

# Carbon emissions from peat-swamp forest clearing quantified

March 8 2011, by Lin Edwards

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Satellite image of the island of Borneo on August 19, 2002, showing smoke from burning peat swamp forests. Image: Jacques Descloitres, MODIS Land Rapid Response Team, NASA/GSFC

(PhysOrg.com) -- Peat-swamp forests in Southeast Asia are being cleared to make way for food production and for oil-palm plantations for biofuel, but now a new study has quantified the resultant carbon emissions for the first time.

Peat-swamp forests contain huge amounts of stored carbon both in the biomass above the ground in composting organic matter slowly breaking

down in the soils, and much of this is released in the form of carbon dioxide (CO<sub>2</sub>) and methane when the forests are cleared and the swamps are drained.

The new study published in [Proceedings of the National Academy of Sciences](#) (PNAS) used satellite images with 250 meter resolution to produce maps of the closed canopy plantations in Peninsular Malaysia, Borneo and Sumatra.

They found the oil-palm plantations covered an area of 2 million hectares in Peninsular Malaysia, 2.4 million in Borneo, and 3.9 million in Sumatra. These figures do not include the smaller open canopy plantations, which are difficult to identify from the images, or plantations planted after 2002.

The study showed that around 880,000 hectares of peatlands (around six percent) had been converted to oil-palm plantations by the early 2000s. The researchers also looked at the effects of clearing the forests in the region on wildlife, and found that 12.1 percent of species face probable extinction in Peninsular Malaysia (equivalent to 46 species of forest birds), 3.4 percent in Sumatra and 1 percent in Borneo. Among the species at risk are orang-utans, pygmy elephants and Sumatran tigers and rhinos.

The researchers calculated that clearing the peatlands released around 140 million tonnes of carbon from above-ground biomass and 4.6 million from oxidation of peat in the ground. Clearing also reduces the [carbon sequestration](#) previously provided by the forest..

Dr Koh said by 2010 around 2.3 million hectares of peat-swamp forests had been cleared that are currently degraded land and not yet developed as plantations. He said if the clearings were planted with palm for oil species losses could be exacerbated by as much as 12 percent, while if

they were re-forested biodiversity would be enhanced by up to 20 percent.

The study recommended the remaining peat-swamp forests in Southeast Asia should be conserved to protect biodiversity and safeguard carbon stocks, with most effort being concentrated in Central and West Kalimantan, Sarawak and Riau in Indonesia, which hold 75 percent of the remaining forests, or around 3.9 million hectares, and much of the cleared but not yet developed peat-swamp [forest](#).

Indonesia is accelerating its production of palm oil and is planning to double its production by 2020. Palm oil is used to make biodiesel and is also used in soaps, cosmetics and in many processed foods. It can also be used as a fuel for cooking.

**More information:** Remotely sensed evidence of tropical peatland conversion to oil palm, *Proceedings of the National Academy of Sciences*, Published online before print March 7, 2011, [doi:10.1073/pnas.1018776108](https://doi.org/10.1073/pnas.1018776108)

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