

HOW THE PALM OIL INDUSTRY IS

COOKING THE CLIMATE

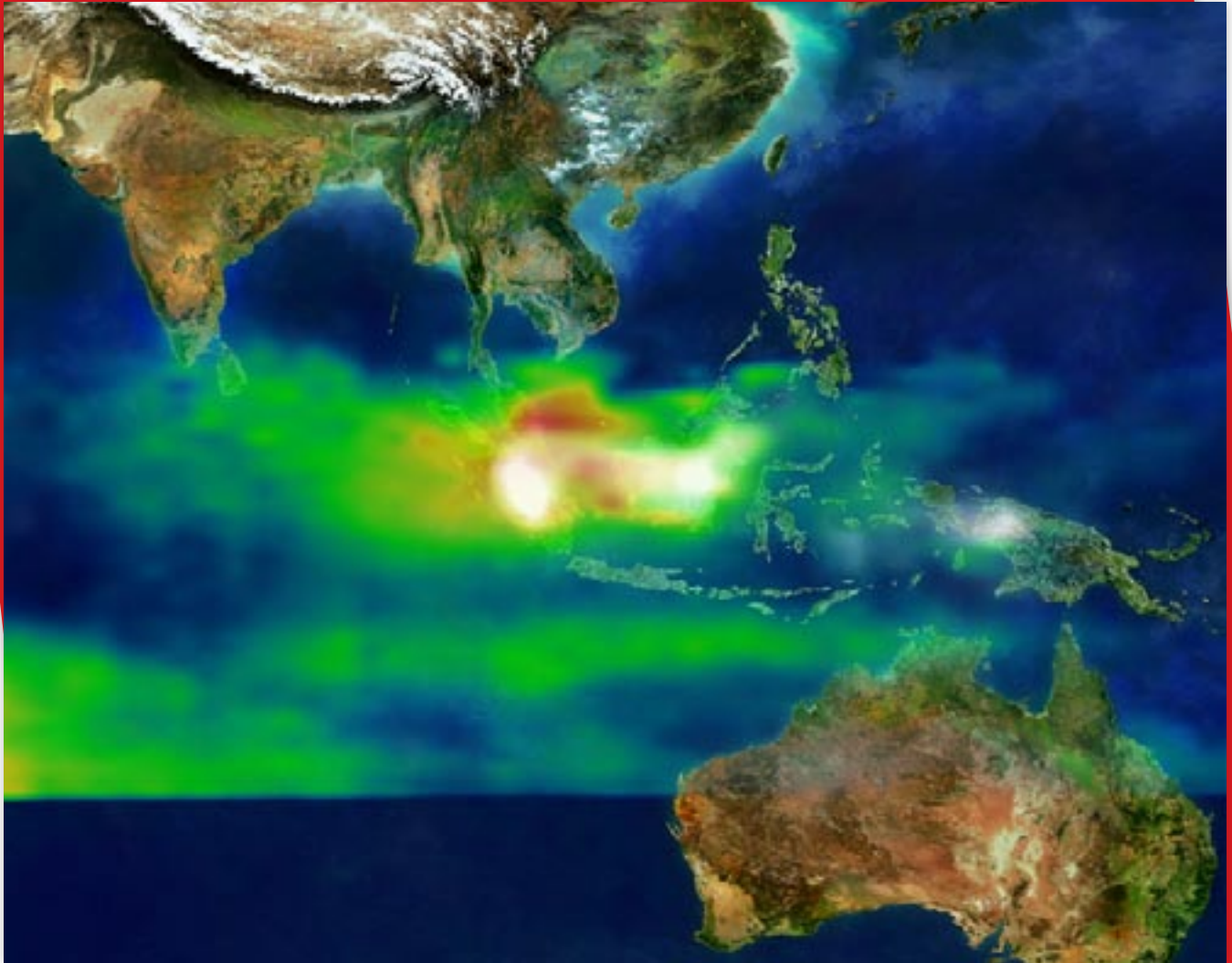




'Climate change is market failure on the greatest scale the world has seen. It results from the fact that the costs of greenhouse gas emissions are not paid for by those who create the emissions.'

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1997: HAZE OVER INDONESIA

Uncontrollable fires in forests and peatlands during 1997 released up to 2.57Gt of carbon, a volume equivalent to up to 40% of the mean annual global carbon emissions from fossil fuels during the period.

EXECUTIVE SUMMARY

INDONESIA'S PEATLAND CARBON STOCKS PLUMMET AS PALM OIL DEMAND SOARS

Every year, 1.8 billion tonnes (Gt) of climate changing greenhouse gas (GHG) emissions are released by the degradation and burning of Indonesia's peatlands – 4% of global GHG emissions from less than 0.1% of the land on earth.

This report shows how, through growing demand for palm oil, the world's largest food, cosmetic and biofuel industries are driving the wholesale destruction of peatlands and rainforests. These companies include Unilever, Nestlé and Procter & Gamble, who between them account for a significant volume of global palm oil use, mainly from Indonesia and Malaysia.

Overlaying satellite imagery of forest fires with maps indicating the locations of the densest carbon stores in Indonesia, Greenpeace researchers have been able to pinpoint carbon 'hotspots'. Our research has taken us to the Indonesian province of Riau on the island of Sumatra, to document the current activities of those involved in the expansion of palm oil. These are the producers who trade with Unilever, Nestlé and Procter & Gamble, as well as many of the other top names in the food, cosmetic and biofuel industries.

The area of peatland in Riau is tiny: just 4 million hectares, about the size of Taiwan or Switzerland. Yet Riau's peatlands store 14.6Gt of carbon – if these peatlands were destroyed, the resulting GHG emissions would be equivalent to one year's total global emissions.

Unless efforts are made to halt forest and peatland destruction, emissions from these peatlands may trigger a 'climate bomb'.

FORESTS AS TICKING CLIMATE BOMBS

Forest ecosystems currently store about one and a half times as much carbon as is present in the atmosphere. Without drastic cuts in GHG emissions, climate change – which is in part driven by forest destruction – may soon tip these carbon stores into sources of emissions. Resulting temperature increase could disrupt ecosystems in ways that provoke yet more greenhouse emissions, potentially leading to further acceleration of climate change.

Conclusions from the world's leading climate scientists in the Intergovernmental Panel on Climate Change (IPCC)

show that large cuts in GHG emissions are needed rapidly. Time is desperately short. The greater the delay in realising emissions reductions, the higher the financial, social and ecological costs will be.

INDONESIA'S RAINFORESTS AND PEATLANDS IN THE POLITICAL SPOTLIGHT

Indonesia offers a critical example of why GHG emissions arising from deforestation and land-use change need to be dealt with at the international level, by governments and corporations.

