

Low Rainfall Farm Forestry for Southern Australia

Many primary producers in low rainfall areas* of southern Australia are faced with a growing number of land degradation issues that are eating away at the viability of their agricultural enterprises. The search is on for productive solutions that can be integrated into current agricultural systems. One option being explored is farm forestry.

(*The definition of what is a low rainfall region varies from place to place. In some areas it's defined as under 600 mm, in others it's under 500 mm. In the wetter SE corner of Australia low rainfall is sometimes classed as under 800mm. The discussion presented here focuses on areas typically receiving 400-600mm of rain per year.)

The term farm forestry means different thing to different people but generally refers to the integration of perennial woody plants with other farm enterprises for commercial, environmental or social outcomes. Many areas of southern Australia are too dry for conventional farm forestry (for example, large plantings of radiata pine or blue gum). Consequently, new farm forestry systems and species better adapted to low rainfall regions are under development.

One strategy being trialled, for example, is to lay out trees in such a way that they can capture more water than just the rain that falls on the planted area. There are two ways this can be done:

- tree crops may be set out in permanent belts that can intercept surface run off or sub-surface down-slope movement of water.

- tree crops can be planted in small, targeted blocks on moisture gaining sites or 'seepage' areas.

Options for southern Australia

In the low rainfall areas of southern Australia, the following farm forestry options are being adopted by many primary producers:

- oil mallee (Eucalypt species)
- WA sandalwood (*Santalum spicatum* and various host species e.g. *Acacia acuminata*)
- Maritime pine (*Pinus pinaster*)
- long rotation timbers for sawlogs, firewood or other timber products (Various species, e.g. sugar gum, *Eucalyptus cladocalyx*)
- brushwood (*Melaleuca uncinata*)
- fodder shrubs (e.g. saltbush species)
- other 'niche' options such as bush foods, flowers and foliage, etc

As the initial cost of revegetation can be high, especially when fencing is required, it is advantageous to plan your farm forestry operation (species, planting patterns, or management) to capture multiple benefits. This is especially important in low rainfall areas where the commercial returns from growing trees are often marginal.

Appropriately planned and designed farm forestry can complement existing agricultural practices through the provision of:

- windbreaks to protect crops and pastures from harsh winds;

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- shade and shelter for livestock;
- fodder and drought reserves for livestock; and
- improved land value and aesthetics.

Farm forestry can also assist in controlling land degradation by reducing ground water recharge, stabilising fragile soils, combating erosion and provide habitat for wildlife.

Assessing your options

When assessing a farm forestry option for low rainfall areas, it is important to consider the following questions:

- What's the most appropriate product for your situation and location? Sawlogs may offer high returns, though it will take a long time to produce logs of millable size in low rainfall areas. If you do grow sawlogs, aim for high-quality, premium-value logs (prune and thin) to cover the costs associated with reaching appropriate markets. The products identified as most suitable for low rainfall areas are fodder, eucalyptus oil and biomass for electricity production (Zorzetto and Chudleigh, 1999). These products need to be grown on a large scale and will usually require cooperation at a regional scale to be viable. The products from your farm forestry enterprise must have markets close by, particularly for low-value products where transport cost can quickly eat up any profits. In WA, sandalwood offers the opportunity to grow a high value, low volume product, making distance to markets not as important as low value, large volume products such as oil mallee or biomass.
- What areas of the farm need trees? Where will revegetation provide land management benefits and complement existing agriculture? Areas to consider include:
 - > creek lines or waterways;
 - > areas subject to erosion, such as lighter soils and exposed hills;
 - > high recharge sites, such as deep sands or gravels;
 - > fence lines, laneways or boundary fences;
 - > paddocks that currently have no or little stock shelter;
 - > areas where revegetation can complement other land conservation works, such as below earth-work banks, or connecting or buffering remnant vegetation.
- What species are best suited to your climate and soil conditions? Speak to those with revegetation experience in your area, local nursery managers or farm forestry or revegetation advisors to confirm the suitability of the species being considered. Remember that some farm forestry regimes may involve long rotation lengths, so the species needs to be able to withstand times when below average rainfall are experienced. Select species that have a record of performing well in your area. Investigate if improved seed or proven provenances are available, or use a local provenance to enhance the possible biodiversity value of a planting.

Greening Australia has been establishing low rainfall species trials, in conjunction with a number of other organisations and state agencies, and will be able to provide advice in selecting appropriate species for our area. See Organisations and Programs for contact details.

