

# Analog forestry: An alternative to 'clear and simplify'

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**M**odern agricultural and forestry practices have devastated many natural and traditional ecosystems and their diverse flora and fauna, replacing them with monocultures designed for maximum short-term production. The resulting highly simplified ecosystems are unstable and unsustainable and often require considerable external inputs. It is not only the poor who have ravaged local forest ecosystems, modern development agriculture and silviculture are often more destructive than 'slash and burn'.

The NeoSynthesis Research Center in Mirahawatte, Sri Lanka has examined alternatives to modern forestry and has developed a strategy to intensify agriculture in an ecologically sound way. Twenty years of field experimentation has led to an approach that tries to work according to nature's designs. The system is known as Analog Forestry (Senanayake 1987). The Center's work proves that moving towards ecologically designed tree crops brings back economic and ecological stability.

## Forest home gardens

Forest home gardens are a traditional form of cultivation in Sri Lanka and they are also common in other tropical areas. Forest gardens are patches of cultivated land dominated by trees and perennial shrubs and have a forest-like system appearance. The gardens are usually located close to farmers' homes and provide a wide variety of food, fuel, fodder, wood and medicinal crops. They also provide a cool and pleasant living environment. The composition of tree species varies with climate and elevation and is a product of generations of farmer experimentation, cultural and spiritual beliefs, and economic necessity.

Analog forestry in Sri Lanka draws on the strengths of this traditional paradigm. Many forest home gardens mimic the natu-

ral species succession found in local forest vegetation. The use of succession stages of natural ecosystems to design a cropping system was first reported by Hart (1980) who saw this as an analog to natural processes. He recognised the fact that a forest progresses from grassland to climax forest over time and that all of the organisms, from grass to tree represent the forest.

## Analog forestry design

The trees and plants in an analog forest will be similar to those in native ecosystems. They will provide food or microhabitat for native species, but can also supply human needs. This requires a careful selection of analog species. In designing the analog forestry system it is important to keep in mind that, because of natural species succession, this will be a dynamic system and one that will mature. Therefore, a dynamic approach to management is needed as well as an understanding of how maturity can be used as a performance indicator. It is also important to identify opportunities for microhabitat creation. Protecting 'keystone' species becomes easier if the farmer develops this knowledge. Planning an analog forest is highly situation specific and will often entail different designs reflecting the characteristics of the local ecosystems. As the system matures it will create production opportunities and maximise species diversity.

## Alternative to slash and burn

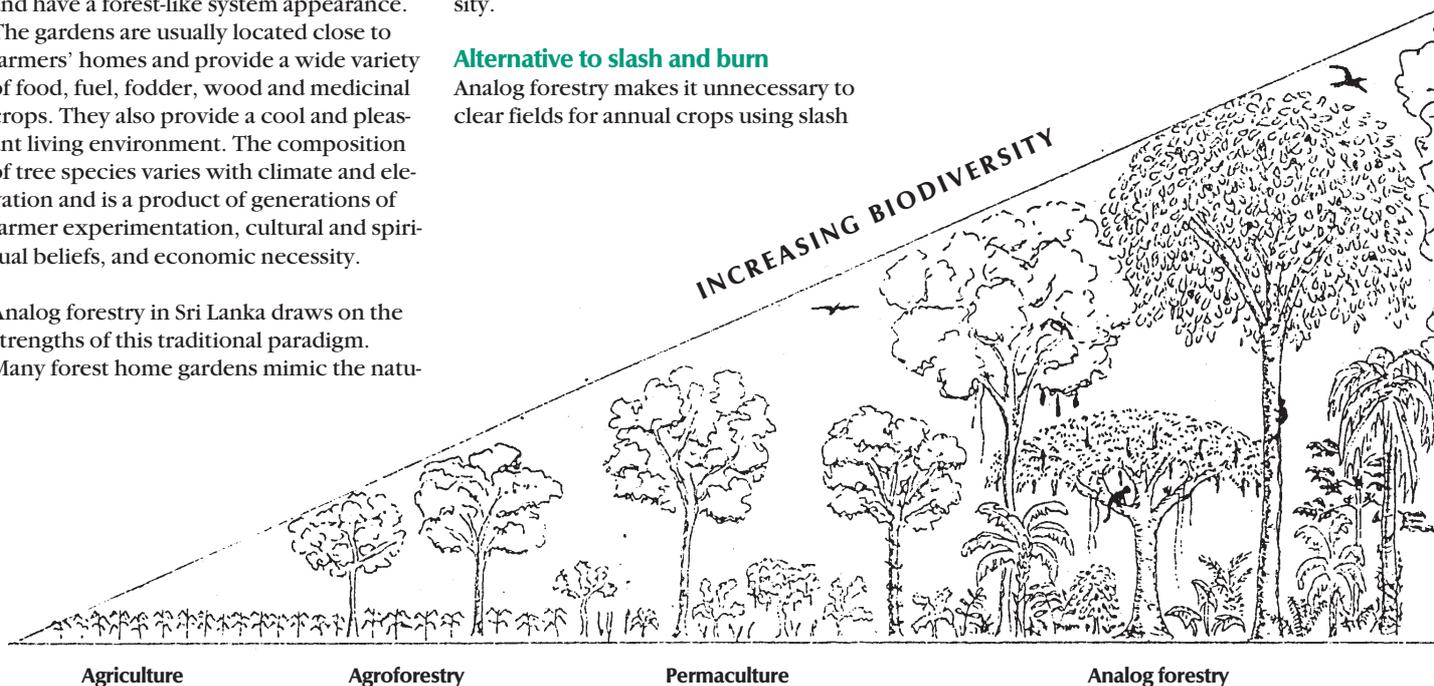
Analog forestry makes it unnecessary to clear fields for annual crops using slash

