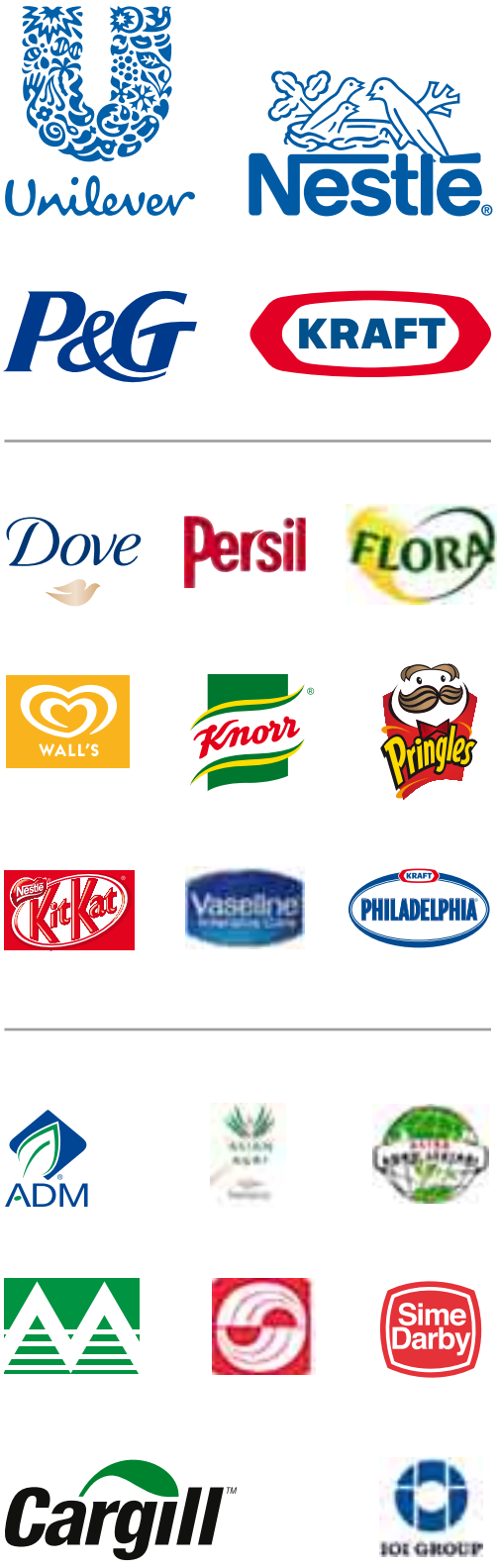
SECTOR REVIEW

THE HIDDEN CARBON LIABILITY OF INDONESIAN PALM OIL

	SHARE OF GLOBAL PALM OIL CONSUMPTION	SUPPORT A HALT TO DEFORESTATION
Unilever	3%	✔
Nestlé	0.5%	✖
P&G	>1%	✖
KRAFT	0.5%	✖



BENCHMARK PERFORMANCE INDICATORS IN RELATION TO PALM OIL SUPPLY CHAIN LIABILITIES – KEY QUESTIONS FOR INVESTORS IN UNILEVER, NESTLÉ, PROCTER & GAMBLE AND KRAFT

Governance

Does the company refuse to trade with groups whose operations raise governance issues – eg whose concessions are on protected peatlands over 2 metres deep?

Policy

Does the company support sectoral and national level efforts to reduce emissions associated with deforestation (eg through supporting a moratorium on deforestation in Indonesia)?

Risk assessment

Has the company assessed the carbon liability and collateral risks associate with deforestation and peatland degradation by its suppliers at group level?

Inventory

Has the company calculated the emissions embedded within its raw material supply chain both at the commodity level and in terms of the groups with whom it trades, including emissions associated deforestation and peatland degradation?