- What's an appropriate layout for your situation? The layout and design should be tailored to meet individual requirements. Belts or alleys are a useful way to integrate trees into a farming system, either in straight lines or following the contour, however considerations such as machinery width and grazing management need to be considered. Initial stocking should be 1100 to 1250 stems per hectare to encourage upright growth for sawlogs. At this stocking rate there will be competition for moisture after a few years. Be prepared to thin early when your plantations are showing signs of competition for moisture. It is better to have fewer, larger and healthier logs than a dense stand of trees that are struggling for moisture. Wider spacings should be used for bio-mass or firewood production.
- Can you stagger your operation over several years? Consider annual planting targets. This will reduce risk, by spreading plantings over several years. Management workloads, such as silviculture and weed control can also be spread over several years. About 2 - 3 ha per year for intensive farm forestry (sawlogs) is enough for a family with a working farm. Bigger blocks can be established where there is more machinery available. When it comes to harvesting, blocks planted a few years apart can be all harvested at once to supply sufficient volumes of the product.

Plan for your priorities?

To gain a number of benefits from revegetation, it's important to plan for those outcomes rather than simply accepting the best-bet options for just one outcome. Always keep in mind that it's possible that the benefits may vary over time. For example, revegetation initially set up or managed for wildlife or land protection might later be harvested for timber or valued for aesthetics.

A good way to begin planning a farm forestry project is to identify why you want to plant trees. What are you trying to achieve with the revegetation? Of course it would be wonderful if your trees could provide everything from nature conservation to high financial returns but the truth is that multipurpose systems require compromises, and all forestry projects involve risk.

Be sure about your highest priority from the beginning and accept that compromises will need to be made if other benefits are to be achieved. Ask yourself how much are you prepared to compromise to receive a number of benefits from your revegetation.

Smells good

Commercial revegetation with sandalwood

by Geoff Woodall, Centre of Excellence in Natural Resource Management, Albany, Western Australia

Prior to broadscale clearing, Southern Sandalwood naturally occurred throughout most of what is now the wheatbelt region of Western Australia (it naturally occurs in the drier regions of Western Australia and South Australia). It was an important commercial product that initially financed colonial development and then farm clearing earlier last century. In Western Australia, up to 2,000 tonnes is still harvested per annum, oil is extracted from some of the wood but most of it is exported to Asia where it's used primarily in the manufacture of joss sticks. Most of this wood now comes from the semi arid pastoral country of southern Western Australia. Only scattered remnants of Sandalwood remain in the wheatbelt today.

The Gnowangerup Land Conservation District Committee (an enthusiastic community group of wheat and sheep farmers) in partnership with other community groups and Greening Australia have developed a Sandalwood revegetation project for the Pallinup valley that balances nature conservation and productivity. Sandalwood is a parasite, and requires deep-rooted perennial host species for survival. In the Pallinup valley, remnant Sandalwood trees parasitise a range of native legumes and some non-leguminous plants.

In this revegetation project, over 50 species of local trees and shrubs, including Sandalwood, have been cheaply established by direct seeding. The 210 ha of revegetation links up numerous remnants and reserves along the valley and will have a significant nature conservation value. Numerous creek lines have been fenced off and revegetated (on average the fence is 30-50 m out from the creek).

Because Sandalwood is a commercial reality, farmer interest in the project has been high despite adverse seasonal conditions and a depressed rural economy. Farmers view sandalwood as a long term commercial investment and the areas revegetated by the project were generally prime cropping areas that are neither salt affected or waterlogged. If there was not long-term financial return, these productive areas would not have been revegetated.



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Then there is the question of commitment: what are you prepared to commit in terms of land, money and time? To gain some of the wanted benefits from revegetation, a commitment of time, or even the development of new skills may be required.

With farm forestry projects, management and maintenance may be necessary. The level of management is influenced by the species selected, the target product, the role of the trees and the goals and purposes of the landowner.

For example, to produce quality sawlogs, pruning and thinning are required to produce a more valuable product. This is important and may demand a commitment of time and money in the future. It may also require you to develop some new skills in tree and plantation management.

Some options, however, may only need minimal management once established. These include oil mallee, firewood crops or sandalwood (all of which are well suited to low rainfall areas).

Finding assistance

There may be people or organisations that could benefit from your forestry projects. They might be prepared to help with advice, resources or money.

Government agencies and industry organisations often provide funds for land protection works. Community groups are often willing to help farmers develop wildlife habitats. There may also be investors willing to share the costs of establishment for a share of future income. However, the involvement of others may require further compromises in order make the project attractive to them.

Now you are able to set about tailoring a farm forestry project for your situation. This can be as simple as adapting the designs used by others in your area. On the other hand, you might be willing to try something new. Whichever way you go, consider your options, talk and seek advice from as many people as possible and look at other revegetation projects in your local area.