Indonesia holds the global record for GHG emissions through deforestation, putting it third behind the USA and China in terms of total man-made GHG emissions. During the last 50 years, over 74 million hectares of Indonesia's forests have been destroyed – logged, burned, degraded, pulped – and its products shipped round the planet.

Unlike industrialised country (Annex I) signatories to the Kyoto climate treaty, Indonesia – as a developing country – is not required to set a target to reduce its GHG emissions. Consequently, since the Kyoto Protocol provides no incentives for preventing the destruction of tropical forests, the expansion of palm oil into carbon-rich landscapes such as peatlands and rainforests makes short-term economic sense but no ecological sense.

In December 2007, negotiating teams from governments around the world will gather in Bali, Indonesia to thrash out an agreement that will ideally lead to an international plan to deliver deep cuts in global GHG emissions, as an extension of the current Kyoto climate treaty.

These climate negotiations are first steps toward international political measures to tackle deforestation. Meanwhile, global industry continues business-as-usual, and is expanding into the world's rainforests.

PALM OIL'S BOOM!

NASA's climate scientists warn that 'continued rapid growth of CO₂ emissions and infrastructure for another decade' may make halting high-risk increase in global temperatures 'impractical if not impossible'.

'Our actions now cast their shadow far into the future. [Climate policy needs to] have the economics of risk at its core; and go beyond the marginal changes which are the usual daily fare of economists.'

Nicholas Stern, former Chief Economist of the World Bank

A report published by the United Nations Environment Programme (UNEP), in 2007, acknowledges that palm oil plantations are now the leading cause of rainforest destruction in Malaysia and Indonesia.

Indonesia has destroyed over 28 million hectares of forest since 1990, largely in the name of land conversion for plantations. Yet the area of oil palm or pulp wood plantations established in this period was only 9 million hectares. This clearly implies that most of the companies obtained permits to convert the forest only to gain access to the timber. Rainforest continues to be destroyed for plantations because of the financial value of the timber.

Oil palm plantations feed a growing global demand for cheap vegetable oil used in the production of food, cosmetics and fuel. Compared to the year 2000, demand for palm oil is predicted to more than double by 2030 and to triple by 2050.

A handful of powerful players control much of the international trade in palm oil from Indonesia, among them Cargill, the world's biggest private company, the ADM-Kuok-Wilmar alliance, currently the world's biggest biofuels manufacturer and Synergy Drive, the Malaysian government controlled company that is soon to become the world's biggest palm oil conglomerate.

Following business-as-usual logic, industry's current expansion strategy – including taking advantage of concern about climate change to push palm oil as a source of biodiesel – casts an ominous shadow over our ability to cut emissions.

Much of the current and predicted expansion oil palm plantations is taking place on peatlands which are among the world's most concentrated carbon stores. Ten million of the 22.5 million hectares of peatland in Indonesia have already been cleared of forest and have been drained, resulting in a substantial and continuing increase in GHG emissions as peat soils dry out, oxidise and even burn.

GHG emissions from peatlands are set to rise by at least 50% by 2030 if predicted expansion proceeds.



RIAU: A LIT FUSE

In early 2007, through satellite monitoring, Greenpeace identified fire hotspots in Riau Province.

Comparing and overlaying maps of peatlands and forest concessions signalled there was significant overlap between the location of fires, oil palm concessions and peatlands.

The peat soils of this once heavily forested province of 9 million hectares have the highest concentration of carbon stored per hectare of anywhere in the world. The area of peatland involved is small: just 4 million hectares – about the size of Taiwan or Switzerland. But they store 14.6Gt of carbon, or 40% of Indonesia's peatland carbon.

Riau's huge carbon store is at high risk from drainage, clearance and ultimately from fire. Destroying these peatlands could release GHG emissions equivalent to one year's total global emissions or to five years' emissions from all fossil-fuel power plants in the world.

A quarter of Indonesia's oil palm plantations are located in Riau. By 2005, 1.4 million hectares of oil palm plantation had been established in the province. Data suggest that over one-third of oil palm concessions in Riau are sited on peat.

Riau is facing further expansion in palm oil due to its available infrastructure. A further 3 million hectares of peatland forests are earmarked for conversion over the next decade. Where once there was mostly forest, soon half of Riau will be covered in oil palms.

According to a 2001 report by the European Union and the Indonesian Ministry of Forestry, 'it is inevitable that most new oil palm will be in the wetlands, as the more "desirable" dry lands of [Sumatra] are now occupied.'



DUTA PALMA: THE OIL PALM INDUSTRY'S RECIPE FOR CLIMATE DISASTER

The privately-held Duta Palma group is a company with major operations in Riau. It is one of Indonesia's ten-largest palm oil refiners.

Duta Palma now controls about 200,000 hectares of land, over half of it in Riau. This landbank overlaps significant areas of deep peat, which are theoretically protected under Indonesian law.

Greenpeace analysed satellite data from the period 2001-2007. This showed significant forest clearance within several of Duta Palma's contiguous concessions in Riau. According to official maps, nearly half of the total area of the concessions is on peatlands with a depth greater than 2 metres. One area is officially designated as protected peatlands, ie more than 3 metres deep.

Measurements made by Greenpeace of the peat depth in October 2007 show that the concessions lie on very deep strata of peat ranging from 3.5 metres in depth outside the boundary of the concession to more than 8 metres in the middle of the concession area. Therefore, the entire area should be protected under Indonesian law.

Additional field investigations by Greenpeace confirms extensive peat drainage, including construction of large canals, and clear-cutting of rainforests is happening across these concessions.

Duta Palma is also involved in the destruction of habitat critical to endangered and protected species including the critically endangered Sumatran tiger.

WHO CONTROLS THE TRADE?

ROUNDTABLE ON SUSTAINABLE PALM OIL

The Roundtable on Sustainable Palm Oil (RSPO) is a high profile initiative chaired by Unilever. Its members include major companies along the supply chain from plantations through to commodities traders, including Cargill and ADM, to the world's food giants, including Cadbury's, Nestlé and Tesco. Together they represent 40% of the global production and use of palm oil.

On-the-ground investigations by Greenpeace reveal that RSPO members are dependent on suppliers that are actively engaged in deforestation and the conversion of peatlands.

THE FOOD GIANTS

The RSPO board president Unilever is a major player in the global palm oil trade. It uses around 1.2 million tonnes of palm oil every year, or about 3% of total world palm oil production, most of which originates from Indonesia and Malaysia. It uses palm oil in brands such as Flora margarine.

