

Peatland degradation fuels climate change

An unrecognized and alarming source of greenhouse gases

November 2006. Government representatives from almost all countries of the world gathered at the UN-FCCC 2006 summit in Nairobi to discuss actions regarding climate change and the use of fossil fuels.

Recent investigations by Wetlands International and Delft Hydraulics present new and shocking information on the huge emissions from a totally different source: degraded peatlands, mostly in South-east Asia. These new figures show that annual peatland emissions in South-east Asia far exceed fossil fuel contributions from major polluting countries and overshadow the reductions being sought under the Kyoto Protocol. Almost nothing is being done to address this problem even though there are cost-effective solutions and opportunities to do so.

Actions needed

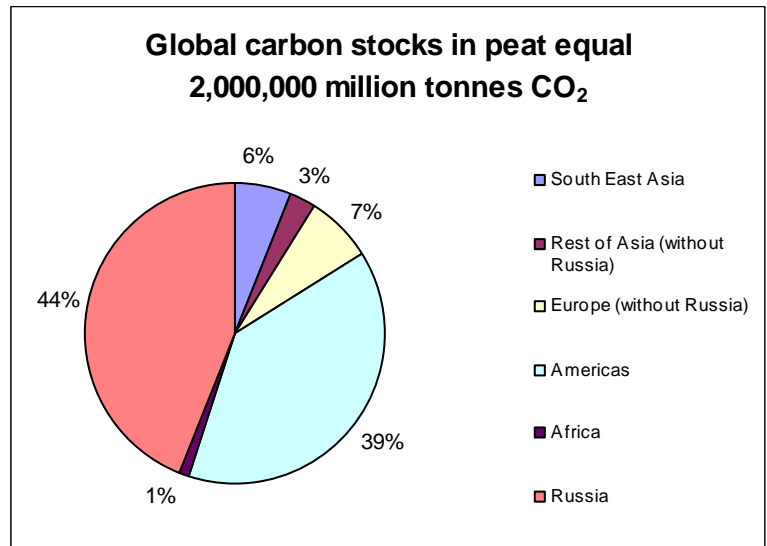
- Individual countries, regional authorities (like the EU) and international conventions should establish legislation and practice to curtail the problems of imports of products from vulnerable peatland areas, e.g.:
 - Timber from illegal logging,
 - Biofuel from oil palm plantations on peatlands,
 - Pulp wood and related products from pulp plantations on peatlands.
- Contracting Parties of The Climate Convention (UN-FCCC) should ensure that the CO₂ emissions from peatland degradation are taken into account in climate change mitigation strategies.
- An alternative finance mechanism should be developed to trigger and support peatland protection and restoration as an urgent action by nations within their suite of climate change strategies.
- Linked to this, a Global Peatlands Fund should be established to restore peatlands world wide, but with a priority on South-east Asia. Development here should have a pro-poor approach and be based on principles of sustainable use of these vulnerable areas. Local people should be paid for restoring and conserving these globally important areas.
- Methods and support mechanisms for improved water management in agricultural and conservation peatland areas is needed.

What are peatlands?

Peat is undecomposed plant material that has accumulated over thousands of years. Due to the absence of oxygen in water-saturated environments, the decomposition of this material has been halted.

Peatlands cover over 400 million hectares of land, which is only about 3% of the global surface of land and fresh water. However, they store huge quantities of organic material, equivalent to up to 2,000,000 million tonnes CO₂; comparable with 70 years of the current emissions of fossil fuels.

Peatlands can be found all over the world. Examples are the permafrost areas of Russia and Canada and the highlands of the Andes and Himalaya, where dead plants hardly decompose due to the wet and cold conditions.



Source: Wetlands International and Delft Hydraulics

Other examples of areas endowed with extensive peatlands are the lowlands of humid tropical forests in Asia. In these areas the peat soils store 30 times more carbon comparable than stored above ground in normal rainforests.



Pristine peat swamp forest, Sumatra.

