A Manual for Planted Farm Forestry for the Northern Inland of New South Wales

Appendix Q

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Greening Australia Field Notes

Species Selection for Farm Forestry on the Northern Tablelands, Slopes and Plains of NSW

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Farm forestry offers many opportunities to landholders in northern NSW in terms of financial returns and enhanced economic and environmental sustainability. Like any other investment in farm enterprises it carries certain risks. Minimising these risks is a vital step in gaining the most from the opportunities presented by farm forestry.

One way to minimise the risks is to select the right species for your farm forestry project. There are no "best-bet" species which apply everywhere. Good species selection involves consideration of a range of issues.

Matching Species To Sites

Contrary to popular belief, trees will not grow just anywhere. Many species are frost or drought sensitive or require particular drainage or soil characteristics. Without these characteristics, trees may not survive at all or may perform so poorly that they are no longer commercially viable.

On the tablelands the three main factors which affect tree survival, particularly in the early stages, are frost, drought and waterlogging. There are many commercial species which will be killed outright by frost. This is particularly important on the tablelands, but can also be a factor on the slopes and plains. Waterlogging on many sites, often in conjunction with frost, limits the variety of species which can be grown.

Eucalyptus laevopinea (silvertop stringybark) Ben Hall's Gap National Park

On the slopes and plains, rainfall is a significant factor limiting the growth of commercial species. This is also an issue on the tablelands. Best commercial prospects occur in areas of high rainfall (>1000mm), however there are species to suit most rainfall areas. For instance Sydney blue gum *(Eucalyptus saligna)* grows best at rainfalls over 1200mm and would not be suitable for a plantation at Manilla (M.A.R. of 650mm), however narrow-leaved ironbark *(Eucalyptus crebra)* will thrive in this rainfall zone.

Soil is often a limiting factor to tree growth. This usually relates to drainage, but may also relate to soil strength or fertility. Heavy clay soils, particularly those that crack, limit the growth of many species, while sandy, stoney or shallow soils limit the growth of others.

Some site factors can be modified, allowing a wider range of species to be grown. Low rainfall can be compensated for by irrigation; frost and waterlogging can be alleviated somewhat by ground preparation and selecting upper slope sites on the property. Soil infertility can be overcome to a degree by fertiliser application. Other factors are not so easy to modify, such as soil texture, depth and drainage, so species should be chosen to match them.

Your best guide to what will grow on your site comes from what is already growing. Identifying these species will give you, and your advisors, an indication of the characteristics of your site. Knowing your own property in terms of soil types, climate, microclimates and topography will help narrow down the range of species available to you. A farm plan will help in this, particularly in identifying areas of your property with the optimal soils and microclimates for farm forestry.

Matching species to particular products

Many growers will want to grow a specific product to supply local markets, to grow high-value products, to meet on-farm needs or to meet specifications of grower cooperatives. There are a range of wood and non-wood products which can be produced in farm forestry systems. Each product has its own specific criteria as to silviculture and species selection.

Some species can produce a wide range of products (such as spotted gum - *Corymbia variegata)* while others may be limited to sawn timber only. The range of products which can be produced will also depend to an extent on the markets for those products. Many species will produce pulp but this may not be viable if there is no local pulp market.

An understanding of available or potential markets for products will assist the prospective grower with species selection. The length of time the grower is prepared to wait to gain some direct returns and the value of the target product should also be considered. Some species will grow quickly but yield low returns while others may be slower growing but yield high returns and have a stable market. Other species are of high value but have very limited demand.

There are currently local markets for radiata pine, hardwood from a range of eucalypts and some speciality timbers such as *Acacia* and *Casuarina.* Some speciality products such as joinery wood from *Acacia* spp. will require extra effort to market, but the returns should be high. Other products such as pallet grade sawn timber or rough construction timber from existing native forest will be easier to sell locally but will fetch a much lower price.

Matching species to landholder needs

Every landholder will have different expectations from farm forestry. Accordingly they will choose different species to grow. Choices about species selection may be dictated by available markets or limited by site factors but usually landholders can find species which also match their other farm needs.