Targets

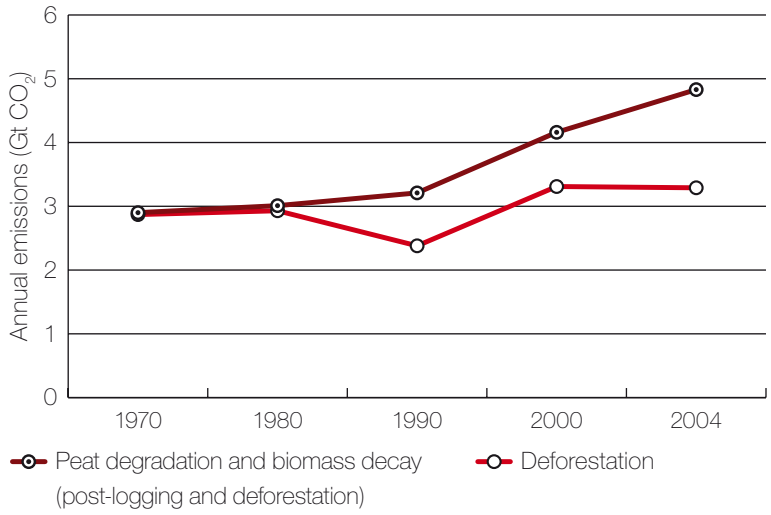
Has the company set meaningful targets in both relative and absolute terms for reduction in emissions in its raw material supply chain emissions, including emissions associated with deforestation and peatland degradation?

Implementation

Has the company explained how it proposes to reduce its raw material supply chain emissions, including emissions associated with deforestation and peatland degradation?

Leadership and performance

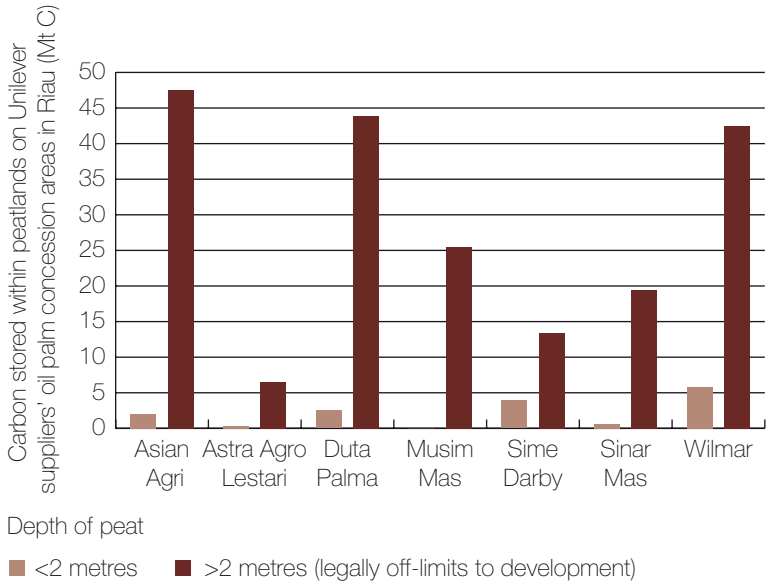
Has the company played a leadership role in reducing emissions associated with the palm oil sector? Is it calling for and supporting sector-wide and national efforts to reduce emissions associated with deforestation (eg through supporting a moratorium on deforestation in Indonesia)? Is the company leading the sector through its own purchasing power?



Source: IPCC (2007)

Annual CO_2 emissions from peat degradation, biomass decay and deforestation (1970–2004)

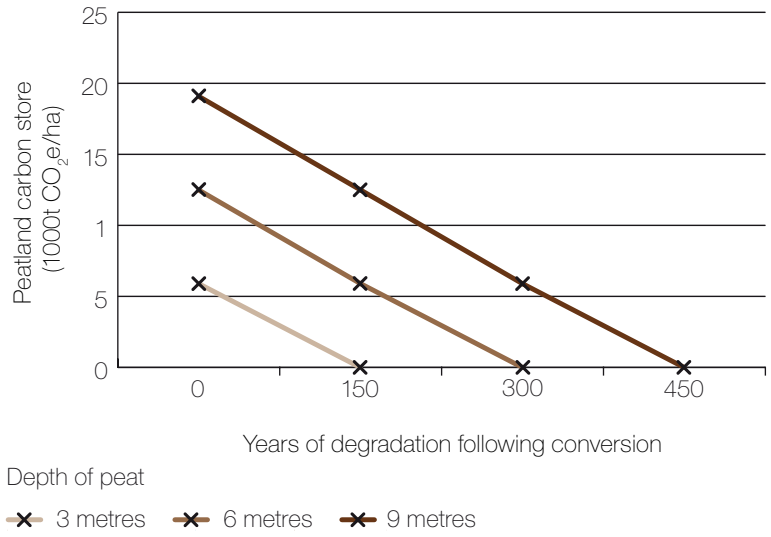
Indonesia is the 3rd largest GHG emitter, after China and the USA. The vast majority originates from the degradation of its peatlands, accounting for 4% of global GHG emissions.



