

## FACTSHEET 1: SOUTH-EAST ASIA'S PEAT FIRES AND GLOBAL WARMING

### **How serious is the destruction of South East Asia's peat forests for the global climate?**

At least 550 billion tonnes of carbon are stored in peat globally. This is the equivalent of about 75% of all the carbon in the atmosphere at present, or 70 years of fossil fuel emissions at current rates. Carbon in peat is released into the atmosphere through oxidation if the peat is drained and damaged, and also through fires, which are more common where peat has already been drained, where peat forests have been logged and degraded, and during droughts, which are becoming more frequent and severe as a result of global warming.

30% of global peat is in the tropics, and Indonesia holds 60% of this, across an area of around 22.5 million hectares (with 3.7 million hectares of peat having been completely destroyed already). There are around 2 million hectares of peatlands in Malaysia and 2.6 million hectares in Papua New Guinea, and smaller areas in Brunei. Of South-east Asia's 27.1 million hectares, 12 million hectares are deforested and mostly drained. South-east Asia's peat holds at least 42 but possibly 50 billion tonnes of carbon.<sup>1,2</sup>

Less than 5-10% of South-east Asia's peatlands are officially protected, yet even those 'conservation areas' are affected by fires, logging, and drainage.

According to a new study by Delft Hydraulics, Wetlands International and Alterra<sup>2</sup>, peat degradation alone accounts for 97-238 million tonnes of carbon being emitted every year from South-east Asia, about 90% of that from Indonesia. The most likely figure is around 172 tonnes of carbon per year. Those emissions stem solely from the oxidation of drained peat and do not include emissions from peat fires. With current projections for peatland 'development', they are expected to increase sharply in coming decades. Eventually, all the carbon in the drained and logged peat will enter into the atmosphere.

Whilst draining and logging of peatlands will eventually commit all the carbon into the atmosphere, this process is greatly accelerated by annual fires, set for land-clearance, which quickly burn out of control in the peatlands, and which are made worse by more frequent and intense droughts, which are in line with climate change projections and expected to intensify in future<sup>3</sup>. According to a study by Susan Page et al<sup>4</sup>, fires in 1997 released up to 2.57 billion tonnes of carbon. Thousands of fires now burn every dry season and the worst fire-seasons since 1997 have been 1998, 2002 and 2006, with over 60,000 hotspots in each of those years. The average annual emissions from those fires have been estimated as between 0.39 and 1.18 billion tonnes of carbon. The authors of the most recent study<sup>2</sup> consider the lower range figure to be more likely but cannot rule out the higher range one. Annual emissions from peat fires are expected to increase, too, as more of the peatlands are logged, drained and converted, primarily into oil palm and timber plantations.

Deforestation also releases amounts of carbon which is held by the vegetation, ie above soil. Indonesia's old growth forests are estimated to hold around 306 tonnes of carbon per hectare.<sup>5</sup> 86% of that carbon are lost during 'selective logging', which tends to be followed by land clearance for plantations or agriculture. A mature oil palm plantation only holds less carbon than logged forest, around 63 tonnes per hectare, but those plantations have an average life-time of only 25 years. Indonesia's emissions from deforestation alone, not including peat fires, have been estimated at probably around 200 million tonnes of carbon a year, but possibly as high as 400 million tonnes.<sup>6</sup>

There may be some overlap with the figure for emissions from peat drainage. Those figures are for emissions from logging in different types of forests in Indonesia. The deforestation rate, however, is twice as high in peat forests as it is in forests on mineral soil, largely because most of the non-peat forests in lowland Indonesia have already been logged, and the lowland peat forests are more accessible than the hill forests. We could not find any detailed study of carbon emissions from deforestation in other countries in South-east Asia.

If all the figures are added up, then South-east Asia's emissions from peat fires and oxidation alone are between 136 million and 1.42 billion tonnes of carbon per per year (most likely in the regions of 562 million tonnes a year, but considerably higher in bad fire years), plus the substantial emissions from deforestation and the loss of carbon above soil. Emissions from peat oxidation and fires are expected to increase considerably in coming years and decades, as peatland deforestation and drainage is expected to increase from the current 45% to near 100% in the absence of any major policy changes.

