

Plantation forests

Plantation forests are stands of trees created by the regular placement of seedlings or seeds. Plantation forests can be either native or exotic tree species, and of any age.

Plantations currently supply more than half the logs for Australia's timber requirements, and provide a range of economic benefits, such as employment in regional and rural areas.

They also benefit the environment and are used, for example, for salinity and erosion control, and as windbreaks.

Sometimes, they are planted solely to provide environmental benefits, but for the purposes of this profile, 'plantation forest' refers only to those planted for economic benefit.

Plantation forestry in Australia dates back to the 1870s. The major factors that prompted the first plantations were the need for timber to support settlement of regions that had little useful local timber, and the mining industry, which used substantial amounts of timber and left large areas of cleared land in need of reforestation.

A range of exotic and native species were trialled until those that best suited the climate and available sites were identified. Radiata pine was first planted for forestry in 1876 at Bundaleer, South Australia, and Macedon, Victoria in 1880. By 1900, it was evident that it was the best softwood species for plantation forestry in South Australia. There are now more than 1 million hectares of softwood species which supply the majority of timber used in Australia. Eucalypts were also tried, and there are still some small areas of eucalypt plantation dating from the late 19th and early 20th centuries. It was not until the 1980s that the planting of large areas of eucalypts began.

In December 2004, Australia had more than 1.7 million hectares of timber plantations, which was approximately one per cent of the country's total forested area.

The area of plantations in Australia increased by 60% from 1995 to 2004, primarily due to private investment supported by government policy initiatives. These included *Plantations for Australia: The 2020 Vision* (1997) which aimed to treble the existing plantation area by 2020. New plantations in Australia have been established at an average rate of 75 000 hectares per year for the five years from 2000 to 2004.



Plantation of native blue gum (Eucalyptus globulus)



Radiata pine (Pinus radiata), Kuitpo Forest, South Australia

Plantation forests can either be 'softwood' or 'hardwood' species groups. 'Softwoods' in Australia generally (but not always) produce softer, lighter coloured wood and are mainly exotic pine species. 'Hardwoods' generally produce harder, denser wood and, in Australia, are mainly eucalypt species. These two species groups are covered separately in more detail later in this profile.

Where are Australia's plantation forests?

Victoria, Western Australia and New South Wales each have about 20% of the nation's total area of plantations. Queensland and Tasmania account for about 13% each, and South Australia has 10% (Table 1 and Figure 1). All South Australian commercial forests are plantation forests.

Plantation ownership

Australia's plantation resources are split almost evenly across public and private land tenures, with 53% (905 000 hectares) on private land and 47% (811 000 hectares) on public land. However, there has been an increasing trend in recent years to establish new plantings on private land.



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Sawn pine timber

Table 1: Total area of plantation forest in 2004 by State and Territory (hectares)

Plantations	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
Hardwood	65	54 060	8 437	34 427	39 438	151 272	168 461	259 371	715 531
Softwood	5 363	287 302	3 817	180 158	124 313	74 420	214 874	110 395	1 000 642
Total	5 428	341 362	12 254	214 585	163 751	225 692	383 335	369 766	1 716 172

Source: National Plantation Inventory Annual Update 2005





Table 2: Tenure	of plantation	forest by St	tate and Territory	(hectares)
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Tenure	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
Public land									
Hardwood	65	35 296	0	4 012	1 316	37 959	12 547	5 871	97 066
Softwood	5 363	215 289	0	178 628	82 848	54 042	116 793	60 684	713 647
Total (47%)									810 713
Private land									
Hardwood	0	18 764	8 437	30 415	38 122	113 313	155 915	253 500	618 465
Softwood	0	72 013	3 817	1 530	41 465	20 377	98 081	49 711	286 994
Total <i>(53%)</i>									905 459

Source: National Plantation Inventory Annual Update 2005

Farm forestry

Farmers are increasingly using plantations for both commercial returns and land management and environmental purposes. The National Plantation Inventory makes a distinction between 'industrial' plantations (those greater than 1000 hectares) and 'farm forestry' plantations (less than 1000 hectares). An estimated 20% of current plantations have some degree of ownership by the farm forestry sector.

Softwood plantations

About one million hectares (or 58%) of plantations at December 2004 were softwoods.

Exotic softwood tree species are valued for plantation forestry, because the timber is easily processed and they are productive on a wide range of sites. The choice of species generally reflects climatic and site conditions.



Radiata pine (Pinus radiata) plantation, South Australia

A poster showing all main forest types is available from the NFI. See back page for contact details.



Farm forestry is a small but significant proportion of the national plantation area

The main softwood species planted in temperate regions are the exotic radiata pine (*Pinus radiata*), Caribbean pine (*P. caribaea*) and slash pine (*P. elliottii*). Western Australia has a significant maritime pine (*Pinus pinaster*) plantation resource.

Hoop pine (*Araucaria cunninghamii*) is the only native conifer planted for wood production in Australia, and has been planted predominantly in Queensland.

Although softwoods make up the majority of the total plantation resource, their proportion has declined from more than 80% in 1995 to 58% in 2004, due to the large area of hardwood plantations established.