Source: Greenpeace analysis

Peatland carbon stores at risk in concessions controlled by Unilever suppliers

Unilever suppliers in Riau have concessions on deep peat which is legally off-limits to development. These peatlands hold considerable stores of carbon.



Source: Germer and Sauerborn (2007)

GHG emissions commitment period and carbon loss through development of deep peat

Three metres of peat stores 1,800 tonnes of carbon per hectare (equivalent to 6552 tonnes of CO_2). Palm oil development commits the majority of this carbon to degradation over a 150 year timeframe.

EXECUTIVE SUMMARY: PUTTING PALM OIL'S CARBON LIABILITY ON THE BALANCE SHEET

'We intend to support the call for an immediate moratorium on any further deforestation for palm oil in Indonesia. We are committed to doing this because we believe it is the right thing to do for the people who use our products, for the environment and communities in and around which palm oil is grown and for our business and our brands.'
Unilever CEO Patrick Cescau, 1 May 2008

In April 2008, the former chief economist for the World Bank and climate expert Lord Nicholas Stern told business and political leaders in Singapore: 'Deforestation and burning for land clearance are huge problems for the world in terms of the carbon emissions. Indonesia is the third largest emitter, largely the result of deforestation and peat fires.'

Sectors that lead to considerable growth in GHG emissions from deforestation are no longer an option if we are to keep temperature rises below 2°C. This presents investors and major corporations involved in the palm oil sector with an entirely new set of challenges.

Expansion of the palm oil sector in Indonesia is driving the country's growing greenhouse gas (GHG) emissions. A moratorium on further deforestation is an urgent priority.

In May 2008, one FTSE 100 corporation, Unilever, called for an immediate moratorium on further deforestation for palm oil.

This report focuses on Unilever, which shares major institutional investors with other leading corporations including Nestlé, Procter & Gamble and Kraft. Not only do these corporations share investors, they also share growing carbon liability within their raw material supply chains through the expansion in the palm oil sector in Indonesia.

Unlike Nestlé, Procter & Gamble and Kraft, Unilever has recognised the global problems associated with palm oil expansion and the need for drastic reform to this sector. Major liabilities associated with palm oil from Indonesia include poor governance and illegality, biodiversity loss, social conflict and major carbon liability.

Given these sector-level crises, Unilever has taken a bold move in calling for an immediate moratorium on deforestation and peatland clearance. It recognises that this is the only realistic way to curb the growing liabilities associated with palm oil in Indonesia and to allow time to clean up the on-the-ground operations of oil palm producers.

While Unilever's position is strengthened by its status as the largest palm oil consumer in the world, this report shows how unless companies like Nestlé, Procter & Gamble and Kraft support its call for a halt to deforestation, the palm oil industry itself will continue to present a massive carbon liability over the coming years.

THE CARBON DISCLOSURE PROJECT

Unilever's policy should resonate with institutional investors and corporations who share common interests.

A number of major corporations, including Unilever, Nestlé, Procter & Gamble and Kraft, are currently in the process of analysing their impact on the environment through a recent investor initiative known as the Carbon Disclosure Project (CDP). The CDP is being hailed by investors and risk management experts alike as the beginnings of a proper audit of the contribution companies make towards climate change, and a tool by which these companies can evaluate the risk they face as the world begins to decarbonise.

Many signatories to the CDP are also significant shareholders in corporate groups whose supply chains include palm oil. CDP signatories who are also shareholders in Unilever, Nestlé, Procter & Gamble or Kraft include AXA, Barclays, Blackrock, BNP Paribas, Credit Agricole, Credit Suisse, F&C Asset Management, Fortis, Goldman Sachs, Henderson Global Investors, HSBC, ING, JP Morgan, Legal & General, Morgan Stanley, Standard Life and UBS.

Both Procter & Gamble and Unilever are part of the CDP's 'Supply Chain Leadership Collaboration'. As part of a strategy to reduce overall GHG emissions, this aims to look at the whole carbon footprint of businesses that form part of the supply chain.