By comparison, the Kyoto protocol aims to reduce global emissions by 195 million tonnes compared to 1990 levels by 2012 (120 million tonnes from the ratifying nations). To offset the additional global warming caused by South-east's peat drainage, fires and deforestation alone, we would need several Kyoto Agreements! Wetlands International calculate that Indonesia is the third largest emitter of carbon dioxide worldwide, after the US and China if peat emissions are taken into account.<sup>7</sup> If all of the carbon in peat, possibly as much as 50 billion tonnes, is allowed to enter the atmosphere, this will significant increase risk of global temperatures more than 2°C above pre-industrial levels, as explained by Fred Pearce in *The Last Generation*<sup>8</sup>, drawing on findings presented at the *Avoiding Dangerous Climate Change* conference in 2005. This level of warming is widely understood to constitute dangerous warming as defined by the Convention on Climate Change. Avoiding dangerous climate change is the purpose of the UNFCCC and of the Kyoto Protocol.<sup>9</sup>

All the above figures are based on carbon dioxide emissions. Methane emissions from forest and peat fires are harder to calculate, however one study suggests that Indonesia's fires in 1997 may have increased global emissions of methane by as much as 10% in that year.<sup>10</sup> Different types of emissions from forest and peat fires can, at least temporarily, reduce the atmosphere's ability to break down methane quickly.

Finally, peat drainage, fires and deforestation do not just emit carbon into the atmosphere – they also destroy one of the most important terrestrial carbon sinks, which take carbon out of the atmosphere and help to regulate the global climate.

### **How serious is the destruction of south-east Asia's peat otherwise?**

Peat swamps are vital for biodiversity, for regulating the fresh water cycle, and for local economies: They provide 70% of the fish in Central Kalimantan, fire wood, rattan and medicinal products. In the areas where peat fires are common, 30% of children under five have respiratory illnesses and linked growth inhibition. Poverty in the peatland regions is 2-4 times higher than in the rest of Indonesia<sup>11</sup>. The expansion of plantations (particularly for palm oil), and the concessions granted to logging companies is leading to the eviction of local communities, many of whom are pushed into the peat swamps, and it also goes along with severe violence, human rights abuses and a lack of any enforcement of legal rights. Deforestation contributes to regular landslides, loss of reliable water supplies, salt water intrusion and the development of acid sulphate in soils in coastal areas.

Whilst logged and degraded forest is susceptible to fires and holds far less carbon than virgin rain forest, it is nonetheless rich in biodiversity and capable of regeneration if given a chance, oil palm plantation are nearly devoid of wildlife, which deplete the soil and are treated with pesticides and fertilizers. Some of the world's most biodiverse habitats are lost and countless species, including the orang-utan, the Sumatran tiger and rhinoceros are on the brink of extinction.

### **Causes of peat drainage and fires in South-east Asia:**

No South-east Asian government has any policy to protect peatlands from development, governments actively promote drainage and 'conversion', mostly to oil palm and timber plantations (usually acacia). Indonesia has a regulation which prohibits development where the peat is deeper than 3 metres, but this is not generally enforced and is ineffective because development of the shallower margins means that peat domes collapse and then the deeper peat, too, becomes eligible for development. Even those peatlands which are still forested are affected by drainage and logging,

which lowers their water table and turns those previous carbon sinks into major carbon sources.

In Indonesia, the use of fire for land clearance is illegal, but enforcement of this law is minimal to non-existent. The ASEAN Agreement on Transboundary Haze Pollution provides for regional cooperation to prevent and extinguish fires. It states that natural resources, including forests, should be managed in an ecologically sustainable way. Indonesia, however, has not ratified or implemented this agreement, despite having the most widespread fires and being eligible for the most funding and help by regional partners, if they were to ratify it.

In the 1990s, drainage of peat for rice expansion was a major reason for peat destruction, particularly through the Mega Rice Project in Kalimantan. In recent years, the expansion of oil palm and timber plantations, together with illegal logging have been identified as the driving forces of the destruction and of deforestation overall. ENVISAT satellite monitoring in 2002 revealed that most of the fire hotspots were on plantation land, and fire is routinely used by oil palm plantation owners to clear land. The laws which prohibit fire-raising are not enforced. Converting millions of hectares into plantations has displaced large numbers of local communities, and many are being forced into ecologically fragile peat swamps, where they have no option but to contribute to the destruction of those important ecosystems<sup>12</sup>.

