



How Pine Forests are Managed

Plantation Forest Cycle (Radiata Pine)

Seed collection - Mature pine cones are harvested from the seed orchards and when they open, the seed is collected. Seed orchards produce seed of a particular genetic make-up, using special breeding programs based on research results.

Propagation - Young pine trees are raised in tree nurseries either from seed or from cuttings taken from trees with good genes for growing timber.

Breeding programs have enabled foresters to produce superior trees on the basis of growth rate, stem form and wood quality. Characteristics such as fast growth rate, stem straightness, small branches, few knots and disease resistance are achieved by breeding from high-quality parent trees.

Pine trees can also be propagated from cuttings. Cuttings are taken from near the end of a branch and when placed in a nursery bed will produce roots and develop into a new plant which is genetically identical to the parent plant. This is known as vegetative propagation. Genetically-superior trees are often kept just as a source of cuttings.

Another type of vegetative propagation is cloning.

A clone is one of a group of offspring which are identical. Each individual has the same genes as the original plant from which the clone was made. Clones can be created using cuttings, but more commonly it is done in a laboratory using tissue culture. All tissue culture propagation is carried out under sterile conditions. The original seed embryo can yield up to 100,000 plantlets.

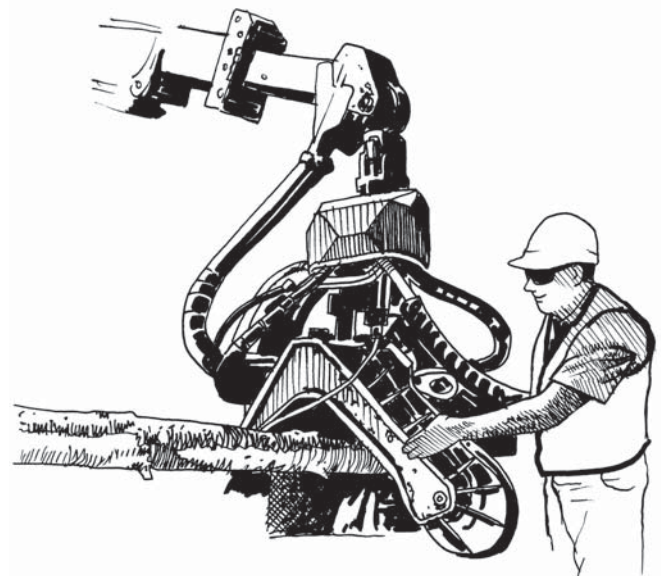
The advantage of growing forests from clones developed from high-quality radiata pine trees is that the trees will be more uniform in height

and diameter, with the same wood properties. The main disadvantage of using cloned plants is the lack of genetic variability within a forest, making it more susceptible to disease or insect attack.

Seedlings or cuttings are grown in a nursery for 9 to 12 months before being planted out.

Land preparation - The soil is cultivated usually either by ripping to about 600 mm, mound ploughing or spot mounding. Foresters are trying to use low-residue methods of logging so that the leftover branches from previous plantings can be mulched rather than windrowed (*bulldozed into heaps and burnt*).

Planting - Seedlings and rooted cuttings are lifted from their nursery beds and taken to the forest site for planting out. Depending on site conditions, seedlings are either planted by hand or machinery. Approximately 1,600 trees are planted per hectare. Young trees are kept free of weeds for the first couple of seasons to minimise competition for water, light and nutrients, and they are protected from grazing by animals.



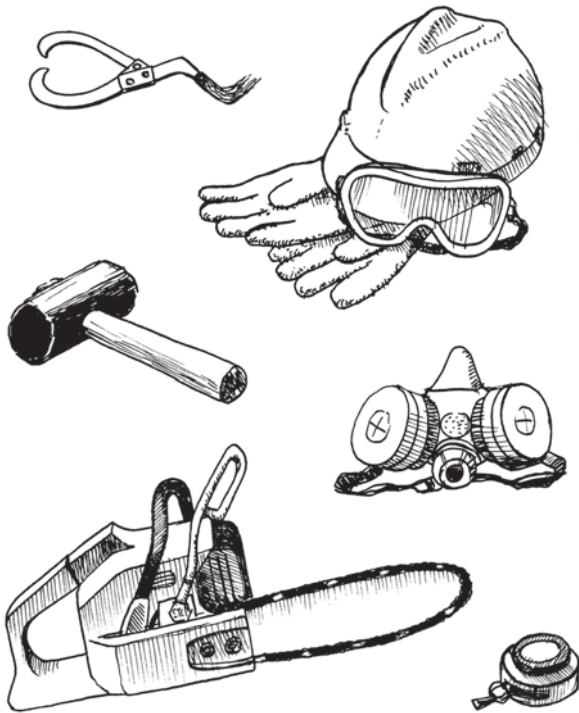
Bark being stripped from a tree.

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Tools and equipment used by foresters.

Pruning - Pruning improves the quality and value of wood. In some plantations, the lower branches are pruned from trees when young to produce clearwood which is free of knots and is used for furniture, veneer and plywood.

Thinning - Trees are initially planted quite close together to encourage them to grow tall and straight as they compete for light. Thinning involves removing some of the poorer-quality trees to give more space to the remaining trees. The culled logs from the first thinning are often treated with preservatives and used as fence posts or other outdoor timber, or can be pulped to make paper. Thinnings occur about every five to ten years, until the plantation is fully mature and the trees are cut and replanted.

Harvesting - Mature trees are harvested for large diameter sawlogs at 30 to 50 years of age, depending on site conditions and growth rate. Trees for other uses, such as pulpwood or smaller logs, are harvested earlier, at 30 to 35 years. The logs are removed from the forest and taken to a sawmill for

processing. ForestrySA practises low-residue logging, which uses larger leftover timber for woodchips and other products and mulches the smaller branches.

Replanting - The area is now prepared for replanting and the cycle begins again.

Forest Protection

An important part of forest management is protecting the forest asset from insect attack, disease and fire damage. (*see Forest Pests and Diseases*).

What is Sustainable Forest Management?

Forest managers aim to ensure that forests are used sustainably. Sustainable use means finding a balance between meeting our present needs for resources while conserving natural resources and protecting the environment for the benefit of future generations. In plantation forestry this involves balancing timber harvesting and replanting to ensure a continuing supply of wood.

Forest land is being used sustainably if all plant and animal species occurring within forests and their habitats are being conserved and protected, and if the forests continue to protect our soil, water and air resources.