This report aims to provide just such an audit, using Unilever's palm oil supply chains as a case study to help quantify the carbon liability and collateral risks associated with the Indonesian palm oil sector.

It shows how, by buying palm oil from suppliers who account for more than one-third of Indonesia's palm oil production, Unilever and its competitors are increasing their potential carbon liability and thus leaving investors exposed to potentially significant levels of hidden risk, compromising long-term financial and brand stability.

This analysis highlights the urgent need for global palm oil consumers and investors to support Unilever's call for an immediate moratorium on deforestation and peatland clearance. This must be backed by urgent efforts to clean up the on-the-ground operations of oil palm producers. This must include market sanctions and the risk of financial disinvestment.

CASE STUDY: UNILEVER

Unilever is the world's largest consumer of palm oil. In 2005, the corporation purchased 1 in every 20 tonnes of palm oil produced in Indonesia, and about half of Unilever's supply comes from the country.

Corporate groups that supply Unilever with palm oil are leading the destruction of Indonesia's peatlands, including areas of deep peat. Development in deep peat areas is illegal under Indonesian law. It is also devastating for the climate, releasing considerable amounts of CO_2 when burnt or drained.

With the planned aggressive expansion of the palm oil sector in Indonesia, peatland emissions are set to rise. The main areas remaining for new plantations are large tracts of tropical peatlands – until recently virgin rainforest areas. Over 50% of planned plantations are located in these peatland areas.

CARBON LIABILITY FROM INDONESIAN PALM OIL SUPPLIERS

In Indonesia, annual emissions from peatlands within oil palm concession areas represent 1% of total global emissions.

Preliminary calculations by Greenpeace suggest that nearly half of Unilever's own estimate of its total supply chain emissions come from the palm oil sector. The respected industry group Point Carbon estimates that under Phase II of the Kyoto Protocol CO_2 will be priced at around €30 per tonne. If Unilever were to pay for the annual emissions of its palm oil supply chain at this carbon price, it would be liable for €714m annually – or nearly 14% of its annual profit for 2007. It is safe to assume that other companies operating in the sector are subject to comparable levels of financial risk.

Another way to assess the carbon liability associated with palm oil production on peat is to examine the cumulative emissions to which oil palm development commits the land. Ultimately, one tonne of palm oil produced on deep peat can lead to nearly 20 times the emissions of burning a tonne of crude oil.

As a 2008 European Commission report acknowledges: 'Plantations are often abandoned [after one 25-year plantation cycle, which includes the five years it takes for the trees to mature] because of soil exhaustion and new areas of forest are drained instead.' This leaves an ongoing emissions legacy – a projected 'carbon debt' – which significantly increases the liability these companies face when considering emissions from its supply chain.

Unilever suppliers control concession areas located on peat that should be off-limits to development or degradation according to Indonesian law. This stipulates that land should not be allocated for oil palm plantations on peat soils deeper than 2 metres. Greenpeace estimates that the average peatland depth for palm oil plantations on peat in the province of Riau is 3 metres. This means that, based on historic consumption, Unilever's projected share of carbon liability from these areas is 685Mt CO_2, equivalent to the annual CO_2 emissions for the UK and Belgium.

Were Unilever to offset these emissions, the company would have a liability of €20.6 billion at predicted carbon trading prices of €30 per tonne of CO_2, payable over the 20 year productive period of an oil palm plantation –which means a cost of €1 billion a year, or 18% of operational profit for 2007.

THE CLIMATE PRIORITY

Unilever states that: 'The reputation of companies will be judged fundamentally by their response and actions towards climate change which is widely recognised as the most critical challenge facing our planet.'

In April 2008, Unilever called for an immediate moratorium on deforestation for palm oil production in Indonesia.

Such a call signals to the corporate and investor world that cutting down rainforests for palm oil, and externalising the carbon debt is incompatible with the deep cuts in emissions needed to tackle climate change. A halt to further rainforest destruction in Indonesia is also vital to ensuring the future for critically endangered species such as the orang-utan.

Both Unilever and the CDP recognise that if investors and global companies like Unilever intend to make a difference in terms of GHG emissions, they need to move beyond their own direct emissions. Given the profound carbon liability and other collateral risks associated with the palm oil sector and the corporate groups involved, real and urgent pressure needs to be brought to bear.

