What is the future of tropical peatlands?

Current land use and land practise developments give little cause for optimism. While deforestation rates on non-peatlands in Southeast Asia have decreased somewhat owing to depletion of forest resources, those on peatlands have been stable (on average) for the last 20 years. In 2005, 25% of all deforestation in Southeast Asia was on peatlands. Apart from logging for wood production, peatland deforestation has increased owing to demand for land on which

to establish oil palm and timber plantations, which require intensive drainage and water level management leading to high CO_2 emissions from the subsiding peat. New financial initiatives to fund avoided deforestation and maintain existing carbon stores may provide incentives to protect the remaining tracts of relatively undisturbed peat swamp forest and encourage restoration of degraded peatland and, as a result, promote wise use of tropical peatlands through improved land management techniques.

Further reading

Rieley, J. O. and S. E. Page, (2005), Wise Use of Tropical Peatlands: Focus on Southeast Asia, ALTERRA - Wageningen University and Research Centre and the EU INCO - STRAPEAT and RESTORPEAT Partnerships, Wageningen, The Netherlands (www.restorpeat.alterra.wur.nl/download/WUG.pdf).

Hooijer, A., Silvius, M., Wösten, H. and Page, S. 2006. PEAT-CO2, Assessment of CO2 emissions from drained peatlands in SE Asia. Delft Hydraulics report Q3943 (2006)

www.carbopeat.org

CARBOPEAT

A European Union (EU) funded project involving partners from both the EU and Southeast Asia. The aim is to promote better understanding and awareness of the issues surrounding carbon-climate-human interactions in tropical peatlands.

CONTACT

Dr Sue Page or Dr Chris Banks

Department of Geography
University of Leicester
University Road
Leicester
LE1 7RH
UK
Phone: +44 116 2523441
Fax: +44 116 2523854
Email: chris.banks@le.ac.uk

Tropical Peatlands

Carbon stores
Greenhouse gases
Contribution to climate change

What is peat?

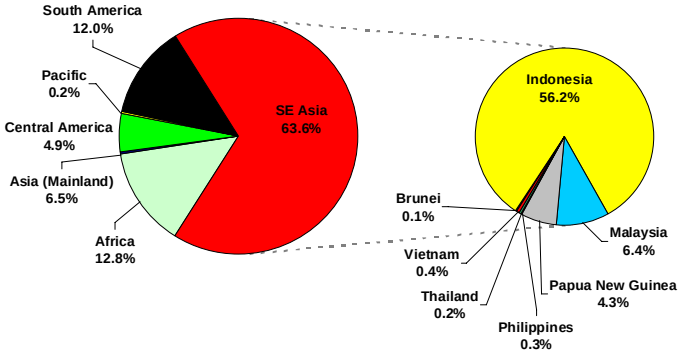
Peat is formed by the accumulation of organic matter derived mainly from dead vegetation (e.g. mosses, shrubs and trees) in situations where decomposition (i.e., the breaking down of plant and animal material) is limited. Tropical peat is formed mainly from the undecomposed remains of rain forest trees.

Where do I find tropical peat?

By area, over half of the world's tropical peat is in Southeast Asia with the remainder occurring in the Americas, other parts of Asia, Africa and smaller amounts throughout the rest of the humid tropics.

How much tropical peat is there?

This question is difficult to answer as estimates vary widely between 275,000 and 571,000 km^2. One of the aims of the CARBOPEAT project is to review and evaluate the data available.



Distribution of tropical peat based on a total estimated area of 392,000 km^2

(Continued overleaf)

How old is tropical peat?

In most tropical peatlands, peat accumulation commenced 3,500-6,000 years before present (BP). In some areas, however, onset of peat initiation commenced much earlier with dates from the Late Pleistocene (13,000-11,500 years BP) through to the early Holocene (11,000-9,000 years BP).

How quickly does tropical peat accumulate?

The fastest rates of peat accumulation in the tropics (of 6-13 mm yr^{-1}) greatly exceed those of peatlands from temperate and boreal regions. During the Holocene, tropical peatlands sequestered large amounts of carbon from the atmosphere and stored it in thick reserves of peat, some of which achieved depths of up to 20 metres.

Why is tropical peat important on a regional and local scale?

Tropical peatlands play important roles regionally and locally in the water cycle and also for climate and landscape stabilisation. In natural peat swamp forest the surface layer of peat may be flooded for nine months of the year and always remains wet. Peat swamp forests contain timber-producing trees and a range of other products of value to local communities, including bark, resins and latex. In addition, tropical peatlands provide unique and diverse ecosystems. For example, in Southeast Asia peat swamp forests are home to a number of endangered species (e.g. orang utan, the valuable timber tree ramin, and many unique species of blackwater fish).

How important is tropical peat as a global carbon store?

In tropical peatlands, both the vegetation and underlying peat constitute a large and highly concentrated carbon pool, which, upon degradation, releases greenhouse gases (GHGs) that can have a significant effect on global environmental change processes. Tropical peatlands, although they cover only about 0.25% of the Earth's land surface, contain 50,000-70,000 million tonnes of carbon (about 3% of the amount of carbon stored in soil worldwide). Tropical peatland accounts for about 12% of the global peatland area but it may contain 25% of the total global peatland carbon.

What happens to the tropical peat carbon store when it is disturbed?

Many tropical peatlands are actively accumulating peat at the present time while others are in a steady state or are degrading. Once the carbon allocation to the system is discontinued (by deforestation and drainage) the surface peat oxidises and emits carbon rapidly to the atmosphere, mostly in the form of carbon dioxide (CO_2), a greenhouse active gas. This process also results in progressive loss of peat from the surface, which leads to surface subsidence and an increased potential for flooding during the wet season.

How do human activities impact on the tropical peatland carbon store?

Legal and illegal logging result in degradation of natural peat swamp forest. Land use change and fire, associated with human settlement, and plantation developments that involve deforestation and drainage, destroy the natural resource functions of tropical peatland. These activities lead to peat subsidence through compaction and oxidation and loss of carbon, that can be exacerbated by frequent fires. Fires in peatland areas reduce air quality over large areas of Southeast Asia and result in the noxious haze that affects human health and the economics of several countries within that region. The 1997 fires on Indonesian peatlands released 3000 to 9000 million tonnes of CO_2, an amount that is equivalent to 13-40% of the CO_2 emitted annually from the burning of fossil fuels in the European Union. Approximately 80% of this carbon was released from combustion of the peat and only 20% came from the vegetation growing on it. The total current CO_2 emission from drained tropical peatlands of approximately 2000 million tonnes per year

equals almost 8% of global emissions from fossil fuel burning. Most of this emission originates from Indonesia and is a consequence of recent, large-scale peatland drainage and development schemes and widespread fires.

Can tropical peatlands be restored?

Once tropical peatlands have been degraded by the construction of drainage channels, restoration is very difficult and has to focus on the reinstatement of the hydrological integrity of the peatland by constructing structures to reduce or restrict water outflow. Hydrological restoration measures help to reduce the fire risk in over-drained peatlands and provide conditions conducive to the re-establishment of forest vegetation. Studies on techniques to promote the regeneration of peat swamp forest on degraded peatlands are in their early stages.

(Continued)