Other leading brands including KitKat, Pringles, Philadelphia cream cheese and Cadbury's Flake and leading companies including Gillette, Burger King and McCain are complicit in the expansion of palm oil at the expense of Indonesia's peatlands.

THE COMMODITY GIANTS

Much of the global trade in Indonesian palm oil is handled by traders based in Singapore. Some of the largest Singapore-based commodity traders are RSPO members, including the ADM-Kuok-Wilmar alliance, Cargill, Golden Hope and Sinar Mas.

The traders are also processors, blending palm oil which originates from deforestation and peatland destruction through their refineries and biofuel facilities.

The companies' control over the entire palm oil supply chain – from plantations in Indonesia to refined palm oil or biofuel – means that they are in a decisive position to affect and change the market.

One RSPO member, a major food retailer, has complained to Greenpeace that efforts towards sustainability are hampered because: '...the global palm oil industry is unable at present to provide anyone with evidence of traceability beyond processor, to plantation level'.

Consequently, consumer companies who manufacture products using palm oil have virtually no way of knowing whether or not the palm oil they are using is from rainforest destruction and conversion of peatlands.

Through carrying on business as usual, the commodity trade and other big players are not taking the urgent action necessary to abandon destructive and socially unjust practices linked to the industry's expansion.

'The draining of wetlands to produce any type of biofuel would produce a loss of stored carbon that would take hundreds of years to make up through the biofuels' annual greenhouse gas savings.'

European Commission, 2007

BIOFUELING RAINFOREST DESTRUCTION

The scale of global diesel consumption dwarfs currently available feedstocks for biodiesel production. Substituting even 10% of worldwide demand for diesel fuel for road transport would require more than three-quarters of total current global soya, palm and rapeseed oil production.

Biofuels have a relatively low financial value compared to other agricultural products. Therefore, biodiesel is generally made from the cheapest of the bulk oil crops: soya, palm and rapeseed. Palm is far more productive per hectare than either soya or rapeseed and is the most significant vegetable oil in the world, accounting for 30% of world edible oil production in 2006/7.

Feeding the growing demand for biodiesel is likely to take place through expanding palm oil plantations in Indonesia. Big commodity traders are already planning significant expansion in the biodiesel infrastructure. Once this is established, it will feed off forest destruction and fuel not only cars but climate change.

Supplying Europe's demand for biofuels is being driven by binding EU targets covering transport fuels. In early 2007, the EU Summit endorsed a minimum target for biofuels to constitute 10% of transport fuels by 2020. This almost doubles the target of the 2003 Biofuel Directive of a 5.75% contribution by 2010. The increased target is dependent on production being both 'cost effective' and 'sustainable'.

Diesel fuel currently meets around 60% of the road transport fuel demand in Europe. Europe's diesel fuel consumption was 172 million tonnes (Mt) in 2005. According to one RSPO member company, there is insufficient rapeseed available to meet EU targets. Of the alternatives, 'vegetable oil sourced from palm oil is among the most widely and commercially available'. The company predicts a growth in the demand for biodiesel of 52Mt between 2005 and 2030 in the EU alone as road transport fuel demand continues to rise.

Meeting this projected growth in demand for vegetable oil through palm oil, for example, would require more than 15 million hectares of mature oil palm plantation. This is nearly three times the acreage that was under oil palm in Indonesia in 2005.

Many other countries from oil-dependent regions are turning to biofuels from Indonesia's rainforests. This trade amounts

to emissions transfer, not emissions reduction. GHG emissions associated with palm oil production, such as forest clearance, are attributed to the producer country.

The Chinese government expects that biofuels will meet 15% of its transport fuel demand by 2020. India has set a target of securing 20% of its diesel fuel from biofuels by 2012.

Greenpeace estimates that current plans for biodiesel refineries in Indonesia will create an additional biodiesel production capacity of up to 9Mt a year, including a 5Mt 'mega-project' planned by Sinar Mas.

To feed this desire for an expansion in capacity, companies are thinking ahead and turning their attention to the region of Papua on the island of New Guinea – the last great expanse of rainforest in Southeast Asia. There is already evidence of large-scale land-grabbing in the name of biofuel, with one company alone reportedly laying claim to nearly 3 million hectares of forest.

TICK TICK TICK ... TIME FOR ACTION

Time is running out.

The debate is not whether we need to reduce emissions from fossil fuels in the industrialised world or whether we should stop deforestation in the remaining forests of the developing world. The inescapable reality is that we must do both, and now.

The increasing worldwide demand for vegetable oil for food, combined with current land-grabbing by biofuel companies – many of them RSPO members – is significantly increasing pressure on the world's threatened rainforests and other vulnerable habitats. Continued clearance of tropical rainforests, and their replacement with agricultural commodity crops like palm oil, seems inevitable unless action is taken now by industry and governments.

MAKING BIG EMISSIONS CUTS FAST: HALTING DEFORESTATION

Tropical rainforest destruction accounts for about one-fifth of global GHG emissions – more than the world's cars, lorries and aeroplanes combined. Destruction of Indonesia's peatlands alone accounts for almost 4% of global annual GHG emissions. Curbing tropical deforestation is one of the quickest, most effective ways to cut GHG emissions.

WHERE CAN BIG EMISSIONS BE CUT QUICKLY AND COST EFFECTIVELY?

Cut one:
Cut global deforestation: annual emissions savings – up to 2Gt CO₂

According to an IPCC report, up to 2Gt CO₂ (equivalent of up to 4% of current annual GHG emissions) can be cut cost effectively. The report puts the cost for making these emissions savings at up to \$100/tonne CO₂.

Significantly, this figure does not include potential to halt emissions from peatland and other bog fires.

Cut two:
Stop Indonesian peatland fires, establish a moratorium on peatland conversion: annual emissions savings – 1.3Gt CO₂

The emissions from Indonesia's peatland fires largely represent new expansion and peatland clearance. The best way to avoid these emissions is to stop further conversion of peat swamp forests. Since use of fire for forest or agricultural clearance is illegal, as is degradation of deep peat, the only cost is that of law enforcement and improved governance.

Cut three:
Rehabilitate Indonesia's degraded peatlands: annual emissions savings – 0.5Gt CO₂

Avoiding emissions from the ongoing decay of Indonesia's degraded peatlands poses a cost effective opportunity to make rapid emissions reductions. The area involved is miniscule – about 10 million hectares or less than 0.1% of the earth's land surface. One project being pursued by Wetlands International aims to rehabilitate 43,500 hectares of degraded peatlands in Central Kalimantan, avoiding the emission of 3.4Mt of CO₂ a year, for a one-off investment of 500,000 (this equates to 0.15/tonne). This is small change in global climate change terms.