Causes of peatland destruction

Human use of peatlands including mining (for fuel) and drainage (mostly for agriculture and forestry purposes) has been practiced throughout history. The Netherlands are a good example of this; it is one of the causes for the country to be situated below sea level.

However, at this moment peatlands are being destroyed faster than ever, mostly in South-east Asia. Here, large-scale drainage of (former) rainforest has occurred to enable logging of the peat swamp forests and to transport logs in the drainage canals. After deforestation, drainage has continued or even intensified to establish oil palm and pulp wood (Acacia) plantations. These tree species require deep drainage.

Through drainage, the dry peat is in contact with the air and starts oxidizing, decomposing, and emitting carbon dioxide. This process happens very rapidly in the tropics, and is often accelerated by wildfires. These fires can last for weeks, sometimes even months, burning thick layers of peat over large areas. The peat fires in South-east Asia can burn millions of hectares in one dry season and can last for weeks, sometimes even months, burning thick layers of peat and covering the region in thick smoke. Of the 22,5 million hectares of peatland in Indonesia some 10 million hectares are drained and are decomposing or even burning.



Kalimantan: Peatland forest on fire

Biofuels and peatland degradation

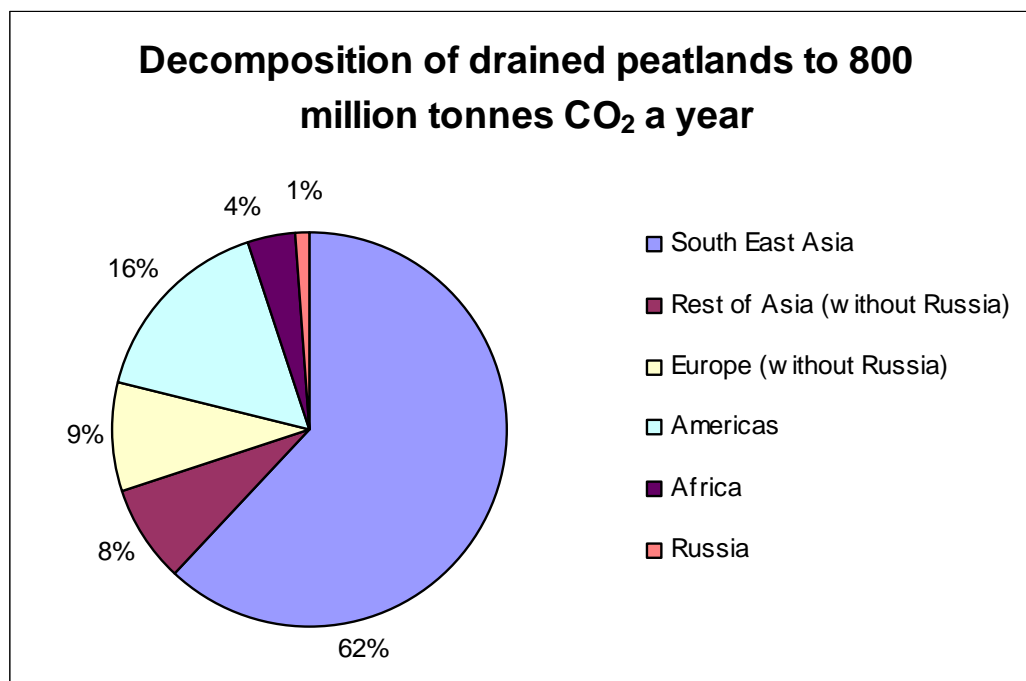
Western countries see oil palm as a good source of biofuel, a 'clean' alternative for fossil fuels. The European Union implements all kind of legislation for a large scale use of biofuels. Export of palm oil to European countries is growing rapidly. However, more than 26% of all Indonesian oil palm concessions are on peatlands, and similar figures apply to Malaysia. It is estimated that production of one tonne of palm oil will result in an average emission of 10 to 30 tonnes of CO₂ from peat decomposition alone – not taking into account the emissions from fire and other CO₂ emissions during the production cycle. The Netherlands alone imported at least 400,000 tonnes of palm oil to meet its Kyoto target for 2005, thus actually increasing green house gas emissions.