Export woodchip mill, Burnie, northeast Tasmania

Australian native softwood plantations

Plantations of hoop pine (*Araucaria cunninghamii*) were first established in Queensland in 1916. They are best developed on deep loams that originally carried rainforest, because hoop pine is a native rainforest species. Between 1940 and 1999, an average area of 3560 hectares of hoop pine was planted every five years in southeast Queensland. The total resource in 2000 was 46 588 hectares, of which 94% was in southeast Queensland and about 3 per cent was in each of northern New South Wales and north Queensland. Hoop pine timber is excellent for plywood, furniture, joinery and flooring, as well as many other purposes, including ice-cream sticks.

Hardwood plantations

In 2004 Australia had about 715 000 hectares of hardwood plantations. Of that area more than 95% was *Eucalyptus* and the remainder included tropical rainforest, *Acacia* and *Corymbia* species.

Only a few eucalypt species are used widely in Australian plantations. The main species are Tasmanian or southern blue gum (*Eucalyptus globulus*), shining gum (*E. nitens*), blackbutt (*E. pilularis*), flooded or rose gum (*E. grandis*), mountain ash (*E. regnans*), gympie messmate (*E. cloeziana*), spotted gum (*Corymbia citriodora* subsp *variegata*) and Dunn's white gum (*E. dunnii*). In 2000, Tasmanian or southern blue gum made up almost two-thirds of the plantations.

Values and uses

Wood

Softwood plantation forests produce sawlogs in a relatively short time (25–35 years), and can be managed to produce products of relatively consistent size and quality. Softwood timber is relatively easy to dry and highly permeable to wood preservatives. Softwood plantations also produce wood that is suitable for newsprint and cardboard. About 70% of softwood plantation timber is used domestically; however, 39% of timber consumed locally is imported because of a shortage of domestic supply.

Most eucalypts in commercial plantations are suitable for a wide range of products depending on their management, although some species have properties that limit their value. For example, some of the older, darker timbers are less suitable for paper production because it is expensive to make them white and the pulp quality may be damaged in the process.



Wooden house frames



Hoop pine (Araucaria cunninghamii), Queensland



Mallees planted on a site prone to waterlogging in Kalannie

Oil mallee plantations in Western Australia

In 1994, a significant eucalyptus oil enterprise was established in the low rainfall areas of Western Australia. The industry uses various *Eucalyptus* mallee species, targeted for different soil types and climates. Mallee trees have multiple stems arising from a central underground root stock. They are well adapted to dry conditions, and new shoots grow back after the leaves are harvested for oil.

The total area of plantations in 2000 was almost 6000 hectares. Eucalyptus oil is used in pharmaceuticals, cleaning products and perfumes. Currently, Australia produces 200 tonnes of oil for specialty markets (for example, fragrances). World production is about 3000 tonnes per year, mainly from China, Portugal and India.

The oil mallee plantations provide a variety of other benefits, such as salinity control, carbon sinks to offset carbon dioxide emissions, decreased waterlogging and erosion, increased yields of surrounding agricultural crops, activated carbon (charcoal) to absorb chemicals, ions and odours (for example, in water treatment, gold recovery, the food and beverage industry) and fuel to produce electricity. Most hardwood plantations have been established in the past 10 years and are managed for pulpwood production. The production period for pulpwood is 10-15 years, but there is increasing interest in growing hardwoods for longer periods to produce sawlogs and other high-value products.

The rotation length for eucalypt plantations varies from 10–40 years or more, depending on the kind of product being grown. For example, a plantation can produce firewood and woodchips on a rotation of 10–20 years. However, it takes 20–30 years to grow trees suitable for sawn and structural timbers. Depending on the species grown, it may take 40 years or more to produce top-quality logs with a large diameter for high-value solid timber products.

Environmental

There are fewer forest-dwelling native animals in plantations than in native forests. However, plantations provide habitat for some flora and fauna species that can be absent on cleared agricultural land.

Native animals found frequently in surveys of softwood plantations include echidnas (*Tachyglossus aculeatus*), kangaroos (*Macropus* spp.), wombats (*Vombatus ursinus*), possums, birds such as the yellow-tailed black-cockatoo (*Calyptorhynchus funereus*), as well as other bird and insect fauna.

If properly sited in the landscape, plantations provide a number of environmental benefits, including wind shelters, increased water quality and reduced erosion, and the potential to reduce the effects of salinity.



Common or southeastern wombat (Vombatus ursinus)



Australian Government Bureau of Rural Sciences

Other uses

Both native and plantation forests are used for recreational activities, such as walking, cycling and camping.

In addition to wood products, plantations are also being established to supplement native sources for non-wood products, such as Eucalyptus and sandalwood (*Santalum spicatum*) oil from Western Australia, and tea-tree (*Melaleuca alternifolia*), and northern cypress pine (*Callitris intratropica*) oils from New South Wales.

Other plantation products that are produced in small quantities include resins, bush food, fodder, cut flowers and foliage, and medicines.

An expanding plantation industry also has the potential to supply biomass for electricity and ethanol production.



Mountain bike racing, ACT forests



Plantations

Acknowledgements

Australia's forest types profiles have been compiled by the National Forest Inventory, a cooperative project between the Australian Government and State and Territory governments, and managed by the Bureau of Rural Sciences. Information in this profile is taken from *Australia's State of the Forests Report 2003*, available by calling **1800 020 157** or online from http://www.brs.gov.au/stateoftheforests.

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