and burn techniques. The shade factor provides good conditions for shade loving crops such as cardamom, cloves, nutmeg and pepper which give the farmer more earning potential than annual crops. Once shade cropping has been established, farmers are reluctant to open the canopy because a return to 'slash and burn' will destroy the potential offered by these valuable crops. Increased crop diversity - tree crops included - brings other social and economic benefits, reduce the risk of glut and increase the demand for skilled agricultural labour.

This community of trees promotes environmental stability, conserves biodiversity and facilitates the production of clean water just like a forest. Recognising these functions is an important feature of analog forestry. It has been demonstrated that the environment created by this type of silvicultural system increases biodiversity and ecosystem stability within production systems. In Sri Lanka, records show that many species of flora and fauna have returned to farms with established analog forests.

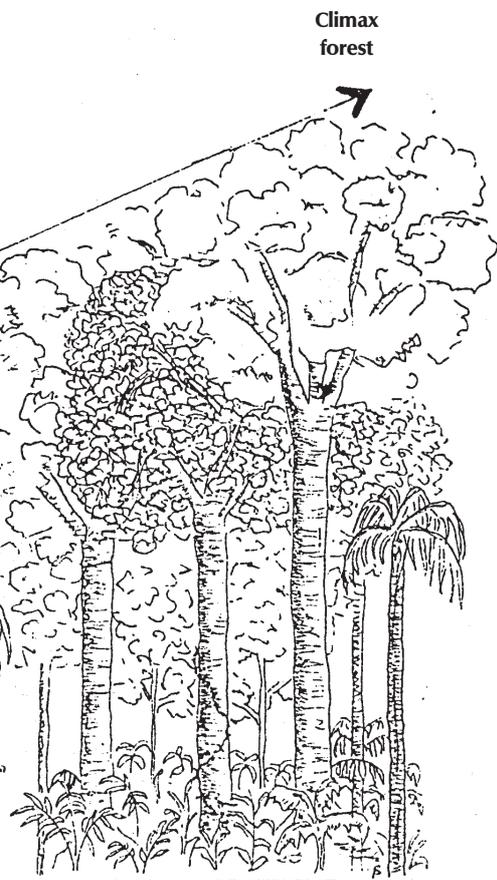
## Biodiversity conservation

While conservation is the ideal way of maintaining original levels of forest biodiversity, resources are too limited to purchase or schedule protected areas.