Total cuts:
Potential annual emissions savings: up to 3.8Gt CO₂. This equates to nearly 8% of current annual GHG emissions.

STOP THE PROBLEM: ZERO DEFORESTATION

Moratorium on forest clearance and peatland degradation.

START THE SOLUTION: CUT ONGOING EMISSIONS

Rehabilitate degraded peatland areas with natural and native flora.

START THE SOLUTION: CLIMATE PROTECTION

Prioritise protection of remaining peat swamp forests and other forest areas with high carbon storage capacity, biodiversity values and benefits for indigenous peoples and other local communities.

Agree a global funding mechanism to reduce emissions from deforestation and make this a central part of the next phase of the Kyoto Protocol (post-2012) agreement on climate change.

Make available international funds to help countries take immediate action to reduce their emissions from deforestation: agree a global funding mechanism to transfer money from rich to poor countries for forest protection.





COOKING THE CLIMATE



This report shows how trade in palm oil by some of the world's food giants and commodity traders is helping to detonate a climate bomb in Indonesia's rainforests and peatlands.

Efforts to prevent dangerous climate change will not succeed unless this and other industries driving forest destruction are brought under control.

Every year, 1.8 billion tonnes (Gt) of climate changing carbon dioxide (CO₂) emissions are released by the degradation and burning of Indonesia's peatlands¹ – from less than 0.1% of the land on earth.² These greenhouse gas (GHG) emissions are comparable to the total reduction in annual emissions required under the Kyoto Protocol from Annex 1 industrialised nations.³

Successfully tackling climate change demands big cuts in emissions from burning fossil fuels. And this has to happen fast. Stopping deforestation also needs to be a priority.

Greenpeace has investigated forest destruction at carbon 'hotspots' in Indonesia by combining satellite imagery of forest fires with maps showing where the most dense carbon stores are. This research has taken us to Riau province on the island of Sumatra.

The peat soils of this once heavily forested province of 9 million hectares have the highest concentration of carbon stored per hectare of anywhere in the world. The area of peatland involved is tiny: just 4 million hectares⁴ – about the size of

Taiwan or Switzerland.⁵ Yet Riau's peatlands store 14.6Gt of carbon.⁶ If these peatlands are destroyed, the resulting GHG emissions would be equivalent to one year's total global emissions of carbon dioxide, or five years' emissions from all fossil-fuel power plants in the world.⁷

Riau is also home to a quarter of Indonesia's oil palm plantations,⁸ and another 3 million hectares are earmarked for conversion over the next decade.⁹ Where once there was mostly forest, soon half of Riau will be covered in oil palms.

Riau's carbon stores are at risk – indeed, they could all go up in smoke if deforestation and degradation continue unabated.

Despite Indonesian government assurances and industry claims, our on-the-ground investigations confirm that oil palm companies continue to actively clear natural forest, and drain and burn deep peat (peat with a depth greater than 2 metres) that underlays these forests.

What's driving this rainforest destruction?
Global demand for palm oil.

So Greenpeace has gone to the world's major traders and users of palm oil – companies like Cargill, Unilever and Nestlé – to find out who supplies them, and what their strategy is for dealing with the links between palm oil, deforestation and climate change.



These companies are all members of the Roundtable on Sustainable Palm Oil (RSPO). Headed by Unilever, the RSPO is a high-profile trade initiative established to 'clean up' the palm oil trade. Its members – including growers like Golden Hope, traders like Cargill, manufacturers like Nestlé and Johnson & Johnson, retailers like Tesco and Carrefour¹⁰ – account for 40% of global production and use of palm oil.¹¹

Cargill, a palm oil supplier, refused to comment on its trade links, claiming: 'our business with [our customers] must remain confidential'.¹² Unilever's response to the devastation linked to palm oil expansion was to say that the company 'hoped suppliers would see sense'.¹³ Nestlé responded that 'most of our suppliers are members of the RSPO and as such have declared their commitment to sustainable sourcing'.¹⁴

By painstakingly piecing together diverse evidence, we have traced the links between Riau's peatland destruction and leading global food, cosmetic and retail brands, including Unilever, one of the world's largest food giants, and Nestlé, one of the world's leading chocolate manufacturers.

Our investigation has revealed the role of commodity traders including Cargill and ADM-Kuok-Wilmar, who control over a third of the Indonesian trade in palm oil. They blend palm oil from deforestation and conversion of peatlands into an undifferentiated supply for the global market, leaving little trace of their sources on the ground.

Further, these traders are investing heavily in infrastructure to allow palm oil to service projected global growth in demand for biofuel, in defiance of the evidence that producing vegetable oil by clearing rainforests and draining peatlands produces considerably more CO₂ emissions than biofuel use can avoid.¹⁵ Indonesia already has the highest level of climate changing emissions linked to deforestation of any country.¹⁶ Without clear market and political measures that preclude the use of palm oil from deforestation, this new market puts additional pressure on Indonesia's carbon-rich rainforests and peatlands. For Kyoto Annex I industrialised countries, which have GHG emissions reduction targets, this is clever carbon accounting, putting the blame on Indonesia for products they consume. Effectively, emissions are not reduced but transferred from the car in industrialised countries to the forest.

The RSPO and its members have taken few meaningful steps to end the devastation and injustice linked to the industry and its expansion. By dragging out and complicating its 'sustainability' process, many in the industry are using the RSPO to cover their backs, putting off urgent action while the destruction continues.

While some RSPO member food manufacturers and retailers want to take action to avoid palm oil from deforestation, Unilever, Cargill, Nestlé and other powerful companies carry on with business as usual.

By driving the expansion of oil palm, these companies are effectively holding the climate to ransom.

TICK TICK TICK...

Time is running out for the climate.

Climate change is undoubtedly the most serious environmental threat currently facing the planet. Leading climate scientists warn that if we allow average global temperatures to rise above 2° Celsius, up to 30% of plant and animal species face increased risk of extinction, and about 15% of ecosystems are likely to be seriously affected.¹⁷ A series of reports released during 2007 by the Intergovernmental Panel on Climate Change (IPCC) acknowledge that climate change is already having serious impacts.

If business continues as usual, we are on track to see a much higher average temperature rise, with significant extinctions and major coastal flooding, as well as extensive damage to agriculture and water supplies.¹⁸

At a certain point, rising global temperatures will tip the planet's ecological balance. Temperature increase will disrupt ecosystems in ways that provoke feedback of more GHG emissions and a catastrophic acceleration of climate change. In the scientific language of the IPCC: 'Synergistic interactions are likely to be detrimental.'¹⁹

Carbon sinks of global significance, such as tropical rainforests and peatlands could become sources of GHG emissions.²⁰ Every ecosystem that tips from a sink to a source increases the likelihood that another will tip – like a series of ever more powerful climate bombs being detonated.

