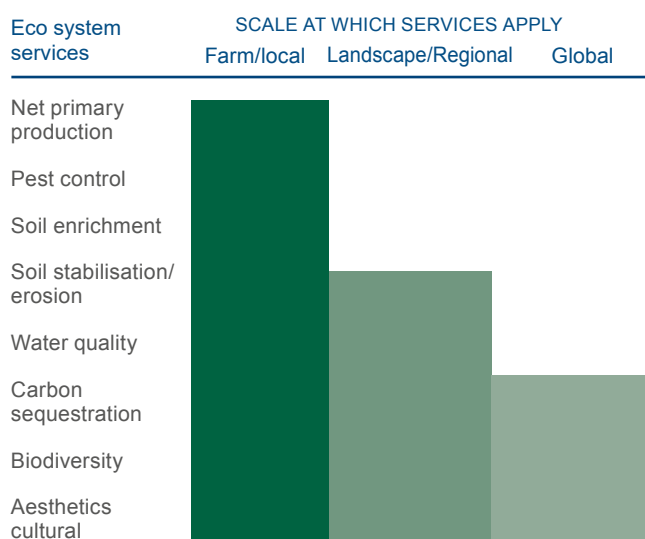


Table 1. Scale of ecosystem effects provided by farm forestry (adapted from Jose, 2009)



Figure 2. Farm trees helping to reduce wind velocities and provide shelter for stock (source: PIRSA)



Figure 3. Woodlots add to farm beautification while capturing carbon (source: PIRSA)

Reducing salinity & water logging

Trees, as deep-rooted plants, can play an important role in the movement of water through the landscape, both above and below the soil surface. Planting trees can help restore water balance in a catchment and therefore control dryland salinity and waterlogging. The effectiveness of planting trees for salinity control will depend on the size of the area planted, the arrangement of the trees, the tree species used and their location within a catchment (Abel et al., 2000). It is important to conduct a careful assessment of the site conditions and landholders expected benefits from planting trees. The larger the area planted, the greater the resulting impact.

Carbon farming

Climate change poses a significant risk to the resilience of primary industries throughout South Australia. Carbon farming practices can restore landscapes, improve agricultural productivity, generate new sources of income and deliver a range of social and economic benefits for regional communities.

Carbon farming includes projects that:

- sequester carbon in the landscape through regeneration and planting of native vegetation; farm and plantation forestry; and improving soil management to ensure that carbon inputs exceed outputs
- reduce emissions, such as livestock methane and fertiliser emissions

In South Australia, the *Forest Property Act 2000* enables the separation of ownership of land, forest, and carbon to enable investment opportunities. Not only do renewable plantation forests sequester carbon, but the wood products produced from these forests tend to have smaller carbon footprints than other construction materials, enhancing pathways to carbon neutrality.

Providing Shade and Shelter

Wind breaks, woodlots and scattered trees in landscapes can improve productivity by protecting plants and livestock from weather extremes. Trees can reduce wind speed which can help manage erosion and protect crops from blowing soil and gusty winds (Cleugh, and Hughs 2002). Trees can also protect stock from wind-chill in cold weather and provide shade in hot weather.

In designing a windbreak to maximise shade and shelter benefits, it is important to note that the shaded and sheltered zone of a windbreak depends more on the windbreak height and length than it does on its porosity or density, although more than one row is usually needed (Abel et al., 2000). Ideally, windbreaks are positioned to provide protection from prevailing winds that cause the most damage. However, if the windbreak is long enough, there is some degree of shelter provided regardless of wind direction. Research has shown crop yields to increase by more than 20 percent in the zone extending out to a distance of approximately ten times the windbreak height.

Other considerations

- Trees attract birds, insects and other animals which may damage or feed on the crops they shelter.
- Gaps in windbreaks can lead to winds stronger than when a windbreak is absent.
- Planting design should allow for the maintenance of fence lines and minimise competition with pasture and crops.
- Growers need to be careful about not introducing - any new plant species that may represent a weed risk.
- Growers are encouraged to seek specialist forest management, financial, and legal advice regarding their proposed land use.

References:

Abel, N., Baxter, J., Campbell, A., Cleugh, H., Fargher, J., Lambeck, R., Prinsley, R., Prosser, M., Reid, R., Revell, G., Schmidt, C., Stirzaker, R., and Thorburn, P. (2000) *Design Principles for Farm Forestry: A Guide to Assist Farmers to Decide Where to Place Trees and Farm Plantations on Farms*. Joint Venture Agroforestry Program.

Cleugh, H. Hughs DE (2002) *Impact of shelter on crop micro climates: a synthesis of results from wind tunnel and field experiments Australian Journal of Experimental Agriculture* 42: 679-701

Jose, S. (2009) Agroforestry for ecosystem services and environmental benefits: an overview. *Agroforestry Systems* 76: 1-10.



Figure 4. Harvesting a farm plantation of *Pinus radiata* (source: PIRSA)



Figure 5. Farm plantation buffering grazing land from native vegetation (source: PIRSA)

Further information

Landscape SA Boards

Information on sustainable landscape management including weed risk assessment is available at landscape.sa.gov.au

Australian Government Department of Agriculture, Fisheries and Forestry

Information on Australian Government forestry programs are available at agriculture.gov.au/agriculture-land/forestry

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Last Revised February 2023



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Department of Agriculture,
Fisheries and Forestry



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Department of Primary Industries
and Regions