Government plans for the conversion of around 20 million hectares of land for oil palm expansion have been revealed, most of it for biodiesel. Millions more hectares may be converted to other biofuel crops, such as sugar cane and jatropha. Concessions for 5.25 million hectares have recently been announced as part of the government's biofuel expansion strategy.<sup>13</sup> A 2001 study commissioned by the European Union and the Indonesian Ministry of Forestry predicted that most new oil palm development, at least on Sumatra, would be in the peatlands.<sup>14</sup>

Most of the peatlands which are being drained and 'converted' are in Indonesia, however Malaysia is fast destroying its own peatlands and ancient forests, largely for conversion to oil palms. Figures published by the UN's Food and Agriculture Organisation in 2005 showed that Malaysia's deforestation rate is accelerating faster than that of any other country in the world.<sup>15</sup> Satellite images clearly reveal regular peat and forest fire hotspots in Malaysia, too. New oil palm concessions have recently been granted in peat swamps areas in Pahang, Terengganu and Sarawak. Peat swamps along the Kinabatangan River in Sabah are systematically drained, logged and converted into oil palm plantations. 39% of Papua New Guinea's peatlands and 16% of those in Brunei were deforested in 2000.

### **What needs to be done to end this climate change disaster?**

Protecting south-east Asia remaining peat from drainage, land conversion, logging and fires is essential to avoiding catastrophic climate change. Peat which has already been drained must be re-flooded and re-planted with natural, native vegetation. Small-scale peat restoration projects in Kalimantan have demonstrated that, with sufficient funding and political support, this is feasible<sup>16</sup>. Peat restoration must not happen at the expense of rainforests on mineral soils. All remaining rainforests must be protected, not just those on peaty soils.

The Round Table on Sustainable Palm Oil sets out criteria to ensure that palm oil expansion does not destroy remaining forests, although it does not address the importance of tropical peat swamps and does not provide for the protection and restoration of peat in areas which have already been logged. However, there is no firm time-table for the introduction of an RSPO verification scheme. A study by Sawit Watch and others shows that reform of Indonesia's administrative and legal framework is essential if the principles of the RSPO are to be put into practice – in other words, RSPO certification of 'sustainable palm oil' is unlikely to succeed without legal and political reform in Indonesia.<sup>14</sup> The same conclusion has been reached by ICRAF and the FSC Board who have found that the administrative and policy framework in Indonesia is a major obstacle to sustainable forestry. Regardless of RSPO criteria, the massive expansion of monoculture plantations is inherently unsustainable. Palm oil plantations have hardly any biodiversity, exhaust soils, require fertilizer inputs for high yields, and put pressure on land well beyond their remit, as local

communities are forced elsewhere, often into the forests and peatlands, in order to survive and grow food. A different 'development' model which does not rely on the massive expansion of monoculture plantations for export will be required if large-scale carbon emissions, as well as biodiversity losses and serious impacts on local communities are to be halted.

It is essential that there is no further development of oil palm and timber plantations in South-east Asia's peatlands or rainforest areas, that forest laws and land rights laws are reformed, that community rights and customary rights in Indonesia are recognized in law and in practice and that local communities are involved in land development decisions (instead of granting concessions to plantation companies without local involvement). Water management must be planned and improved not just in the peatlands, but across the whole plantation and agricultural sector. It is also essential to halt and reverse monoculture expansion, which competes with the land and food needs of the local population.

The international community must stop supporting the current 'development path' financially and by developing growing markets for bioenergy from palm oil, or relying on timber and wood productions from south-east Asia's rainforests, and, increasingly, on bioenergy from palm oil.

Whilst fire-management alone cannot address the root causes of peat destruction and deforestation, it is nonetheless essential to drastically reduce and control the annual fires. Indonesia must ratify the Transboundary Haze Agreement, and all ASEAN nations must implement it via national legislation and law enforcement.

### **What are the United Nations and member states of UNFCCC doing to address the problem?**

There have been no meaningful attempts to address the destruction of south-east Asian peatlands at all.