Most farm forestry plantings will have a second purpose apart from the commercial product. Shelter, shade, erosion control, biodiversity and aesthetics are just some of the co-products of farm forestry.

Preferences about native and exotic species are also important to many landholders. This is very much a matter of individual taste but will also depend on the products the landholder wishes to produce. However, utilising native species, particularly local indigenous ones, has the added advantage of preserving local biodiversity and contributing to the ecological sustainability of the region. Conservation of our local flora is likely to be best achieved through its utilisation (Curtis *et al*, 1997). Compromises may need to be made in terms of growth rates, but there are returns in terms of ecosystem stability and maintenance of rural landscapes.

The purpose for which plantings are undertaken will also have a bearing on species selection. If the planting is purely for commercial timber production, then the most marketable, fastest growing species will be chosen. If the planting is more for farm shelter or biodiversity, with the option to take commercial products, then the species chosen can reflect this. An example might be yellow box *(E. melliodora)* which is an excellent fencing timber tree which can produce sawn timber, but would not be the first choice in a purely commercial planting, due to slow growth rates.

The availability of quality planting material

No matter what species are chosen for the farm forestry operation, the best quality planting material should be chosen. The availability of this material will influence species selection to some extent.

Selective breeding and clonal improvement has seen several species developed to the point where the performance of plants can be predicted with some certainty. This is most obvious in Monterey pine *(Pinus radiata)* for which there is a wide range of material available with improved growth characteristics. Amongst native hardwood species the research has been more recent. Most work has been carried out on the main plantation species Tasmanian blue gum *(E. globulus)* and shining gum *(E. nitens)* but improvement work has also been carried out on other species (e.g. *E. saligna*).

In many cases the local provenances will be the most suitable for the site. For these, seed is collected from trees with the desired form. Many forestry characteristics such as trunk straightness and branching height are strongly inherited. The availability of seedlings with these characteristics from local nurseries is currently limited but will increase as demand increases.

At present farm foresters looking for superior planting stock should collect their own seed or have it collected by local nurseries from the species they wish to grow. Seed should be collected from trees which have the characteristics required by the grower such as good form, insect resistance etc. Alternatively seed can be purchased from specialist producers for those species which have undergone genetic selection (such as *Pinus radiata, E. nitens* and *E. globulus).*

