

Rainforests – the economic potential

The rainforest is often thought of as an underused resource, containing trees that could be sold to bring in much needed foreign capital and covering land that could be used for agriculture or mined for its valuable mineral resources. If used to its full economic potential, the forest could provide sustainable supplies of food, wood and medicines. Amongst the factors sometimes ignored, when considering the economic benefits of the rainforest, is its beneficial relationship with local agriculture. Because the rainforest regulates water flow and protects soils, its removal can actually cause economic disaster through flooding or silting up of irrigation channels.

Sustainable timber extraction

Timber harvested from the rainforest is used for many purposes. Some trees, such as Mahogany (*Swietenia macrophylla*), Ebony (*Diospyros ebenum*) and Teak (*Tectona grandis*), have beautifully coloured or patterned woods that are valued for veneers and high quality furniture. Others are important constructional timbers – Greenheart (*Chlorocardium rodiei*) is a durable wood widely used in marine building for lock gates and harbours as well as for fishing rods.

In all wood-harvesting operations, the survival of the rainforest depends on its regeneration. Under natural conditions, fallen trees are replaced first by herbaceous plants, then by shrubs and finally by small trees, each shading out the lower levels in turn. The time taken for large trees to grow may be fairly short, as little as 30 years, but this secondary forest contains different species from those found in the original, primary forest. In time, possibly over several centuries, this secondary forest will develop into primary forest.

In areas of the rainforest that have been logged, this natural succession can be mimicked if the forest is able to re-establish itself. This depends, initially, on several factors: maintenance of the soil's structure and fertility during logging, and the presence of suitable trees as sources of seeds. Soil compaction caused by heavy machinery used in logging can be prevented by felling trees manually and removing the logs using an overhead



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Above: A selection of crops gathered from the rainforest.

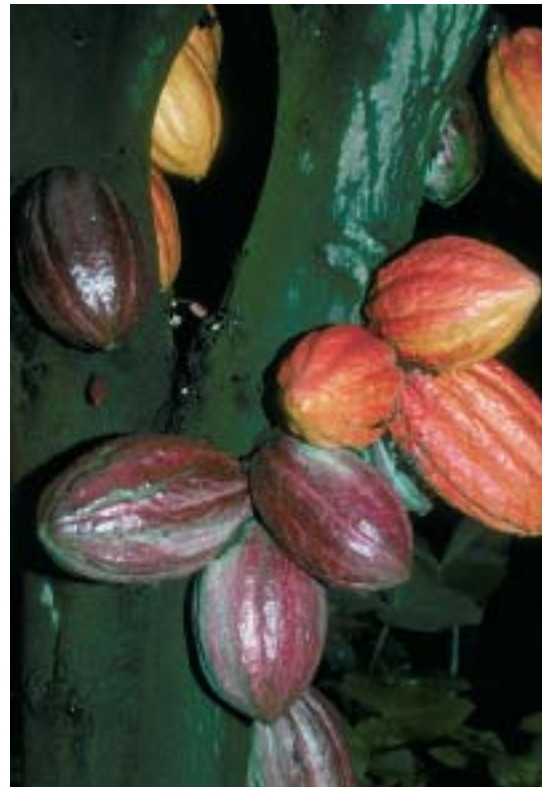
Below: The pods of the Cocoa tree (*Theobroma cacao*).

system. If the logs are trimmed and debarked at the site where they are cut, nutrients are returned to the soil. In selective felling, trees at a suitable stage of fruiting should be left undamaged to provide seeds whilst clear cutting of narrow strips should ensure that seed is available from trees on either side.

Alternative sources of wood – for furniture, paper and fuel

An alternative to using the forest itself for wood is to provide other sources of trees and remove pressure from intact, undamaged areas of rainforest. One option is to establish plantations of timber trees on land that has already been degraded; trees such as *Eucalyptus*, *Gmelina*, *Leucaena*, *Albizia* and various species of tropical conifers grow more quickly than those in the forest. Using plantations ensures that the tree cover is maintained, preventing erosion and protecting watersheds.

Although plantations are easy to manage and harvest, they are expensive to establish and do not produce an immediate cash return. Pulp and fencing wood can, however, be obtained during thinning operations, and by intercropping trees with food plants, the plantation provides benefits before tree harvesting begins. Single-species plantations tend to impoverish the soil and to be susceptible to epidemics of pests and diseases. They lack the genetic diversity of the original rainforest and provide a very restricted habitat for wildlife.