Responsible investors and buyers need to take a macro-level approach to reducing carbon liability. They must use their considerable influence to support the call for an immediate moratorium on further deforestation, including the threat of immediate market sanctions and financial disinvestment from corporate groups involved in forest conversion and peatland degradation.

CONTENTS:

INTRODUCTION:
THE TOP LINE PERSPECTIVE

- **Traditional strategies for economic growth have not taken account of environmental and social impacts, notably climate and biodiversity, but also impacts on local communities.**

  - The current economic growth model, which leads to substantial greenhouse gas (GHG) emissions, is incompatible with climate and long-term economic security. To keep global average temperature rise below 2°C, assessments by the Intergovernmental Panel on Climate Change (IPCC) show the need for a peak in GHG emissions by 2015 and drastic reductions by 2050 (see Appendix I 'The bottom line perspective').

- **Institutional investors with combined assets of $57 trillion are seeking to quantify the carbon liability of their investments through the Carbon Disclosure Project (CDP). This assessment includes indirect emissions held within corporate supply chains.**

- **Seen as a showcase for green and ethical investment, Unilever is part of a pilot project to disclose GHG emissions embedded within its supply chain. Greenpeace's analysis shows the challenge facing Unilever if it is to live up to its green credentials, which both mainstream and SRI analysts currently rate as an investment opportunity.**

  - Unilever estimates that its supply chain emissions represent 50Mt CO_2 annually, on a par with Sweden. This is likely to be a substantial underestimate, as the company's initiatives to address emissions from agriculture (eg RSPO) do not include emissions associated with deforestation and peatland degradation.

  - Preliminary Greenpeace calculations suggest that, as the world's largest consumer of palm oil, Unilever's additional carbon liability through its Indonesian palm oil supply chains accounts for 23.8Mt, nearly half of Unilever's own total estimated supply chain emissions. Were Unilever to seek to offset these annual emissions at predicted carbon trading prices of €30 per tonne of CO_2, it would pay an annual premium of €714m. It is equivalent to almost 14% of operating profit in 2007.

'Unilever is supportive of market mechanisms aligned to the Kyoto Protocol and that provide a robust and standardised framework across different regulatory regimes. For example, we support the broadening of the EU ETS to include other sectors, the extension of targets to the year 2025 and incentives for non-ETS countries to participate in the Scheme.'
Unilever's response to Carbon Disclosure Project questionnaire, 2008

TRADITIONAL GROWTH STRATEGIES THAT LEAD TO SUBSTANTIAL GHG EMISSIONS ARE INCOMPATIBLE WITH ECONOMIC AND CLIMATE SECURITY

Current economic growth strategies have thrived on uncosted carbon intensive natural resource exploitation: notably deforestation and fossil fuel use.

The 2007 assessments by the IPCC suggest that the best opportunity to limit average global temperature increase to 2°C is for GHG emissions to peak within the next decade, by which time the world must be on track for drastic emissions reductions by 2050 across all sectors (including energy, agriculture and land-use change including deforestation).

Business-as-usual growth is creating substantial carbon liability that is incompatible with building climate security and maintaining economic stability, or protecting biodiversity. It is the investments made today that will determine whether we curb the increase in global temperatures.

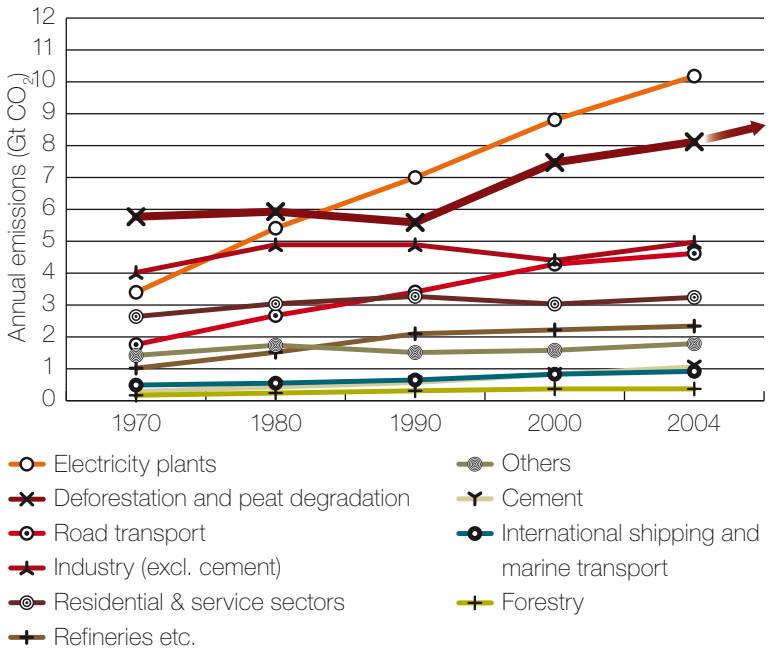
A consortium of the world's 315 top institutional investors with a combined $57 trillion of assets under management are seeking to quantify the liability associated with GHG emissions linked to carbon intensive growth strategies of the world's 3000 largest corporations.