Farm Forestry Species for North West NSW

* Species exotic to this region Species	Common Name	Height	Preferred Rainfall	Minimum Rainfall	Frost Tolerance	Drought Tolerance	Products	Non-wood Products	Optimal Soil Type	Detrimental Soil Type	Tolerance of poor drainage	Preferred Topography	Limiting Factors
Eucalyptus macrorhyncha	red stringybark	15m	650+	500	high	high	general construction	fencing, firewood	mod fertile clay loam	heavy clay	low	foothills/slopes	
Eucalyptus obliqua	messmate	50m	800+	600	high	low	construction, joinery, furniture, interior finish	firewood, pulp	mod fertile gravelly loam	wet clay	moderate	cool wet slope	
Eucalyptus fastigata	brown barrel	35m	1100+	800	V. high	V. low	construction, flooring, panelling, joinery, furniture	firewood, pulp	granite loams		low	valley/slope	
Eucalyptus bicostata	eurabbie	30m	800+	700	moderate	low	general construction timber	firewood, rails	loam		moderate	moist valley	
*Eucalyptus globulus**	Tasmanian blue gum	30m	900+	700	moderate	V. low	general construction, poles, piles, sleepers		heavy loam/clay		moderate	cool valley	
Eucalyptus quadrangulata	white top box	25m	1000+	800	high	moderate	heavy construction, sleepers, poles	firewood	heavy, fertile soils	deep sands		mountain valleys	
Eucalyptus dalrympleana	mountain gum	30m	900+	700	high	moderate	framing, flooring, joinery, handles		deep red/ red brown loams over clay		moderate	hills/slope	
Eucalyptus saligna	Sydney blue gum	30m	1000+	700	mod-high	low	general construction, flooring, cladding, panelling		sandy loam	heavy clay	moderate	alluvial flat	
Eucalyptus cypellocarpa	monkey gum	30m	800+	600	V. high	low	construction, engineering, marine veneer,	fencing	clay-loam		moderate	slope	
Eucalyptus melliodora	yellow box	16m	600+	400	high	high	heavy engineering, poles, sleepers, furniture	firewood, honey, fencing	sandy clay-loam	heavy clay	moderate	mid-low slope	
Eucalyptus sideroxylon	mugga ironbark	20m	550+	350	high	V. high	heavy engineering, sleepers, furniture	firewood	heavy clay loam	deep sand	moderate	hill/slope	
Eucalyptus crebra	narrow-leaved ironbark	20m	700+	500	high	high	heavy construction, poles, sleepers, furniture	firewood, fencing	sand and loam	heavy clay	moderate	hills/low slope	
Eucalyptus camaldulensis	river red gum	20m	600-750	500	high	low-mod	construction, sleepers, framing, flooring, veneer, plywood, turnery	charcoal, fencing, firewood	moist sandy loam over clay	deep sand, shallow, stony	high	alluvial plain	
Eucalyptus blakelyi	Blakelys' red gum	16m	700+	500	high	moderate	heavy construction	fencing, firewood	compact fertile loams		high	lower slopes	
Eucalyptus albens	white box	16m	600+	500	high	high	heavy construction, poles, sleepers, furniture	fencing, firewood	red earths, loams		moderate	hills	
Eucalyptus melanophloia	silver-leaved ironbark	12m	650+	400	high	moderate	heavy construction	fencing	moderately fertile silts		moderate	hills	
Eucalyptus microcarpa	grey box	20m	700+	500	high	moderate	heavy construction, poles, sleepers, posts	fencing	clays		high	alluvial lower slopes	
Eucalyptus mckieana	McKies' stringybark	15m	700+	600	high	moderate	general construction	firewood	clay loams	heavy clays	low	hills	
Eucalyptus nova-anglica	New England peppermint	20m	800+	650	V. high	high	craft	pulp, fencing	sandy alluvial soils		high	lower slope	
*Corymbia maculata**	spotted gum	30m	800+	600	low	moderate	heavy construction, flooring, handles, bent work, poles, plywood	firewood	sandy clay	wet/heavy clay	low	valley/slope	
*Grevillea robusta**	silky oak	20m	1000+	900	moderate	mod	furniture, joinery, cabinet work		fertile alluvial soils	shallow soil	moderate	lower slope	
Callitris glaucophylla	white cypress pine	15m	600+	300	V. high	V. high	construction, joinery, flooring, cladding, poles, posts		shallow, sandy or red earth	wet clay	low	slope/hill	fire
Brachychiton populneum	kurrajong	to 12m	450-1200	400	high	V. high	leaves fodder	bushfood	clay		moderate	slope/ridge	
Atriplex nummularia	old man saltbush	2m	200-400mm	175	moderate	V. high	leaves/seeds	bushfood	light		yes	shady rises	frost
Acacia aneura	mulga	to 15m	250-500	200	low	V. high	leaves	timber	red earth, sand		yes	flood plains	frost
Acacia dealbata	silver wattle	(see "Timber" section above)					foliage	timber					