Establishing protected areas and private reserves is not enough to ensure the sustainability of many native species. In May 2000, a workshop hosted by the Ministry of Forests and a local NGO - Rainforest Rescue - held in Quito, Ecuador made clear that many areas currently described as having 'no forest' on the national forest map, actually contained a very high percentage of forest patches and corridors. In some regions the local NGO reported that forest cover extends over more than 50% of farm area. If the management of forest patches and the extension of corridors are not addressed urgently, the current policy of treating these areas as devoid of forest will become a self-fulfilling prophecy. Analog forestry projects in this region have show how effective reconnecting patches through an 'analog corridor' can be.

In order to re-establish components of natural biodiversity, analog forestry design often goes beyond the farm boundary and farmers are encouraged to think in terms of off-boundary effects, and the continuity of corridors and drainage systems.



Natural forest ecology

### Critical elements

Programmes using analog forestry, such as the Forest Garden Programme of Counterpart International identified several factors that were critical in its work in Sri Lanka, Philippines and Mexico.

- A network of local seedling nurseries and community seed banks to provide a diverse range of seed stock and seedlings of plant species to rural farmers wanting to expand subsistence and cash crop tree gardens, wood lots and local tree belts.
- A 'seed and tools fund' to help rural farmers to buy the materials they need to improve their agriculture and land management capacity.
- Technical assistance and training to help farmers design, plant and maintain their analog forests, wood lots and buffer forests.
- Rural education materials adapted for local use and which foster improved farming, farm-based enterprise, community nutrition, family health and the management of the local environment.
- To get better prices extension officers should work together with distributors of niche products to foster national, regional and international markets for the products of 'Forest Gardeners' around the world.
- Certification that guarantees all products have been produced according to organic principles and in systems that benefit rural environments.

Forest Garden Products Certification is a system that sets standards for the certification of crops grown under analog forestry design. This national certification system has been running in Sri Lanka for over twelve years and is presently under international management. There are good markets for forest garden products such as tea, syrup and cashews in Australia and Japan.

### The International Network

The International Analog Forestry Network (IAFN) has active members implementing projects in eight countries. Analog forests are being established in Sri Lanka to add value to local products and facilitate landscape management. In Mexico they are seen as an extension of the traditional Mayan land use system. In Colombia analog forests are being used to recover mine tailings left after the destruction caused by gold mining. In Ecuador they have been introduced to stimulate a change in the way cattle-dependent *campesinos* use their land and in Peru they are enhancing the gardens of indigenous peoples in Amazonia. In Canada analog forestry has increased crop diversity and biota in woodland while in Australia it is seen as a component of farm planning. It is clearly a viable approach with a wide applicability.

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### Box I. The frijolar, an indigenous example of the use of species succession

The frijolar system was developed and is being used by the indigenous descendants of the Mayas, in Central America. It is a system where beans - sometimes together with maize - are cultivated near a huge primary forest tree, *Ceiba pentandra*, which is considered sacred. This tree is 70 m tall and has a crown of about the same diameter. Where this tradition is followed, a plot with a dense stand of fast growing leguminous species will be found under the crown of the *Ceiba* tree, all of them showing signs of heavy pruning. Up to 40% of them can be *Inga sp.* a tree that can grow in stormy places or where flooding is frequent.

The ground layer is formed by herbaceous species, mainly *Piperaceae*. In the latter half of the rainy season, when the *Ceiba* tree loses its leaves, beans and maize are broadcast on the plot. At the same time, the herbaceous vegetation is moved and all the twigs of the adult fast-growing leguminous trees are cut off. The organic material obtained is cut into small pieces and distributed evenly over the soil. Beans and maize grow vigorously and cover the thick mulch layer within a few weeks. The trees that have been pruned react with a profuse flush of new twigs and leaves within 5-6 weeks. Weeds are unknown in this system. Two months after seeding, at the beginning of the dry season, the *Ceiba* tree renews its leaves. Three or four weeks later the beans are ready for harvest. Two weeks later the maize begins to ripen. Yields of about 2100 kg of beans and 1430 kg of maize per hectare have been recorded. This is quite good when compared to 800 kg of beans and 1000 kg of maize in slash and burn systems in the same region and on similar sites. In the slash and burn system weeding is done twice and only one crop is possible on the same place every 10 to 12 years.

Adapted from: Götsch E, 1995. *Break-through in agriculture*. Rio de Janeiro, AS-PTA