Through the CDP, this consortium has sought to assess the carbon intensity within their portfolios,[1] including the GHG emissions within corporate supply chains.

Investors' search for transparent corporate disclosure and unified emissions calculation methodology through the CDP is a critical first step in reducing risk from GHG emissions: 'The highest sources of emissions in the whole supply chain are not always obvious… Breaking down total emissions in a meaningful way is a precursor to focusing resources to take action.'[2]

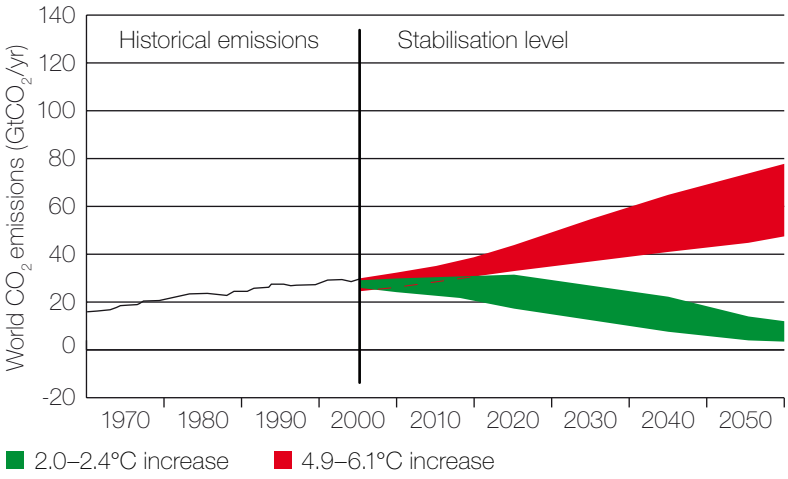
Growth in annual CO_2 emissions by source (1970–2004)

20% of global GHG emissions are from deforestation and peatland degradation. Emissions have increased by almost 50% since the early 1990s, largely as a direct result of the expansion of oil palm and pulpwood plantations into Indonesia's peatlands.



Source: IPCC (2007)

Full disclosure of emissions from the entire product supply chain and business operations enables investors, policy makers and responsible corporations to assess emissions both in terms of sector exposure (eg GHG emissions linked to palm oil production versus alternative sources of vegetable oil) and at the corporate group level (ie not just individual plantations but across a group's entire operations), and to make decisions accordingly. Initiatives like the CDP must work to make visible gross carbon liability to key decision makers who recognise the need to mitigate climate change impacts and safe-guard species threatened with extinction.



Source: IPCC (2007)

Global annual CO_2 emissions – climate stabilisation at 2ºC versus business-as-usual

To keep global average temperature rise to 2°C above pre-industrial levels, assessments by the IPCC show the need for a peak in CO_2 emissions by 2015 and drastic reductions by 2050.

'Unilever believes that the reputation of companies will be judged fundamentally by their response and actions towards climate change which is widely recognised as the most critical challenge facing our planet.'
Unilever's response to Carbon Disclosure Project questionnaire, 2008

FOUR HIGH PROFILE CORPORATIONS WITH SHARED PALM OIL SUPPLY CHAIN RISKS

Unilever, Nestlé, Procter & Gamble and Kraft are some of the highest profile brand-led stock-listed corporations in the world reliant on the palm oil sector. Between them, these companies represent more than 5% of global palm oil consumption[3] and are heavily dependant upon on Indonesian palm oil supplies, with all its incumbent risks.