There is likely to be a great deal of experience within your local area or region and amongst organisations like Greening Australia, CSIRO, state agencies, local conservation groups as well as private organisations. There are many farmers and support services willing to share ideas and possibly provide direct support.

Almost certainly there is potential for farm forestry to improve the beauty, productivity and sustainability of your farm in some way, but it will need careful planning and commitment. Although the prospects of commercial returns might be some time off, the satisfaction from getting started and the joy of seeing healthy trees provide shelter, wildlife habitat and land protection within a few years might be sufficient reward in itself.

These notes were prepared by Tim Emmott (Greening Australia Western Australia), Anne Brown (Greening Australia South Australia) and David Carr (Greening Australia Limited).

Treveneth: Planting for the farm system

by Trevor and Gweneth McCallum

Treveneth is a sheep grazing and cropping property in the mid north of South Australia. My grandfather took up the land in 1876. In 1936, my father bought the farm next door. I bought my grandfathers farm when I got married. There aren't many farms still in the original name around here so it's quite a good feeling.



Our farm had basically been cleared, only the creek still had scrub on it. Prior to it being cleared most of it would have been mallee scrub.

When I left school, I wasn't conscious about the environment - nobody was, really. Back in the 50's you got the most out of your land you could, and that was it. We could see that the country started to drift in dry times, mainly through overstocking and burning off stubble and things. All the goodness was being swept away when we had a big wind. With the equipment we had, we didn't know what to do to prevent it.

Things have come along in leaps and bounds in the last 20 years. We don't burn anything now unless it is absolutely necessary and we are more conscious about overstocking. We set feedlots up when the paddocks get too bare.

At our farm, rainfall is just over 12 inches (300mm). Our other block gets just under 19 inches or 475 mm. Trees grow easier with that bit of extra rain but you just have to select the variety, be prepared for a few more deaths and a bit slower growth, in the lower rainfall plots.

Getting towards the 80's I started to tune into the land as a system. I had planted a few trees for shade and shelter, but then I started planting windbreaks as well. We started with Aleppo pines but found that they are not very bird friendly. Then we planted West Australian gum trees but they kept falling over, so now we try the local ones.

Originally we planted trees for the look of the farm, now we plant for the farm system. I have planted along the roads for windbreaks and around the feedlots for shelter. I think at least 5% of a farm should have trees and shrubs on it. That's not much land to give up.

I plant local species now. Wallowa, *Acacia calamifolia*, and *Acacia notabilis* are good ones, so is Drooping sheoak (*Allocasuarina verticillata*) and red gums in the creeks. Inland blue gum, (*Eucalyptus leucoxydon ssp pruinosus*) and peppermint gum (*Eucalyptus odorata*) and *Eucalyptus porosa* are good.

At the foot of the Mount I have planted blue gums and Sugar gum (*Eucalyptus cladocalyx*) for firewood. I think that further down the track you won't be able to go into native scrub and cut firewood but plenty of people will still be burning wood fires. I think I will stick to firewood as I'm too far away from mills to economically process the timber. Sugar Gum coppices well, shoots up multi-stemmed, quick smart.

I spend a fair bit of time on my trees to keep the weeds down and rip it beforehand but some of the species are 7 or 8 feet high and just over one year old. I go to a fair bit of trouble when I am planting them. I plant a thousand trees a year.

What have trees taught me about farming? Well, the more you put into it the more you get out. You've got to work with what's suitable for your land and your rainfall. The trees have made this farm look better, increased its value and it's not such a windswept place now.



"You've got to work with what's suitable for your land and your rainfall"

Greening Australia's vision for farm forestry in Australia

Greening Australia believes farm forestry provides Australia with a range of unique opportunities to build socially, environmentally and economically healthy communities. This is done by creating links between people, the landscapes they live in and commercial investment.

Greening Australia's farm forestry is not just for farmers or foresters, it enables the whole community to contribute to a sustainable future for regional Australia. It provides urban investors with opportunities to generate wealth, and allows urban communities to engage with rural Australia through direct involvement in environmental improvement and economic development. It promotes government investment in the environmental benefits of farm forestry which provides a return to all Australians.

Farm forestry in Australia is broadly defined. It sits in the space between revegetation and industrial forestry. It combines many elements of both, and has no single model to define it. A spectrum of farm forestry models exists, ranging from those with an emphasis on nature conservation to those with a production emphasis. Greening Australia's farm forestry embraces the full range of this spectrum.

