

‘An ecological disaster, but with a positive outcome’

Henk Wösten, soil scientist

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04 On 1 November 2004 the Restorpeat project was approved and Henk Wösten's research budget secured.

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In November 2004, soil scientist Henk Wösten had cause to celebrate: he'd been awarded 1.5 million euros by the European Union for his proposal for a project called Restorpeat to study the potential for restoring peat swamp forests in Asia.

by Astrid Smit

> The EU's choice of Wösten's project was not unexpected, as his research team had just completed a four-year study of the state of tropical peat swamp forests for the EU. 'Yet it felt like recognition', Wösten says, 'a signal that we'd done our work well. And with this follow-up project we could contribute to finding a solution.'

Indonesia, Malaysia and, to a lesser extent, Vietnam, are faced with a major problem: they emit vast amounts of greenhouse gases. Indonesia is in third place on the list of countries responsible for the largest emissions – only China and the US contribute more to the greenhouse effect. Indonesia's high ranking is not so much because of massive use of fossil fuel but because so much peat swamp forest has been converted into land for agriculture. The same is true for Malaysia.

Tropical peat swamp forests are, by nature, a good place to store carbon dioxide. In these swampy jungles the trees have their roots in water and remove vast amounts of CO₂ from the air. When they die, they form a thick layer of

peat which releases very little carbon; the swamp water prevents the plant matter from being broken down completely. This makes tropical peat swamp forests, seventy per cent of which occur in Southeast Asia, an important carbon sink. They account for about three per cent of all the carbon stored in the world's soil and forests.

But in recent decades, much of the tropical peat swamp forest of Indonesia and Malaysia has been drained for logging, rice cultivation and, above all, for palm oil plantations. The result is that the peat areas have become a major source of greenhouse gases. When the swamps are drained, the peat decomposes more quickly: oxygen from the air reacts with carbon in the ground, releasing CO₂. An associated problem is that dry peat is a perfect fuel and catches fire easily, with the result that even more carbon dioxide disappears into the atmosphere. Every year, lightning, arson or extreme drought result in thousands of hectares going up in flames. According to Wösten, the 26 million hectares of tropical peat are responsible for eight per cent of global emissions of greenhouse gases.

In 1997, when El Niño caused severe drought in Indonesia, the fires in the Kalimantan peat areas got completely out of control. They were so intense and lasted so long that thick grey smog hung over Borneo. Airports and schools were closed. The smoke affected people as far away as Singapore and the Malaysian capital Kuala

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Digital elevation model of the Air Hitam Laut catchment (a peat area) on the island of Sumatra. Each colour gradation indicates a height difference of 1 metre. The darkest colour indicates an altitude exceeding 20 metres above sea level; the palest colour indicates 0 to 1 metres above sea level.



Using local material to dam small drainage canals in Sebangau National Park in central Kalimantan. These simple and thus cheap dams are effective in rewetting the peat areas upstream.

> Large dam in a large drainage canal in Sebangau National Park in Kalimantan, made from local materials plus imported sand-bags. If they stay in place, these large and relatively costly dams rewet large areas upstream.



Oya river Sarawak, Indonesia spring 2005

The Oya river in Sarawak meanders through a peat area, sometimes with villages on its banks. Major rivers like this form the natural boundaries of large, contiguous peat areas and so are used as boundaries when modelling the hydrology of areas.



Railway used to access many uncontrolled logging sites. Such activities must be halted, in order to manage areas more sustainably. Local people must be given the prospect of income from sources other than logging.





Berbak, south-east Sumatra. Alterra scientists Herco Jansen, Henk Wösten and Henk Ritzema (seated on right) and Indonesian colleagues, during fieldwork in a peat area recording, among other things, the density and composition of the peat swamp forest, peat thickness and the country gradient.

Lumpur. 'It was a real ecological disaster', says Wösten, 'but it did have a positive outcome. Indonesia and Malaysia decided that henceforth they'd take better care of their peat areas.'