The Conference of Parties decided in 2005 to set up a working group to report back by 2007 about a proposal for reducing emissions from tropical deforestation (.Compensated Reduction.). This proposal, brought forward by Papua New Guinea and Costa Rica and supported by the Coalition for Rainforest Nations and many scientists, would allow developing countries (nonAnnex 1 countries) to gain carbon credits if they can demonstrate that they have reduced the rate of deforestation. The proposal would allow Indonesia to gain carbon credits for reducing deforestation, including in peat forests, and for restoring drained peatlands. Though endorsed by many countries and scientists, some critics are concerned whether Compensated Reduction could tackle the causes of deforestation.<sup>17</sup> Compensated Reduction is a voluntary scheme drawn up primarily to deal with tropical deforestation in general, not specifically with peatland protection. No significant progress on tackling deforestation was seen at the Conference of Parties in 2006. Worst of all, the proposal is for inclusion into a post-2012, post-Kyoto agreement, yet so far there is no framework for any post-2012 climate change agreement at all. So far, there is no framework for reducing tropical deforestation – there are only long-term proposals being discussed.

At the 2006 Conference of Parties, peat fires in South-east Asia were discussed at a breakout session, organized by Wetlands International, however delegates failed to make any decision even to consider peat emissions in greenhouse gas inventories, let alone take any steps to reduce this important and growing source of global carbon emissions.

Carbon credits under the Clean Development Mechanism are only available for re-forestation of areas logged before 1990, or for afforestation, but most of the peatland destruction and deforestation has happened since 1990. The Canadian International Development Agency funded one project to restore peatlands under CDM: The Climate Change, Forest and Peat Lands in Indonesia (CCFPI) project. This ended in 2005. A small-scale project is being undertaken by the EU. Those projects have shown that peat restoration is technically possible, but have no impact on the speed or scale of peat destruction.

Plans are being considered by the UN to give CDM carbon credits for biofuel production – something which could significantly worsen the situation in South-east Asia's peatlands.<sup>18</sup>

## **How the Clean Development Mechanism and climate change policies pursued by Annex 1 nations are contributing to peat and forest destruction:**

As of June 2007, around 60% of current approved CDM projects and funding for Malaysia and Indonesia combined include funding for the palm oil industry, even though that industry, as a whole, is responsible for much of the destruction of peatlands and forests. Within Malaysia, over 90% of CDM funds involve palm oil companies. There are calls for large-scale funding for liquid biofuels by CDM and Joint Implementation which, if successful, could greatly increase the amount of funding going into this industry in future<sup>19</sup>. The Indonesian government aim to rapidly expand their biodiesel industry, which will require funding for 11 refineries by 2010, and the conversion of 20 million hectares or more to oil palm plantations. This policy is expected to vastly increase the rate of deforestation and peat drainage, both directly and indirectly, as more local communities will be evicted and forced to try and survive in sensitive ecological areas, including peat swamps.<sup>20</sup> The Asian Development Bank has declared 18% of Indonesia's forest land to be idle and useable for CDM funding for carbon sequestration.: Land on which local communities depend for their livelihoods and which is rich in biodiversity.<sup>21</sup>

Annex 1 countries are implementing measures under the Kyoto Protocol which are vastly increasing the demand on palm oil and thus giving an incentive for ever faster deforestation and peat destruction. This includes the European Biofuels Directive, the European Biomass Action Plan (making palm oil burnt in power stations eligible for government support), and biofuel obligations adopted by other

Annex 1 member states. Palm oil is expected to meet most of the biofuel demand in Europe because it is the cheapest and highest-yield of all forms of biodiesel. CDM funding has been criticized by many NGOs because it allows polluting companies in rich countries to buy themselves out of having to reduce their own emissions. In this instance, the companies involved not only fail to reduce their own emissions, but they fund the causes of forest and peat destruction in Indonesia. There is probably no single industry in any single country which contributes as much to global warming as palm oil in Indonesia, and the Kyoto Protocol is being used to finance and sustain it.

### **Note:**

For an analysis of greenhouse gas emissions linked to palm oil biodiesel from South-east Asia's peatlands, see here: [http://www.biofuelwatch.org.uk/SE\\_Asia\\_palm\\_biodiesel\\_analysis.doc](http://www.biofuelwatch.org.uk/SE_Asia_palm_biodiesel_analysis.doc)

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- 15: See: <http://news.mongabay.com/2005/1228-malaysia.html>
- 16: see for example the Restorpeat Project:  
<http://www.geog.le.ac.uk/staff/sep5/RESTORPEAT/RESTORPEAT.pdf>
- 17: see <http://www.wrm.org.uy/GFC/cover/ForestCover20.pdf>
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- 21: see [World Rainforest Movement report, http://www.wrm.org.uy/](http://www.wrm.org.uy/)