Working across the whole spectrum of farm forestry, Greening Australia aims to achieve multiple benefits and the integration of production and environmental outcomes at the farm scale. Regionally, Greening Australia focuses on the farm forestry needs of the community, but emphasises that all values, including environmental benefits, must be considered when evaluating farm forestry.

"Greening Australia's farm forestry links people, landscape and investment"

The community, business and government contribute a great deal of money and time to solving environmental, economic and social problems. Often they are tackled in isolation from each other. Greening Australia's farm forestry has the potential to maximise the economic and environmental returns Australia receives from investment in farm forestry. Money spent to grow timber or a range of other farm forestry products can also be an investment in salinity mitigation, soil and water improvement and biodiversity conservation. The reverse also applies. Vegetation established primarily for salinity mitigation or biodiversity conservation can also provide commercial returns.

Large-scale industrial plantations are the most visible manifestations of the increasing production of wood in line with Plantations for Australia: The 2020 Vision. They play an important role in meeting our future wood supply needs and generating wealth for Australia. They can have significant environmental, social and aesthetic implications for the farm and the regional landscape.

Greening Australia farm forestry offers a way of increasing the social and environmental values of large plantations as well as providing real alternatives at smaller scales for diverse, farm-integrated commercial revegetation.

Greening Australia believes the "high value and low volume" approach as most suitable for a large number of participants growing a diverse range of products in a variety of systems. However, Greening Australia also recognises the value of "low value and high volume" systems in addressing landscape scale land degradation and in attracting external private investment in farm forestry. Greening Australia acknowledges the importance of developing markets for new products and new markets for existing products.

Greening Australia does not support the elimination of native vegetation for farm forestry development. Native forest and woodland, even when substantially modified or degraded, provides significantly higher nature conservation values than plantations. Some native forest on private land can be sustainably managed for both timber production and improved nature conservation values and this is an area for priority attention.

Greening Australia works with other farm forestry organisations and individuals to maximise the benefits of farm forestry. This commitment to a cooperative approach is outlined in the Joint Position on farm forestry of Greening Australia, National Association of Forest Industries, Australian Forest Growers and National Farmers' Federation (1996). Greening Australia recognises that strong partnerships between these, and other, organisations and individuals are essential to ensure the success of farm forestry.

Guiding principles

Greening Australia farm forestry is:

Sustainable:

economically; socially; environmentally.

Diverse:

products and markets; species; operating scales; growers and other participants.

Integrated & planned:

within the farm business; into the farm landscape and operations; within the regional landscape; with the community; with nature conservation and with industry

Greening Australia's approach to Farm Forestry offers multiple benefits:

income enhancement and diversification;
local employment and business;
commercial products;
salinity mitigation;
soil, air and water quality improvement;
biodiversity conservation;
carbon sequestration; and
improved farm agricultural ecology.



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References

Abel, N, Baxter, J, Campbell, A, Cleugh, H, Fargher, J, Lambeck, R, Prinsley, R, Prosser, M, Reid, R, Revell, G, Schmidt, C, Storzaker, R, and Thorburn, P, (1997). Design Principles for Farm Forestry

Binning, C, Baker, B, Meharg, S, Cork, S and Kearns, K (2002). Making farm forestry pay. RIRDC Publication No 02/005

Bird, R (2000). Farm forestry in Southern Australia, Pastoral and Veterinary Institute, Dept of Sustain & Environment.

Guijt, I and Race, D (1998). Growing successfully: Australian experiences with farm forestry. Greening Australia Ltd.

Harwood, C and Bush, D (Editors) (2002). Breeding trees for the low rainfall regions of southern Australia. RIRDC, JVAP Research Update Series No.4.

Lindenmayer, D, Claridge, A, Hazell, D, Michael, D, Crane, M, MacGregor, C and Cunningham, R (2003). Wildlife on farms, how to conserve native animals. CSIRO Publishing, Melbourne.

McIntyre, S, McIvor, J and Heard, K (2002). Managing and conserving grassy woodlands. CSIRO Publishing, Melbourne.

New, B and England, M (2002). Farm forestry: designing for increased biodiversity. SA Dept for Environment and Heritage.

Reid R, Stephen P (Editors) (1999) The Farmer's Log - Australian Master Tree Grower Manual

Salt, D, Lindenmayer, D and Hobbs, R (2003). Biodiversity and trees: a guide for Australian farm forestry. Part of the JVAP Agroforestry Design Guidelines series. Available through RIRDC.

Spencer, D (2001). Conifers in the dry country. RIRDC Publication No.01/046.

Storzaker, R, Vertessy, R and Sarre, A (2002). Trees, water and salt: an Australian guide to using trees for healthy catchments and productive farms. RIRDC Publication No.01/086.