One rapidly increasing product of the rainforest is pulpwood; by developing alternative sources of fibres for paper manufacture the area of forest cleared each year could be considerably reduced. Straw, Sugarcane residues, reeds, bamboo and Hemp (*Cannabis sativa*) are all suitable fibrous materials. For example, it has been estimated that a hectare of Hemp would provide four times as much paper as a similar area under forest. Increased use of recycled paper would also reduce our dependence on pulp from trees.

Agriculture

Although agriculture is one of the major causes of forest destruction, suitable cultivation systems can, in fact, maintain the productivity of the forest lands. Mixed cropping, using a variety of plants including trees, requires little energy input but has numerous benefits: retaining ground cover; maintaining soil nutrient levels; controlling weeds; avoiding pests and diseases; preserving genetic diversity and providing a range of crops from fuelwood to fruit.

Crops originating in the rainforest

The rainforest is the source of many crop plants, which provide a wide range of products from spices to the raw material for golf balls and from fruits to fibres. Several popular tropical fruits originated in the rainforest, including Banana (*Musa* spp.), Pineapple (*Ananas comosus*), Paw-paw (*Carica papaya*) and Mango

Below: **A rubber tapper at work.**



(*Mangifera indica*). Of the nuts grown in the tropical regions, Brazil Nuts (*Bertholletia excelsa*) are still harvested from the rainforest itself because the tree cannot be grown successfully in plantations. The rainforest is also the source of several staple foods including yams (*Dioscorea* spp.), Cassava (*Manihot esculenta*) and Sweet Potato (*Ipomoea batatas*). Other rainforest derived commodities widely traded in the world markets are Sugar (*Saccharum officinarum*) and Cocoa (*Theobroma cacao*).

A large proportion of the world's spices are derived from rainforest plants: Cinnamon (*Cinnamomum zeylanicum*), Clove (*Syzygium aromaticum*), Nutmeg (*Myristica fragrans*), Pepper (*Piper nigrum*) and vanilla (*Vanilla* spp.) are just a few examples. Various essential oils used in perfumery are also harvested from rainforest plants, notably Ylang-ylang (*Cananga odorata*), Patchouli (*Pogostemon cablin*), Sandalwood (*Santalum album*) and Bay Oil (*Pimenta racemosa*). Dyes include artist's Yellow Gamboge from *Garcinia hanburyi*, a microscopy stain from *Haematoxylum campechianum* and Annatto, an important food colouring from the seeds of *Bixa orellana*.

Many important fibrous plants are native to the rainforest. Jute (*Corchorus* spp.) and Kenaf (*Hibiscus cannabinus*) stems are processed to provide coarse sacking whilst the silky hairs from the seed pods of Kapok (*Ceiba pentandra*) are used as stuffing. The strong stems of rattans are made into cane furniture or split for use in basketry.

One of the most widely used rainforest products is Rubber, produced from the latex of *Hevea brasiliensis*. This is both tapped on a large scale from plantation-grown trees and harvested from wild trees. Other valuable latexes include Balata from *Mimusops globosa*, used for golf balls, and Chicle from *Manilkara zapota*, an important constituent of some chewing gums.

Many rainforest plants contain biologically active compounds which have useful properties. Ipecacuanha (*Psychotria ipecacuanha*) is used as an expectorant and emetic as well as in the treatment of dysentery; Reserpine from *Rauvolfia* is a sedative and tranquilliser; and Diosgenin from yams (*Dioscorea* spp.) is the starting material in the manufacture of contraceptive pills and corticosteroids. Possibly the most famous rainforest drug

is Quinine, still one of the most effective anti-malarials available, which is extracted from the bark of *Cinchona* spp.

The value of the rainforest's genetic diversity

Wild plants are supremely well adapted to their environment; they are resistant to local pests and diseases and can grow in the adverse conditions of low light and nutrients. By using the wild relatives of tropical crop plants in selective breeding programmes, it is possible to incorporate disease resistance and other beneficial characteristics into the crops that we currently grow.

Very little is known about the potential value of rainforest plants as sources of food, fuel or drugs. Within recent years, a compound that is active against the AIDS virus has been isolated from the rainforest tree *Castanospermum australe*. To date, only 1 per cent of the world's plant species have been screened for their therapeutic activity and there are no doubt many more valuable drugs yet to be discovered in the rainforest.

Below: **Cups of latex gathered from the Rubber Tree (*Hevea brasiliensis*).**