The clock is ticking.

Keeping the global temperature increase below 2°C (compared to pre-industrial levels) means global emissions of GHGs must peak by 2015 and by this time the world must be set on track for drastic reductions in overall emissions.²¹

Concerted action by individuals, international industry and political decision makers is imperative.

FORESTS AS TICKING CLIMATE BOMBS

The destruction of the world's forests is one of the main causes of climate change, second only to the energy sector.

HOW FOREST DESTRUCTION COULD TIP THE BALANCE

Forest ecosystems currently store about one and a half times as much carbon as is present in the atmosphere.²²

Tropical forests are critical to climate regulation, acting as a global cooling mechanism through the carbon they store, absorb and cycle. However, these natural buffers are rapidly being destroyed by industrial logging and deforestation for plantations and agriculture. The rapid ongoing expansion of these industries is a disaster for the climate.

Deforestation drives climate change through substantial GHG emissions: deforestation – virtually all of it from tropical rainforest destruction – accounts for about a fifth of all global emissions.²³ This is more than the emissions from all the world's cars, trucks, and aeroplanes. Deforestation also means that there is less forest area to reabsorb the carbon emitted to the atmosphere.

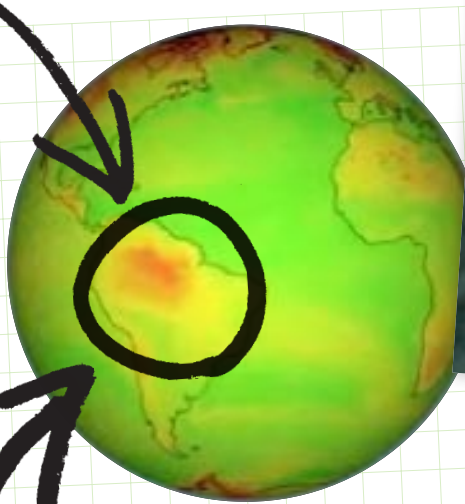
Moreover, climate change – in part driven by forest destruction – may soon tip these carbon stores into sources as forests start to die back. According to the IPCC, the carbon stored in forests is vulnerable to both current climate change and agricultural expansion.²⁴

More GHG emissions from deforestation, as well as fossil fuel emissions, increase the risk of reaching an ecosystem tipping point. Such a tip would probably put an end to any chance of stopping catastrophic climate change.

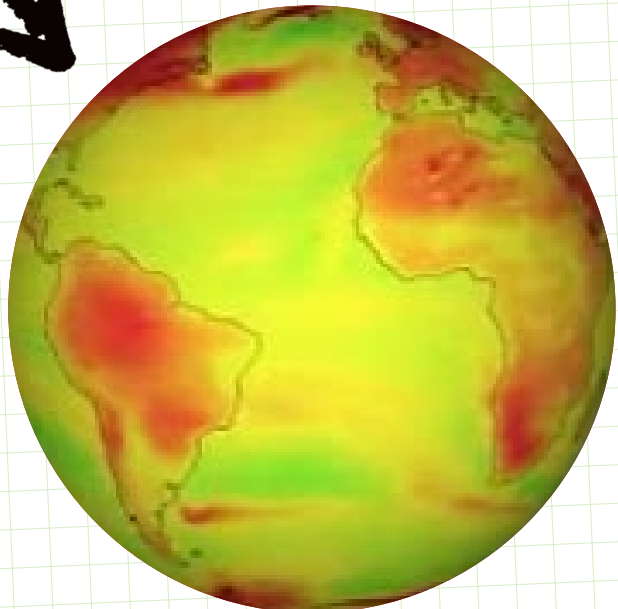
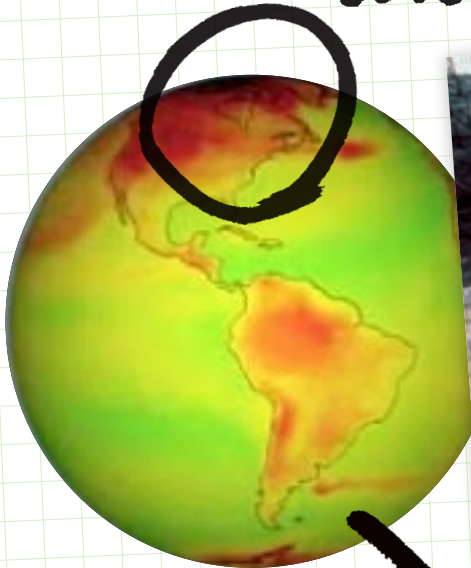
Therefore, addressing deforestation must be a critical component of both political policy and market regulation.



Amazon



Boreal





INDONESIA'S RECORD-BREAKING DEFORESTATION AND GHG EMISSIONS

Indonesia now has the fastest deforestation rate of any major forested country.²⁶ Losing 2% of its remaining forest every year, Indonesia has earned a place in the Guinness Book of World Records.²⁷ Indonesia also holds the global record for GHG emissions from deforestation, which puts it third behind the USA and China in terms of total man-made GHG emissions.²⁸

Over the last 50 years, over 74 million hectares of Indonesia's forests,²⁹ an area three times the size of the UK,³⁰ have been destroyed – logged, burned, degraded, pulped – and their products shipped round the world.

Oil palm plantation
in central
Kalimantan



PRIME NUMBERS: INTERNATIONAL COMMITMENT TO TACKLING CLIMATE CHANGE AT BALI

The next phase of the Kyoto Protocol must address deforestation. A strong mandate in Bali is a first critical step towards an international vision and direction that inspires countries to agree and act upon essential measures to reduce collective GHG emissions by 2015.

Such an agreement requires a mechanism – including adequate funding – to drastically reduce deforestation. The reductions from forest protection must be *additional* to cuts in industrial emissions.