All of them are members of the CDP. CDP investor signatories collectively hold significant shares in these companies (see Appendix IV). Top institutional investors in Unilever who are signatories of the CDP include AXA, Barclays, Blackrock, BNP Paribas, Credit Agricole, Credit Suisse, F&C Asset Management, Fortis, Goldman Sachs, Henderson Global Investors, HSBC, ING, JP Morgan, Legal & General, Morgan Stanley, Standard Life and UBS.

Only Unilever has estimated and disclosed its supply chain liability as part of the CDP. [4]

Greenpeace analysis and investigation of corporate groups that account for one-third of palm oil production in Indonesia are leading the destruction of Indonesia's peatlands, including critical orang-utan habitat, in part to meet growing global demand for palm oil. These groups feed into the supply chain of major corporations including Unilever and Nestlé.[5]

Oil palm development on peat by these groups reveals some of the worst carbon liability of any form of agriculture. A tonne of crude palm oil (CPO) from production on 3 metre deep peat, which typifies some of their operations, carries a carbon liability nearly 20 times that of crude oil.[7]

The degradation of Indonesia's peatlands alone is one of the largest sources of GHG emissions in the world. Indonesia's emissions from degraded peatlands are around 1.8Gt CO_2 per year,[8] equivalent to 4% of total GHG emissions,[9] from less than 0.1% of the world's land surface.[10]

Wetlands International, whose evaluations of peatland emissions are included in the latest IPCC calculations, has estimated that 2.8 million ha of degraded peatlands were within oil palm concessions by 2006.[11] Annual degradation emissions from these peatlands represent at least 476Mt CO_2[12] – equivalent to 1% of global emissions.[13]

With the planned aggressive expansion of the palm oil sector in Indonesia, peatland emissions of CO_2 are set to rise.[14] According to Wetlands International: 'The main areas remaining for new extensive plantations are the large tracts of tropical peatlands – until recently virgin rainforest areas. Over 50% of new plantations are planned in these peatland areas.'[15]

HOW DOES UNILEVER ASSESS BRAND RISK IN RELATION TO CLIMATE?

As the world's largest consumer of palm oil, Unilever is a leading international company with a considerable supply chain liability.

Unilever uses about 3% of global palm oil production every year.[16] About half of Unilever's palm oil supply comes from Indonesia.[17] In 2005, Unilever purchased 1 in every 20 tonnes produced in the country.[18]

Unilever estimates that its total carbon footprint for raw material supply, distribution, consumption and disposal of its products is up to 240Mt CO_2 annually,[19] which is 30 to 60 times greater than its 3.3Mt CO_2 direct manufacturing emissions[20] and larger than CO_2 emissions from the Netherlands.[21] Unilever estimates its supply chain emissions alone at 50Mt CO_2,[22] on a par with Sweden.[23]

Unilever seeks to assess carbon liability and other risks in terms of the impacts these risks could have on its brands. This process essentially puts the environmental effects of Unilever's supply chain on the same page as its marketing interests: 'Climate change risks (and opportunities) are assessed as part of internal risk management processes both at an operational site level and in the strategic thinking of our brands and marketing functions.'[24]

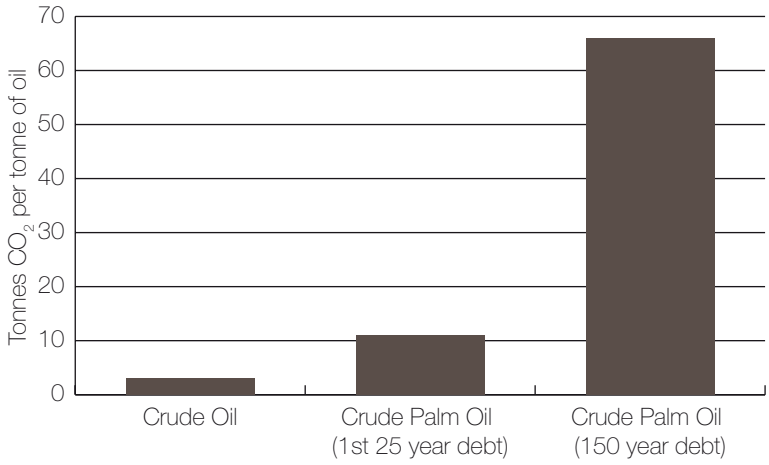
Unilever asserts that assessment of the real action a company takes on climate should be central to investment decisions and company reputation.