Peatlands and climate change

Under natural circumstances peatlands act as carbon sinks, slowly lowering the amount of greenhouse gases in the atmosphere by storing organic materials. They act as a long-term or even permanent store of carbon.

Drainage and oxidation

All over the world the role of peatlands as carbon sinks is threatened by drainage, leading to emission of the greenhouse gas CO₂; either slowly due to decomposition or fast in the case of fires. Just the process of decomposition (i.e. excluding fire) leads to a global emission from peatlands of 800 MtCO₂/yr; 600 originate from South-east Asia as shown in the pie-chart below. Currently, millions of hectares of peatlands are drained and are decomposing. This is especially the case in Indonesia and Malaysia. The oxidation of the desiccated peatland top soil results in emissions of up to 100 tonnes of CO₂ per hectare per year. If current land-use development trends continue, predictions are that the annual emissions from South-east Asian peatlands will have been further increased by at least 50% in 2030.



Source: Wetlands International and Delft Hydraulics

Fires: just speeding up the process

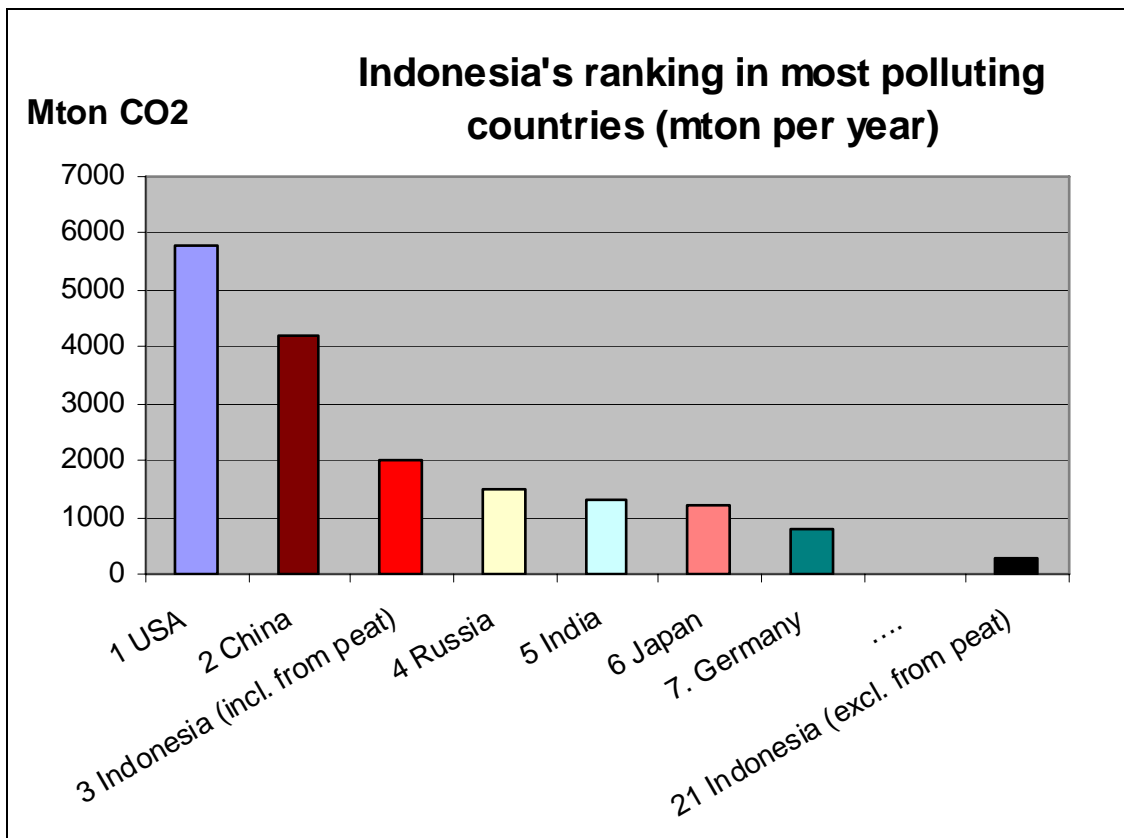
The frequent fires in South-east Asia increase these emissions enormously. Some of the worst peat fires occurred in 1997, 1998 and 2002. In each of these years over 1.5 to 2.2 million hectares of peatland burned in Sumatra and Kalimantan. The emissions in 1997 alone were estimated to have reached between 3000 to 9040 Mtonnes CO₂, or up to 40% of the global CO₂ emissions.