PALM OIL EXPANSION IS CREATING A STATE OF EMERGENCY

A 2007 UNEP report recognises that oil palm plantations are now the leading cause of rainforest destruction in Malaysia and Indonesia.³¹

Within Indonesia, virtually all palm oil is currently sourced from Sumatra and Kalimantan. In 2005, three-quarters of the planted area (some 4.2 million hectares) was on Sumatra.³² The Indonesian Palm Oil Research Institute (IOPRI) estimates that two-thirds of all currently productive oil palm plantations involved deforestation.³³

According to World Bank estimates, between 1985 and 1997, 60% of the lowland rainforest of Kalimantan and Sumatra was destroyed,³⁴ with the expansion of oil palm plantations being a major driver.³⁵



On top of Indonesia's existing 6 million hectares of oil palms,³⁶ the country's central government has plans for another 4 million hectares by 2015 dedicated to biofuel production alone.³⁷ Provincial governments are even more ambitious in terms of oil palm expansion, planning for an additional 20 million hectares.³⁸ Of this, nearly 80% of the expansion is planned for Sumatra and Kalimantan, with most of the remainder, some 3 million hectares, in Papua, Indonesia's largest remaining region of intact rainforests. Nearly 40% of the expansion in Sumatra – some 3 million hectares – is earmarked for the province of Riau.³⁹

PALM OIL'S BOOM!

BOOMING DEMAND

Oil palm plantations feed a global demand for cheap vegetable oil used in the production of food, cosmetics and fuel. Demand for palm oil is predicted to more than double by 2030 compared to 2000, and to triple by 2050.⁴¹ Going by current practices in Indonesia, every drop of extra palm oil production means more expansion directly or indirectly into forests and peatlands. More expansion – particularly into peatlands – means more GHG emissions.

Even as European governments attempt to reduce GHG emissions in their own countries, they use ever more palm oil to feed the demand for biofuels for transport and biomass in power stations – up to 1.5 million tonnes (Mt) in 2005.⁴² This use alone equates to the harvest from 400,000 hectares, or 4.5% of global palm oil production.⁴³ Meanwhile, palm oil use in food continues to increase,⁴⁴ partly as food manufacturers shift to using palm oil instead of hydrogenated fats and partly as it replaces other edible oils being used for biodiesel.⁴⁵

INDONESIA'S GREENHOUSE GAS EMISSIONS FROM PEATLAND CONVERSION

The destruction of Indonesia's peat swamp forests is one of the largest sources of GHG emissions in the world.

Indonesia's emissions from destroyed or degraded peatland are around 1.8Gt CO₂ per year,⁴⁶ equivalent to 4% of total GHG emissions,⁴⁷ from less than 0.1% of the world's land surface.⁴⁸

Fires account for about 70% of Indonesia's annual emissions from peatland.⁴⁹ However, even if all further peatland clearance and burning is stopped, substantial emissions from oil palm and pulp wood plantations on degraded peat soils will continue far into the future. Peatland emissions of CO₂ are set to rise by at least 50% by 2030 if predicted expansion goes ahead.⁵⁰

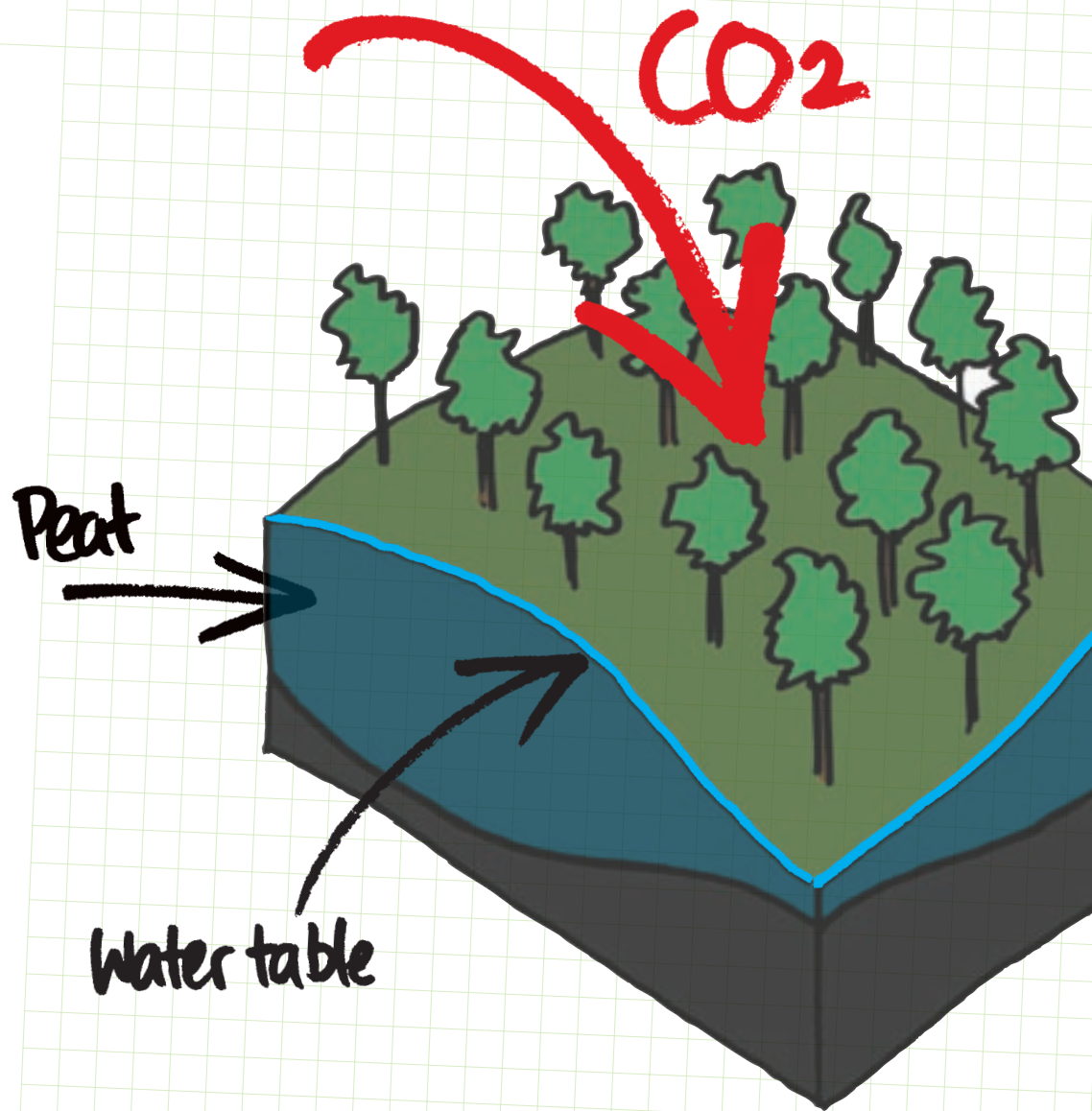
Of the 22.5 million hectares of peatland in Indonesia, some 10 million hectares have already been cleared of forest and drained causing massive ongoing emissions of GHG as the peat soils dry out, oxidise and even burn.⁵¹

According to Wetlands International, production of one tonne of palm oil from peatland results in an average emission of 10 to 30 tonnes of CO₂ from peat decomposition alone. This does not include the emissions from fire or take into account other GHG emissions during the production cycle, such as fertiliser use or methane from refinery waste.

