

THE DEVELOPMENT OF PLANTATIONS THROUGHOUT THE WORLD

The total reported area of forest plantations throughout the world had risen in 1995 to some 180 million hectares, in other words about 3 % of the world's forested area. Of these 180 million hectares, 80 million are situated in developing countries, including China. It should be noted that, for the developing countries, the figures are lowered by 30 %, in relation to the figures officially supplied, in order to take into account the plantation survival coefficient. During the period 1980-1995, the areas planted doubled both in the developing countries and in the developed countries. It is estimated that at the present time between 7 % and 10 % of logs for industrial and construction timber produced in the tropics come from reforested areas. And this proportion will rise swiftly as the plantations established over the last 20 years come into production.

Although it is difficult to make overall statements regarding trends in plantation development, plantation programmes in several countries, especially in the tropics, have nevertheless been characterized in the past by central government ownership, and by relatively low intensity input and management. Plantations in these countries are now evolving towards:

TWO DIRECTIONS

□ Firstly towards private ownership by industry, high levels of input and intensive management more akin to agriculture, with production of wood as the overriding objective.

□ Secondly towards ownership by individuals or communities, relatively small scale and integration with other land uses or meeting multiple objectives.

Private property

Examples of the first direction of plantation evolution may be seen in the Aracruz (Brazil) plantations, where over 100,000 ha of high yielding clonal eucalypt plantations (mainly hybrids of *Eucalyptus grandis* × *E. urophylla*) have been established for pulp wood supply, or the example from Congo quoted elsewhere in this issue. Countries which have expanded their industrial forest plantation programmes since 1980 include Argentina (0.8 million ha), Brazil (7 million ha), Chile (1.4 million ha), China (18 million ha), Indonesia (1.5 million ha). In the USA, 20,000 ha of hybrid poplar plantations have been established between 1992 and 1996 to substitute to some extent for supplies withdrawn from production in the Pacific Northwest, to preserve the habitat of the spotted owl (*Strix occidentalis*), while in Sweden, 16,000 ha of willow plantations have been established to supply renewable energy supplies.

Most of these plantations are composed of fast-growing species grown over short rotations as raw material for various types of reconstituted wood products. Teak* is the most widely grown of the "quality" hardwood, covering about two million ha almost exclusively in tropical Asia and the Pacific. Plantations of decorative timber species are unlikely to be financially attractive unless there are markets or technolo-

gies for converting smaller sizes, and such timber may continue to come predominantly from managed natural forests.

Besides the establishment of plantations for production purposes, there is interest in planting trees to establish a soil cover and a nutrient cycle to help rehabilitate degraded sites. Such plantations may involve intensive site preparation, where soils are indurated or shallow, or the selection of species adapted to the site, where the site is exposed or the soils are saline.

Individual or community ownership

The second direction of plantation development may take a number of forms. It may be towards trees integrated in farming systems, where the trees may be planted not only to provide shelter, but industrial roundwood as well. In view of calls for increased food supplies from the recent World Food Summit (Rome, November 1996), such systems will assume increasing importance. Examples include the smallholdings of poplar clones which are grown with rice in the summer and wheat in the winter, and supply matchwood and plywood mills in Haryana, Uttar Pradesh and Punjab in northern India, covering an area estimated at 26,000 ha in 1992 and expanding by about 2,000 ha yearly since then. We might also mention lines of *Paulownia* planted around farmer's fields in Henan Province, central China, where the trees give shelter to winter wheat and also provide an important source of

* Cf. BFT n° 235.

high quality hardwood for internal use and export. In industrialized countries, plantations are being created not only for roundwood production but for recreation and amenity, and for this purpose mixtures of species and irregular formations are increasingly being preferred.

Some species which are not "traditional" forestry species, such as rubber, coconut and oil palm, are now being used as sources of industrial roundwood or fibre. It is estimated that there are approximately 7 million ha of rubber, 4 million ha of coconut and nearly 2 million ha of oil palm, giving a measure of the potential contribution of these species.



Industrial plantation of five-year old *Eucalyptus grandis* in Burundi.

PLANTATION PROTECTION

Greater attention will have to be paid in the future to the protection from fire, insects and disease of the increasing investment in forest plantations. It is not always possible to separate figures on fires in plantations from data for other wild fires, but it is estimated that in the period 1983-88 over 200,000 ha of plantations in Brazil were affected by fire. The risks of introduction of harmful insect pests have been increased through greater international trade in forest products, the movement of plant material and more widespread human travel. Examples of serious insect attacks include the introduction of the European pine shoot moth (*Rhyacionia buoliana*) into Chile, where it is attacking *Pinus radiata*, the Leucaena* psyllid (*Heteropsylla cubana*) into Asia and, more recently, into Africa, the cypress aphid (*Cinara cupressi*) into eastern and central Africa, and the European woodwasp (*Sirex noctilio*) into South America. Increased

monitoring of insect and disease attack of large areas of plantations will be essential, combined with new strategies for their management and control.

Finally, although governments no longer have a major role in many countries in plantation establishment and management, they will still be involved in forest plantation development in the future, as facilitators of all sorts of plantations, sources of data for sectorial planning (including evaluations of the environmental and socio-economic impact of plantation programmes), as enforcer of legislation, and as monitors of the private sector. Governments will determine and control the kind and quantity of incentives offered for plantation development. In view of the difficulties in determining incentives and of the increasing importance of wood supplies from forestry plantations, there will be an urgent need for better quality data, not only on areas and yields, but on costs and benefits as well.

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* Cf. BFT n° 234.