

The case of tropical rain forests. The sustainable development of forests: aspirations and the reality

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BIBLID [1137-8603 (2000), 15; 13-15]

Oihan tropikal hezeak baso-funtzio eta produktuen ekoizle eramangarri izaten jarrai daitezzen nahi da, eta zuraren produkzioa funtzio horietariko bat dugu. Bioaniztasunaren kontserbazioak protagonismo handia hartu du gaurko egunean. Izan ere, egun oihan tropikal hezeak gero eta urriagoak gertatzen ari dira, harik eta nekazaritza paisaien barneko baso-zatiak bihurtu arte. Orain oihanaren funtzioak bestelako landaredi mota batek betetzen ditu (edo ez ditu betetzen). Basoaren berezko produktuen ekoizpena jaitsi egiten da. Bereziki, landaturiko paisaia horietan bioaniztasunak bizirik irauterik izango ote duen arazoaren inguruan galdera garrantzitsuak geratzen dira erantzuteke.

Giltz-Hitzak: Oihan tropikal hezeak. Bioaniztasunaren kontserbazioa. Nekazaritza paisaiak.

Se aspira a que las selvas tropicales húmedas sigan siendo productores sostenibles de funciones y productos del bosque, siendo la producción de madera una de sus funciones. La conservación de la biodiversidad cuenta ahora con gran protagonismo. Hoy la realidad es que las selvas tropicales húmedas se van reduciendo hasta quedar en fragmentos dentro paisajes agrícolas. Las funciones de la selva las provee ahora (o no) otro tipo de vegetación. Baja la producción de productos propios de la selva. En particular, quedan por contestar importantes interrogantes sobre si la biodiversidad puede subsistir en paisajes culturales.

Palabras Clave: Selvas tropicales húmedas. Conservación de diversidad biológica. Paisajes agrícolas.

On espère que les forêts tropicales humides continuent à être des producteurs soutenables de fonctions et de produits de la forêt, l'une de ses fonctions étant la production de bois. La conservation de la bio-diversité joue en ce moment un rôle de premier ordre. La réalité est qu'aujourd'hui les forêts tropicales humides se réduisent de telle façon que dans certains endroits il n'en reste que des fragments entourés de paysages agricoles. Un autre type de végétation fournit (ou pas) maintenant les fonctions de la forêt. La production de produits propres à la forêt diminue, il reste, en particulier, à répondre aux importantes questions: la bio-diversité peut-elle subsister dans des paysages agricoles.

Mots Clés: Forêts tropicales humides. Conservation de diversité biologique. Paysages agricoles.

Tropical rain forests provide both services and goods. The aspiration is that this will continue. The reality is that rain forests are being altered by timber exploitation and reduced in area at about 1500×10^6 ha every year. The question to be investigated is whether a smaller area of altered forests can continue to provide both services and goods, allowing for the fact that certain of the land uses that replace rain forest also contribute similar goods and services.

Forest services. Forested catchments provide a continuous flow of clean water. However, continuous vegetation cover is more important than the nature of the cover. Indeed, a grassy catchment functions similarly, with in fact a higher water yield than forest due to its lower evapotranspiration.

Forests have low albedo, high evapotranspiration and high surface roughness. These three parameters influence local and regional climate. Their values are more extreme than for grassland, arable crops or bare ground. Thus change from forest can influence climate, though managed forests and plantations are fairly similar to natural species-rich rain forests. Climatic models show large scale climatic perturbation might follow from massive deforestation, but commonly fail to allow that replacement vegetation is likely to be secondary (albeit species-poor) forest of similar function in respect to climate.

Tropical rain forests commonly have *c.* 400 t/ha biomass, or *c.* 200 t/ha carbon. Any replacement vegetation of lower stature holds less sequestered carbon. Annual global forest clearance (which is mainly tropical) adds *c.* 2000×10^6 t against 5600×10^6 t from industrial sources (mainly burning fossil fuels). As the Kyoto Protocol of the International Convention on Climatic Change begins to be implemented the role of tropical forests is coming increasingly into focus, both as stores of sequestered carbon, and through the potential of tropical tree plantations established on degraded land to remove carbon dioxide from the atmosphere. Prototype Joint Implementation schemes to grow trees have begun, for example in Sabah.

Tropical moist forests are extremely rich in both plant and animal species. Many countries have set 5-10 percent of their forests aside as conservation areas over the past quarter century. A realisation has evolved that timber production forests can also play a valuable role in biodiversity conservation, and logging practices now increasingly take this into account. Management is for multiple objectives, not just timber production. Careful low-impact logging practices need to be enforced.

Forest goods. Massive exploitation for low value commodity timbers has increased explosively since the 1960s. The main focus has been the dipterocarp forests of the Far East. Successive countries have gone from boom to bust. Today little unlogged lowland forest remains there. Exploiters are turning to Central Africa and South America. Foresters have lost control, but timber extraction *per se* does not destroy rain forest. However, there has also been massive conversion to agriculture. This conversion is sometimes planned. In Indonesia, under national land use strategies, large tracts of rain forests on soils suitable for agriculture are being planted to oil palm or pulpwood plantations. In Southeast Amazonian Brazil large scale conversion to huge cattle ranches occurred in the 1980s. But much conversion is unplanned and by peasant farmers who move and create farms along logging roads once these have been built and give access to previously inaccessible areas. Shifting agriculture remains the single biggest cause of rain forest destruction, and much of it gets started in forest made accessible by logging.

Today we are witnessing a change from humid tropical landscapes in which little patches of farmland lie in a vast extent of forest to the opposite, where rain forests persist as islands in

a sea of agriculture. Forest services become provided (or not) by other kinds of vegetation. Production of forest goods is reduced. In particular there are big unanswered questions on whether biodiversity can persist in cultural landscapes. These new anthropogenic landscapes resemble those of parts of Europe where the original natural forest cover has become fragmented and persists as one part of a mosaic of different land usages. Today's challenge for rain forest biologists is to learn enough about plant and animal population dynamics and genetics to be able to design landscapes in which the chance of species survival is maximised, with intervention where necessary.