'Deforestation, peatland degradation and forest fires have placed Indonesia among the top emitters of greenhouse gases in the world, among industrial giants the United States and China [...] Global warming will likely cause a vicious cycle by drying up the rainforest and peat swamps, thus increasing the risks of even more intense fires.'







PEAT: A VOLATILE MATERIAL

WHY ARE PEATLANDS IMPORTANT FOR THE CLIMATE?

Peatlands are perhaps the world's most critical carbon stores. Covering just 3% of the earth's land surface,⁵² they nevertheless store somewhere between a fifth and a third of the total carbon contained in the terrestrial biosphere, including all soils and vegetation⁵³ – Wetlands International puts the figure at 528 billion tonnes of carbon.⁵⁴ If all this peat were burnt or fully degraded, it would release 1935Gt of CO₂, or 190 times the current annual global emissions from fossil-fuel power stations.⁵⁵

As a result, preserving peatlands is critical if we are to maintain climate stability. Tropical peat is extremely carbon-rich. Southeast Asian peatlands are estimated to store an average of 60kg of carbon per cubic metre,⁵⁶ and in total they hold an estimated 42Gt of carbon,⁵⁷ equivalent to 15 years' global emissions from fossil-fuel power stations at current levels,⁵⁸ 90% of this is in Indonesia. There are about 22.5 million hectares of peatlands in Indonesia, including peat swamp forests.⁵⁹ These areas contain some of the world's deepest peat deposits – up to 15 metres.⁶⁰

The forest absorbs fresh
Carbon and the peat
beneath it stores
centuries of old carbon



The carbon stored in tropical peatlands is rapidly being released as these habitats are destroyed.⁶¹ Southeast Asian peatlands in particular are being decimated by logging and agricultural expansion, especially for oil palm plantations.

If current trends continue, almost all of Southeast Asia's peatlands could be drained in the coming decades, putting all 42Gt of stored carbon at risk.

CARBON CYCLING AND STORAGE

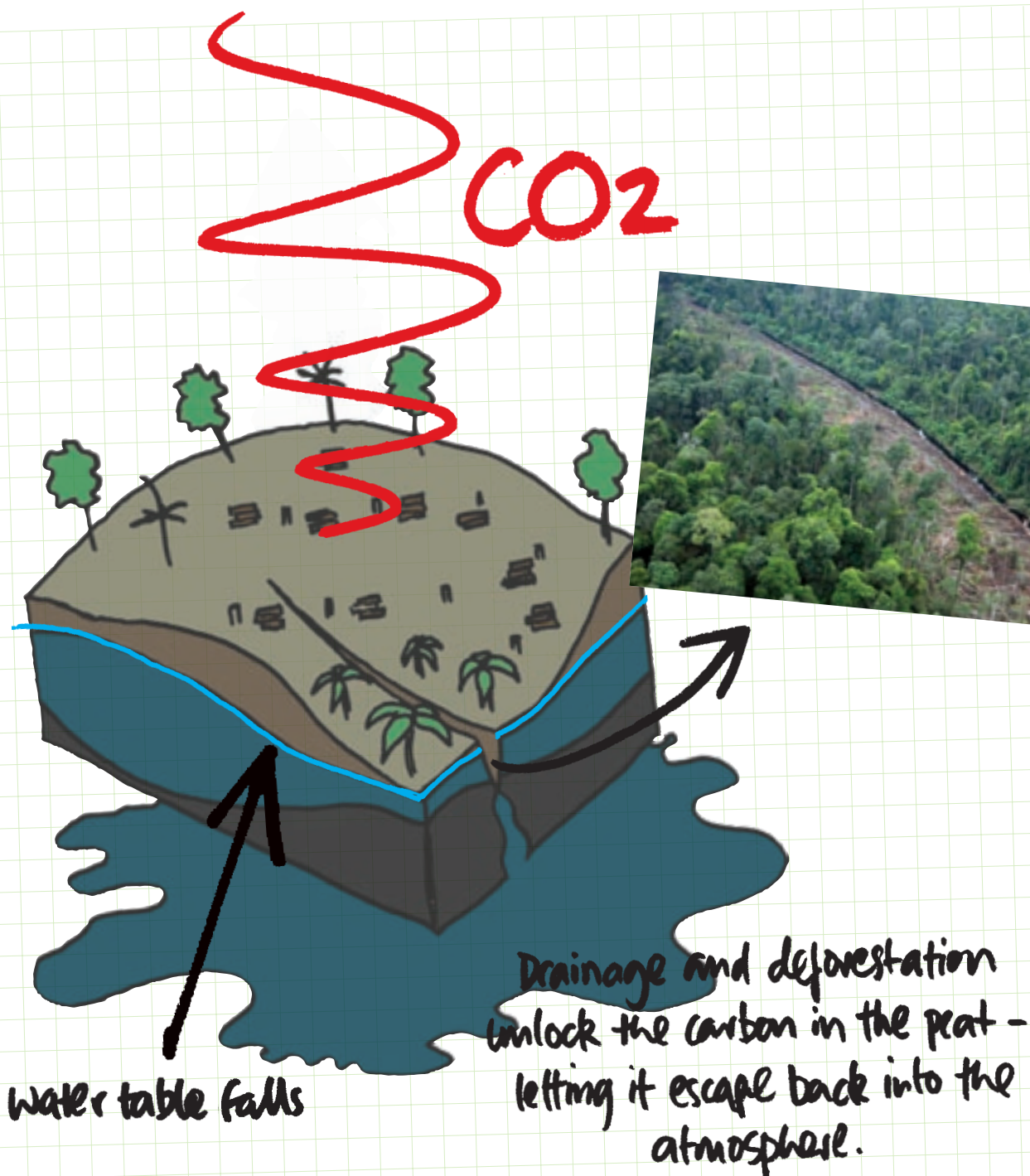
Plants make up an essential part of the global carbon cycle – they take in CO₂ from the atmosphere, store carbon while they live, as a chemical constituent of their tissues and fluids, then return it to the atmosphere through decomposition when they die. In an undisturbed ecosystem this process is largely in balance and as such does not play a role in causing climate change.⁶²

Whole ecosystems such as forests can thus be viewed as long-term carbon stores, holding carbon for centuries or millennia and in huge quantities.⁶³ The separate parts of this store of carbon – individual trees, for example – may die, decay and so release

stored carbon back into the atmosphere, but the ecosystem as a whole retains a store of carbon as each decomposing tree is replaced by a new growing one.