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*Pinus radiata**	Monterey pine	30m	800+	900	V. high	high	general construction	treated poles, pulp	sandy loam over clay	wet, heavy clay	low	slope	fire
Acacia dealbata	silver wattle	12m	800+	600	V. high	moderate	veneer, cabinet work, furniture	pulp	deep clay-loam	deep sand	moderate	valley	
Acacia melanoxylon	blackwood	20m	900+	650	high	low	veneer, cabinet work, furniture	firewood	fertile clay loam	heavy clay	moderate	moist valley	
Acacia implexa	hickory wattle	12m	700+	600	low	moderate	turnery, furniture,	firewood	clay loams		moderate	slope	
*Acacia mearnsii**	green wattle	16m	700+	800	V. high	moderate	turnery, light construction	firewood, tannin	sandy clay-loam		high	lower slope	
Acacia falciformis	mountain hickory	12m	700+	450	V. high	high	turnery, furniture	firewood	sand/gravel loam		V. low	upper slope	waterlogging
Acacia salicina	cooba	10m	600+	450	moderate	high	furniture, cabinet work, turnery	fodder, firewood	alluvial loams	dry ridges, shallow	high	alluvial plains	
Acacia aneura	mulga	8m	400+	100	moderate	V. high	turnery, cabinet detail,	firewood, bush food	red earths, red sands, sandy gravels		high	plains and low rises	
Acacia cambagei	gidgee	15m	400+	250	moderate	V. high	turnery, cabinet detail	firewood, fodder	cracking clays		high	plains and low rises	
Acacia homalophylla	yarran	10m	600	450	moderate	high	turnery, cabinet detail	firewood	cracking clays		high	plains	
Acacia harpophylla	brigalow	12m	500+	300	moderate	high	heavy construction, turnery, furniture	fodder, firewood	heavy black clays	shallow soil	high	plains	
Acacia pendula	myall	8m	650+	400	high	moderate	furniture, craft	fodder, firewood,bush food	heavy black clays	sand	high	plains	
Casuarina cunninghamiana	river she-oak	20m	700+	500	high	moderate	turnery, cabinet	firewood	deep sand/gravel	shallow soil	moderate	drainage line	
Casuarina cristata	belah	12m	800+	350	high	high	turnery, cabinet	fodder, yards, fencing, firewood	self-mulching alluvial soils		high	alluvial flats and depressions	
Allocasuarina verticillata	drooping she-oak	8m	700+	400	high	high	turnery, cabinet	firewood	sandy loam, stony	heavy clay	moderate	slope, hill	
Allocasuarina torulosa	forest oak	20m	1200+	800	low	moderate	veneer, turnery, cabinet work	fodder, cones, firewood	clay loams	infertile sands	moderate	hilly country	
Allocasuarina luehmannii	black oak	10m	1000+	650	moderate	moderate	turnery, handles, furniture, shingles	firewood, fodder, adds N	sandy loams		moderate	slopes	
Allocasuarina luehmannii	bull oak	10m	600+	400	V. high	V. high	turnery, heavy construction, shingles	adds N, fodder, firewood	clay loam	sand	V. high	clay plains	
Eucalyptus viminalis	manna gum	20m	900+	700	V. high	moderate	flooring, panelling, general construction		deep sandy loam over clay	deep infertile sand	moderate	valley/lower slope	
Eucalyptus laevopinea	silver top stringybark	20m	900+	600	high	moderate	general construction timber, panelling	firewood	basalt loams	heavy wet clay	low	ridges/upper slope	
Eucalyptus caliginosa	New England stringybark	20m	800+	600	high	moderate	general construction timber, panelling	firewood	clay-loams		moderate	slopes	
Eucalyptus cameronii	diehard stringybark	25m	900+	700	high	moderate	general construction timber	firewood, fencing	granite loams/ rocky		moderate	ridge/slope/valley	
Eucalyptus andrewsii	New England blackbutt	25m	800+	600	high	moderate	general construction timber	firewood	granite-derived loam		moderate	slopes/valleys	
Eucalyptus campanulata	New England blackbutt	25m	900+	700	high	moderate	general construction timber	firewood	granite-derived loam		moderate	slopes/valleys	
Eucalyptus nitens	shining gum	30m	1000+	700	V. high	V. low	general construction, flooring	pulp	clay-loam		high	cool wet slope	
Eucalyptus nobilis	manna gum	30m	1000+	750	high	moderate	flooring, panelling, general construction	pulp	deep sandy loam over clay	deep infertile sand	moderate	valley/lower slope	
Eucalyptus youmanii	Youmans stringybark	15m	800+	650	high	moderate	general construction	rutin	granite-sandy loams	heavy clay	moderate	mid-slope	

Conclusion

Selecting the right species for successful farm forestry is crucial. Which species you choose depends on site conditions, product requirements, landholder preferences and the availability of planting material. By considering all these factors carefully and consulting references and specialist advisors, landholders can find the right species for their individual farm forestry enterprises.

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Bushcare

Acacia aneura (mulga)

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The following sources of information will help with your species selection.

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