

G. MICHON, H. DE FORESTA, A. KUSWORO, G. VINCENT AND G. WIBAWA

In the search for sustainable land use practices as alternative to food-crop / fallow rotations, farmers in the humid forest zone of Indonesia (Sumatra, Kalimantan) have developed complex agroforests as land use systems over the past two centuries.

Agroforests are important production units, at regional as well as national levels: they provide 80% of the rubber latex consumed and exported by Indonesia (second world most important producer after Thailand), roughly 95% of the various fruits marketed in the country when homegardens are added, between 75 and 80% of the Dipterocarp damar resins traded in and outside the country, a significant part of rattans and bamboo, firewood and medicinal plants.



Agroforest with cinnamon in Sumatra



Harvesting durian from a damar agroforest



Rubber Estate Plantation

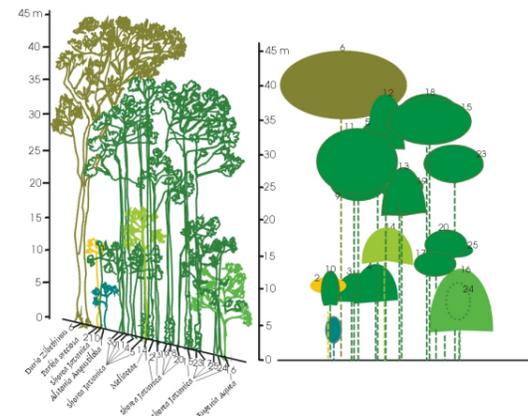


Bamboo shafts are used to protect *sisipan* rubber from pig damage

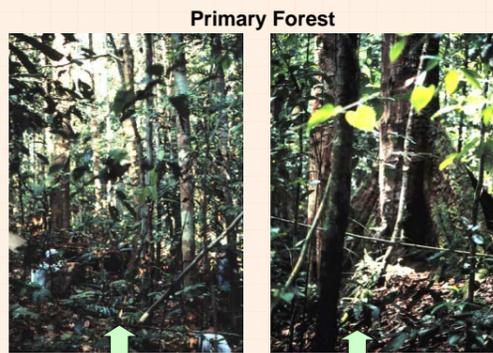
SEXI-FS

The model 'Spatial Explicit Individual Tree Forest Simulation' is being developed to help research on farmer management options for agroforest.

There are plans to apply the model to rubber agroforests and explore farmer management options such as timber harvesting and gap-replanting with valuable trees.

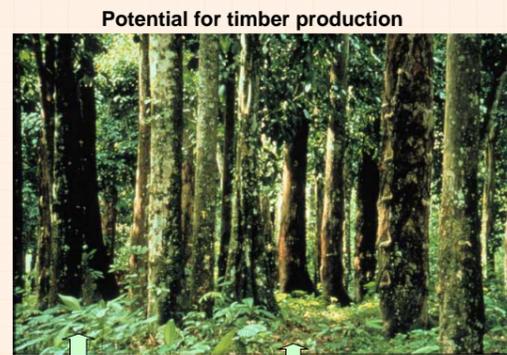


A simple model of light interception was designed to represent light resource variability in multi-strata multi-species agroforests



A Thick forest litter and less understorey

Primary forest in Jambi (Sumatra) has a thick layer of forest litter which creates roots mat as more nutrients available at surface layer. Little understorey is found under such condition due to a very low light intensity.



Various species of understorey

Dipterocarp (damar) agroforest provides a thick layer of surface litter and maintains of various species understorey.



Most agroforests start as swiddens, through systematic introduction of commercial trees in cleared lands. This rubber seedlings planted with upland rice in Jambi, Sumatra.

Current research is aimed at recognition at policy level of the values of agroforests and at exploring with farmers the options for innovation and intensification of production



Harvesting damar resin in Krui, West Lampung.

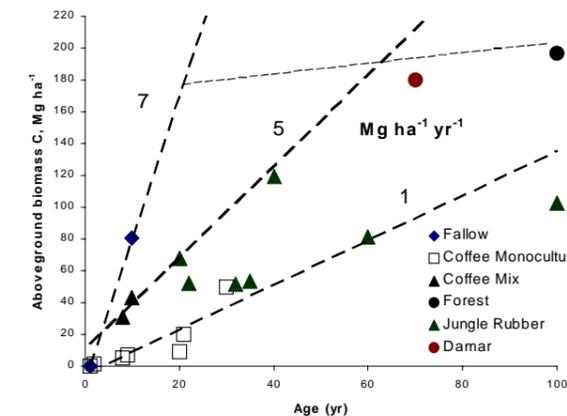


Timber is an important agroforest by-product for its commercial value!

Agroforests replace natural vegetation with a complex community of perennial species, which not only allows the direct conservation of numerous useful forest species, but also acts as shelter for hundreds of forest species not directly useful in our present state of knowledge.

Remaining Research Questions

- How to accurately assess **profitability** in these conditions, and at which time scale?
- How to include **environmental, biodiversity, social functions** and **benefits** in these assessments?



Aboveground biomass-C of various trees compare to fallow systems (dominated by fern) in Sumatra