The European Union offered a helping hand and made 1.5 million euros available for research. 'The outcome was the Strapeat project, a reconnaissance study in which we and colleagues from Europe, Indonesia and Malaysia inventoried the problems surrounding the tropical peat areas: the state of the flora and fauna, the hydrology, the socio-economic situation and the products the local people extract from the forest.'

The Restorpeat follow-up project focused on using the peat area accountably. Peat areas used for oil palm plantations can be kept in good condition by good water management. Currently, some plantations are subsidising by ten to fifteen centimetres a year because dry peat shrinks and compacts. 'We drew up some guidelines, such as keeping

the groundwater level high and constant, and using relatively small dams, and the plantation managers have taken them on board.'

In addition, the project team maintains that the intact tropical peat swamp forests – there are only 1.5 million hectares left, mostly in Irian Jaya – must be protected, come what may, so they can remain a good store for carbon. Apart from that, Indonesia and Malaysia would do well to retain more water in the degraded forests. Currently, these – some ten million hectares – are slowly drying out because of the drainage canals constructed in the past for illegal logging. The canals are above sea level, and as long as they remain open and unimpeded, they will continue to drain the peat.

But the real question is how to conserve and restore the peat swamp forests. These tropical ecosystems are under extreme pressure. They are in demand as areas for logging and for oil palm plantations that yield a lucrative

product. The demand for oil palm continues to rise year on year, especially now that palm oil has become an important fuel in the West. 'It's all very well to say that the countries involved should no longer clear their peat swamp forests, but you also have to offer an economic alternative. One solution is for them to earn money by maintaining these tropical peat swamp forests.'

This can be done by means of carbon credits. A country is then paid for each ton of carbon it stores by planting forests and allowing peat to accumulate again. 'It's not that simple,' Wösten admits. 'How do you work out how much carbon is being stored in the tropical peat swamps at the moment you start this credit system? How do you work out how much carbon the peat swamps store every year? And then, who gets the money – the government, or the local people? And who owns these areas?' So the carbon credits for tropical peat swamp forests aren't yet ready to be launched on the market. But Wösten believes it's just a matter of time.

According to him, Indonesia and Malaysia will have to choose between profit in the short or longer term. They can earn money now by issuing permits for logging or oil palm. Or, later, they can earn carbon credits for good peat swamp management. 'Sometimes I compare the peat swamp forests to Cinderella', Wösten says. 'Once a girl nobody looked at, but now an important princess.'

The Wageningen soil scientist is optimistic about the future of the peat swamp areas in Malaysia and Indonesia. 'They're certainly attracting criticism from other countries. Indonesia is well aware that it's the third biggest emitter of greenhouse gases after China and the US. And it gets many complaints from its neighbours about the continuing forest fires. There were some big ones again in 2009.' Wösten believes that this is why Indonesia will do its best to protect and restore the tropical peat swamp areas. 'For example, under President Yudhoyono there's been some decline in illegal logging, and concessions are not being awarded so readily.'

What Indonesia and Malaysia need to do first, according to Wösten, is to stop the fires: they're responsible for fifty percent of the country's carbon dioxide emissions but serve no purpose. And they're relatively easy to tackle. 'Putting out the fires is the easiest option.' He's all for Europe helping with this. 'If you want to reduce carbon dioxide emissions, each euro invested in putting out the fires in Indonesia achieves more than subsidising double glazing in the Netherlands.'

Wösten looks back with satisfaction at Restorpeat,

which was completed last year. 'It's nice to feel that as a scientist you've helped solve a social problem – that you can help politicians to make good decisions. The peat swamp forests in Asia used to be very poorly understood, with the result that disastrous mistakes were made. I don't think that will happen anymore. We've organised many conferences with stakeholders in Indonesia and Malaysia, and now they have enough in-house knowledge to be able to manage tropical peat swamps properly themselves.'

Peat profile in south-east Sumatra. At the top are remains of the aerial parts and roots of poorly decomposed peat swamp forest vegetation. Deeper in the profile are the oldest and thus most humified peat layers.