Zoretto, A, and Chudleigh, P, (1999). Commercial Prospects for Low Rainfall Agroforestry. RIRDC Publication No. 99/152

Organisations and programs

Australian Forest Growers
PO Box E18, Kingston ACT 2604
Ph: (02) 6285 3833 / Fx: (02) 6285 3855
Email: National.Office@afg.asn.au
Website: <http://www.afg.asn.au/>

Australian Low Rainfall Tree Improvement Group
Website: <http://www.ffp.csiro.au/alrtig/>

Australian Greenhouse Office
Website: <http://www.greenhouse.gov.au/>

Australian Government Department of Agriculture, Fisheries and Forestry
Forest Industries
Website: <http://www.affa.gov.au/forestry>
Ph: 02 6272 5865

CSIRO
CSIRO Forestry and Forest Products: <http://www.ffp.csiro.au/>
Plantation and Farm Forestry Program: <http://www.ffp.csiro.au/pff/>
CSIRO Tree Seed Centre: <http://www.ffp.csiro.au/tigr/atscmain/>

Forest & Wood Products Research and Development Corporation
PO Box 69, World Trade Centre, Melbourne VIC 8005
Ph: (03) 9614 7544 / Fx: (03) 9614 6822
Website: <http://www.fwprdc.org.au/>

Greening Australia Limited
National Office
PO Box 74 Yarralumla ACT 2600
Ph: (02) 6281 8585 / Fx: (02) 6281 8590
Email: general@greeningaustralia.org.au
Website: <http://www.greeningaustralia.org.au>

Greening Australia State offices

ACT &
SE NSW: Ph: (02) 6253 3035
NSW: Ph: (02) 4950 0055
NT: Ph: (08) 8981 1344
Qld: Ph: (07) 3844 0211
SA: Ph: (08) 8372 0120
Tas: Ph: (03) 6223 6377
Vic: Ph: (03) 9457 3024
WA: Ph: (08) 9335 8933

Master Tree Growers (University of Melbourne)
Agroforestry and Farm Forestry Program
Department of Forestry
Institute of Land and Food Resources
The University of Melbourne, Victoria Australia 3010
Ph: (03) 8344 5011 / Fx (03) 9349 4172
Email: mtg-enquiry@landfood.unimelb.edu.au
website: <http://www.mtg.unimelb.edu.au/>

Plantation Timber Association of Australia
830 High Street, Kew East Victoria 3102
Ph: (03) 9859 2455 / Fx: (03) 9859 2466
Website: <http://www.ptaa.com.au/>

Private Forestry Development Committees (PFDCs)

Website: <http://www.affa.gov.au/forestry>
Pathway: Plantations and Farm Forestry/Private Forestry Development Committees (PFDC's)

Rural Industries Research and Development Corporation
Level 1, AMA House, 42 Macquarie Street, Barton ACT 2600
Ph: (02) 6272 4539 / Fx: (02) 6272 5877
Email: rirdc@rirdc.gov.au
Website: <http://www.rirdc.gov.au/contact.html>
Agroforestry & Farm Trees Research Reports website:
http://www.rirdc.gov.au/reports/Index.htm#Agroforestry___Farm

Private Forestry Development Committees (PFDCs)

ACT/NSW
Southern Tablelands Farm Forestry Network Tel. 02 6207 2494

NSW
Central Tablelands Private Forestry Development Committee Tel. 02 6361 2444

Lower North East Forestry Investment Program Tel. 02 6583 5647

Murray Riverina Private Forestry Development Committee Tel. 03 5866 2746\

New England-North West Private Forestry Development Committee Tel. 02 6771 3284

Northern Rivers Private Forestry Tel. 07 5599 3942

South East NSW Private Forestry Tel. 02 6492 5578

Queensland
Central Queensland Forestry Association Tel. 07 4967 0754

Private Forestry North Queensland Tel. 07 4091 8705

Private Forestry Southern Queensland Tel. 07 5483 6114

South Australia
Kangaroo Island Private Forestry Development Committee Tel. 08 8553 0427

South Australia/Victoria
Green Triangle Regional Plantation Committee Tel. 08 8724 7628

Victoria
Central Victorian Farm Plantation Committee Tel. 03 5341 7759

Gippsland Private Forestry Tel. 03 5153 2947
Plantations North East Tel. 02 6056 5806

Western Australia
South East Forest Foundation Tel. 08 9083 1123

Timber 2020 Greater Southern & South Coast Private Forestry Development Committee Tel. 08 9892 8520

Trees South West Private Forestry Development Committee Tel. 08 9780 6100