An ecosystem's soils also store carbon. Peat soils, consisting almost entirely of dead vegetation saturated with water, accumulated over hundreds or thousands of years, can store hundreds of tonnes of carbon per hectare.⁶⁴ The micro-organisms which normally carry out decomposition are unable to function due to the limited oxygen content of the water, suspending decomposition and thus storing the carbon indefinitely.⁶⁵ As long as new peat is forming, more carbon is absorbed by the ecosystem than is lost from it, making it a net accumulator of carbon – a carbon sink.⁶⁶ With the right conditions of pressure and heat over thousands or millions of years, peat can turn to coal – fossilised carbon removed from the carbon cycle almost indefinitely unless it is burned.⁶⁷

Destroying natural carbon sinks makes a double contribution to global warming: the stored carbon is released to the atmosphere, and at the same time, the capacity of the ecosystem to absorb new carbon from the atmosphere is curtailed.⁶⁸



COUNTING THE CLIMATE COST OF PEATLAND DESTRUCTION

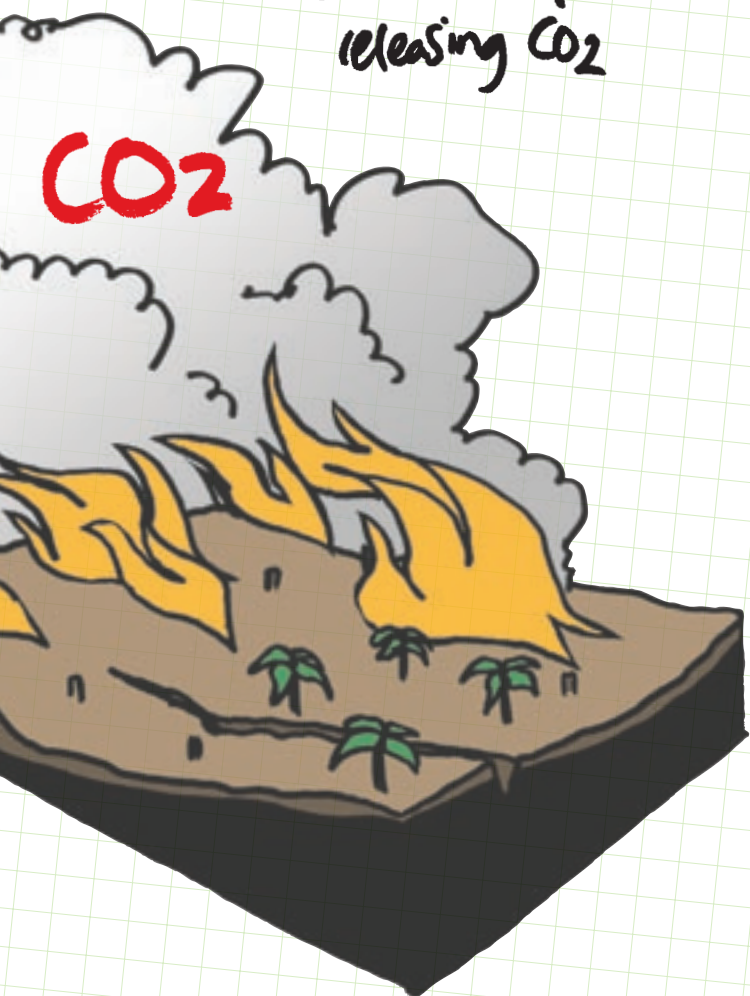
Once peatland is drained, oxygen in the air enables decomposition of the biological material in the peat, releasing the stored carbon as CO₂.⁶⁹ How fast the peat decomposes depends partly on temperature: in the heat of the tropics, decomposition can be up to ten times faster – and annual emissions ten times higher – than in colder regions such as Siberia.⁷⁰ Drainage of tropical peatland to one metre depth results in emissions of 80–100 tonnes of CO₂ per hectare per year, excluding the effects of fire.⁷¹ Emissions continue over a period of decades, tailing off as the carbon store runs out.⁷² Deeper drainage will cause higher emissions. Dry peat is also highly flammable, and once drained, whole areas can catch fire

and can burn for months, producing rapid and massive emissions of greenhouse gases, as well as smog.

In Southeast Asia, large-scale drainage of peatlands takes place to permit logging of the peat swamp forests; logs are also transported in the drainage canals. After logging, drainage continues or even intensifies to enable the establishment of oil palm or pulp wood (acacia) plantations. These tree species require deep drainage, which dries out more peat and so causes more emissions.⁷³ Over a quarter of oil palm plantations are on peat.⁷⁴ Drainage for logging alone is usually less deep, but the effects are significant as it can cover very large areas.⁷⁵

Moreover, peat drainage can have effects on a whole landscape, not just the area targeted. Deep drainage, for

fires incinerate
the dried peat
releasing CO₂



FIRES – SPEEDING UP THE EMISSIONS PROCESS



While degraded tropical forests and peatlands release their stores of carbon over decades, burning releases these stores into the atmosphere rapidly and damages the capacity of the ecosystem to recover.

In 1997/98, Indonesia witnessed an abnormally long, El Niño-influenced, dry season. Uncontrollable fires across millions of hectares of degraded peatlands and forest,⁸¹ released GHG emissions equivalent to up to 40% of annual global emissions from fossil fuels for the 1990s.⁸²

While the practice of burning forest areas has been illegal in Indonesia since 1999,⁸³ in the subsequent decade large peat areas have been burned every year as forest clearance continues unchecked. In 2006 alone, over 40,000 fires occurred in peatland areas in Southeast Asia.⁸⁴

Stopping deliberate burning within concession areas would slow the pace of the alarming GHG emissions from the clearing of peat forests, but would not prevent them. This is because the very process of drainage makes entire peatland landscapes dry, volatile and therefore susceptible to fire. Degrading Indonesia's peatlands puts their carbon stores at risk.

example for oil palm plantations, drains off water from adjoining, still forested areas, and the general water table begins to fall. This effect can extend several kilometres from the intentionally drained area,⁷⁶ resulting in a greatly increased release of CO₂. As a result it is likely that existing calculations of GHG emissions from drained peatlands are underestimated.⁷⁷

Wetlands International estimates CO₂ emissions from peatlands across Southeast Asia between 1997 and 2006 at around 2Gt per year (1,400Mt from fires and 600Mt from decomposition caused by drainage).⁷⁸ 1.8Gt of this – 90% – is estimated to have been from Indonesia. As a result of peatland emissions, Indonesia ranks as the world's third highest emitter of greenhouse gases, after the USA and China.⁷⁹ Brazil ranks fourth, mainly due to deforestation.⁸⁰