However, it should be noted that CO₂ emissions in South East Asia will continue even if fires can be prevented and stopped. The oxidation of the current desiccated peatland top soil results on average in emissions of about 86 tonnes of CO₂ per hectare per year. Currently, millions of hectares of peatlands are drained and are decomposing. This is especially the case in Indonesia and Malaysia.

New alarming figures about Indonesia

Wetlands International and Delft Hydraulics have calculated the emissions from peatland areas in Indonesia on the basis of soil and land-use data, including comparison of comprehensive field data on peat depth and carbon contents. This recent study shows that over the last years, there has been an average annual emission from peatlands of an alarming 2000 Million tonnes CO₂ including 600 Mt from decomposition and 1400 Mt from fires. This is more than the CO₂ emissions from India or Russia and almost three times the German emissions on an annual basis.

Indonesia emits 6.5 times as much CO₂ from degraded peatlands as it does by burning fossil fuels every year. In a ranking of countries based on their total CO₂ emissions, Indonesia comes 21st if peatland emissions are excluded. However, if peatland emissions are included, Indonesia is already the third-largest CO₂ producer in the world.



Source: Global figures combined with calculations Wetlands International and Delft Hydraulics

Many other areas in the world are facing similar problems, albeit of another scale. But this could change. For example, in Russia there are also regular and extensive peat fires. Moreover, with increased global warming, the huge areas of peat in the permafrost of the northern hemisphere are under threat. As long as the soil is frozen, the organic material in these peatlands is stored. However, the melting of the peat soil may result in huge emissions of greenhouse gases, including release of methane.

International agreement on climate change

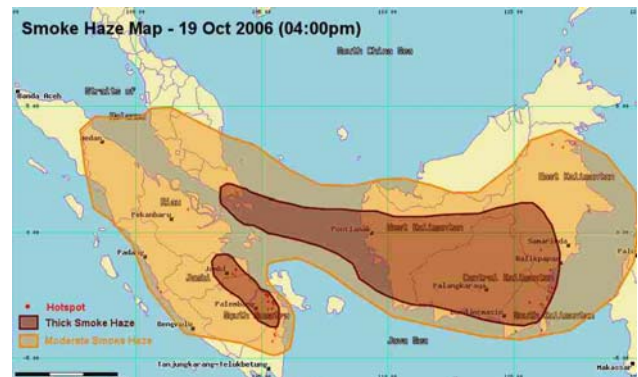
The Kyoto protocol, the international agreement on climate change, sets the western countries that signed the agreement a reduction target for 2012. The agreement allows western countries to reach their emission targets by helping to reduce the emissions in the third world countries (Clean Development Mechanism). However, the Protocol excludes the emissions from soil and (degraded) vegetation and limits itself to reducing emissions from industry, housing, traffic and agriculture. As a result there is little or no attention for peatland degradation, a huge cause of global warming.

More than climate change

Poverty is now up to 4 times more severe in Indonesian peatlands than in other lowland areas. The fires seriously diminish the natural resource base of the local economies and cultures, and cause losses of property, natural assets, and business.

Peat fires also cause serious health problems. About 30% of all young children in peat lands in Indonesia have respiratory diseases and growth inhibition as a result of peat smoke. Indonesian peatland fires have been the cause of thousands of hospitalizations.

Last but not least, the drainage and fires are also destroying the precious biodiversity of the tropical peat swamp forests forever.



Low-cost ways to tackle this massive problem

Investments in the conservation and restoration of peatlands should be an essential part of any strategy to mitigate climate change. Relatively minor investments can have significant impacts in terms of reducing green house gas emissions. In addition, investments in peatland restoration will also contribute to improved mitigation of droughts and floods, biodiversity conservation and poverty reduction.



Dams constructed to prevent further drainage, Central Kalimantan.

Cost benefit of investment for reducing carbon emissions: Some examples			
Measure	Possible reduction of CO ₂ emission	Total costs	Costs per tonne reduction
EU-Emissions Allowance Price			€ 20 (fluctuating)
Shell + Statoil in Norway storage in empty gas fields	2.5 Mt	€ 1500 million	€ 600
Germany (overall) of which:	50 Mt	€ 5000 million	€ 100
- insulation of buildings			€ 350 to € 750
- wind power			€ 70
- hydro power (dams)			€ 22
World Bank in China: investments in old industries	19 Mt	€ 1500 million	€ 80
UK- combination of measures	88 Mt	€ 3000 million	€ 34
Indonesian peatlands: case Central Kalimantan	29 Mt	€ 1.4 million	€ 0,50

Our projects in the region

Wetlands International is implementing several projects to protect the remaining peat swamp forests and restore the degraded peatlands in Indonesia. As well as preventing and fighting peatland fires, the projects take action to benefit biodiversity conservation and local community livelihoods. We work with the support of local communities and governments.

One of our projects is in **Central Kalimantan**; a province where over 1.5 million ha of peat swamp forests have been logged and drained. The area is suffering from extensive fires each year. CKPP is managed by Wetlands International and locally implemented by a consortium of BOSF, CARE-Indonesia, WWF-Indonesia and the University of Palangka Raya working in close cooperation with the local authorities. The project is financed by DGIS/Ministry of Foreign Affairs of the Netherlands. In cooperation with local communities we build dams to close the drainage canals and raise the water levels, thus preventing the oxidation of peat and reducing fire risk. Sensitive areas are replanted with local peat swamp forest trees, including species that are of commercial interest. Fish ponds are created between the dams. Please visit the website of this Central Kalimantan Peatland Project www.ckpp.org.

We also work in Berbak National Park in **Jambi Province of East Sumatra**. Despite being a national park, the area is heavily logged in some parts and is drained and impacted by fire. We have developed a good understanding of the hydrology of the area and are currently working with the local communities to restore degraded forest areas and to invest in developing sustainable livelihoods. More information can be found on www.wetlands.org/wprp, (click on “demonstration projects”). This Wetlands and poverty Reduction Project is conducted by Wetlands International Indonesia in collaboration with Bina Swadaya, Wahana Bumi Hijau (WBH) Foundation and Pinang Sebatang (PINSE) Foundation and is financed by the DGIS/Ministry of Foreign Affairs of the Netherlands and is coordinated by Wetlands International.

A project conducted in 2001-2006 is the **CCFPI Project**: a C\$5 million initiative funded by the Canadian International Development Agency (CIDA) and implemented by Wildlife Habitat Canada (WHC), the Global Environment Centre (GEC) and Wetlands International Indonesia Programme (WIIP). Its purpose is to assist with the sustainable management and restoration of degraded peatland ecosystems in order to support local livelihoods, reduce forest fire incidences, restore ecosystem services, and mitigate sources of climate change. It operates at local (Jambi, South Sumatra, Central Kalimantan provinces), national, regional and international levels.

Wetlands International collaborates with Delft Hydraulics in the **PEAT-CO₂ Initiative** which aims to strengthen the scientific basis of the quantification of CO₂ emissions from peatlands, to develop support tools for improved water management and conservation in peatlands. Our input is based on the before mentioned projects and would therefore not have been possible without the financial support of CIDA and DGIS/Ministry of Foreign Affairs of the Netherlands.