Greenpeace analysis of Unilever's supply chain for its top 'billion € brands' shows that over 80% of its revenue is linked to brands with products containing palm oil.[25]

Preliminary calculations by Greenpeace suggest that 23.8Mt CO_2, nearly half of Unilever's total estimated supply chain emissions, come from its Indonesian palm oil supply chain.[26] Point Carbon predicts carbon trading prices under Phase II of the Kyoto Protocol (2008–2012) will average €30 per tonne of CO_2.[27] Were Unilever to offset the emissions associated with its palm oil supply, it would be liable for €714m annually (see 'Box two: Tropical peatland carbon budgets' for methodology). That equates to nearly 14% of company profit for 2007.[28]

As a spur to meaningful action, this report seeks to quantify in a meaningful way the heavy carbon footprint and other supply chain risks linked to groups producing palm oil in Indonesia.

'We are combining our LifeCycle Analysis process with our marketing process to create a tool called Brand Imprint.'
Unilever CEO Patrick Cescau, 2006



Emissions associated with use of crude oil and production of crude palm oil (CPO) from peatland development

Palm oil produced on peat with a depth of 3 metres carries a carbon burden more than twenty times the emissions linked to crude oil

Source: Greenhouse gas protocol initiative (2008) and Germer and Sauerborn (2007)

SECTION ONE:
UNILEVER RECOGNISING THE BRAND RISKS OF GROWTH IN THE PALM OIL SECTOR

Unilever's 'billion € brand' exposure to palm oil risk

- **Palm oil confirmed**
  - Heartbrand – Wall's & Algida 18%
  - Knorr 18%
  - Dove 13%
  - Dirt is Good – Omo & Persil 13%
  - Rama/Blue Band/Country Crock 6%
  - Lux 4%
  - Surf 4%
  - Becel/Flora/Promise 4%
  - **Unknown if palm oil used**
    - Sunsilk – Seda, Sedal 4%
    - Hellman's/Calvé 6%
    - Rexona – Sure, Degree 4%
    - **No palm oil**
    - Lipton 6%

Piechart shows percentage of turnover for the billion € brands.

Source: Banc of America Securities LLC (BAS) (2007) and Greenpeace research

- **Unilever is the world's largest consumer of palm oil – 1.3Mt, some 3% of global production.**
- **Unilever's main growth is in 'Home and Personal Care' products and Unilever is leading the market expansion in these sectors.**
- **Leading Unilever brand platforms such as Dove, Dirt is Good, and Knorr contain palm oil and are leading corporate growth.**
- **Unilever is leading expansion with these brands into new global markets including India, China and Indonesia, and is driving expansion of demand for products containing palm oil.**
- **This business-as-usual growth strategy is having a two-fold impact: an expanding palm oil sector, and more power to largely privately-controlled conglomerates whose multiple commodity interests largely rely on deforestation.**

UNILEVER IS THE WORLD'S LARGEST CONSUMER OF PALM OIL

Unilever is the largest consumer of palm oil products in the world, using 1.3Mt every year for food and industrial purposes,[29] some 3% of global production. About half of this comes from Indonesia.[30]

Unilever's revenue and reputation are concentrated in 12 'billion € brands'.[31]

The largest of Unilever's 12 'billion € brands' are exposed to carbon liability and collateral risks associated with palm oil production. Brands and brand platforms[32] with key products that contain palm oil or its derivatives include:

- **€4 billion:** ***Knorr*** **and** ***HeartBrand (Walls)***
- **€3 billion:** ***Dirt is Good (Persil, Omo, Surf Excel)*** **and** ***Dove***
- **€1.3 billion:** ***Rama/Blue Band/Country Crock***
- **€1 billion:** ***HealthyHeart (Flora/Becel/Promise)***
- **€1 billion:** ***Sunsilk***
- **€1 billion:** ***Lux***

LEADING UNILEVER HOME AND PERSONAL CARE BRAND PLATFORMS ARE LEADING CORPORATE GROWTH

While Unilever is thought of as a food company, nearly half of its sales[33] are Home and Personal Care products – notably *Dove* and the emerging brand platform *Dirt is Good* (*Omo*, *Persil*, *Surf Excel*) – and these categories are seen as growth drivers within the group. It is a global leader in deodorants and skincare, and the world's Number 2 in hair care,[34] and 'sells more laundry washes than any other company in the world'.[35]

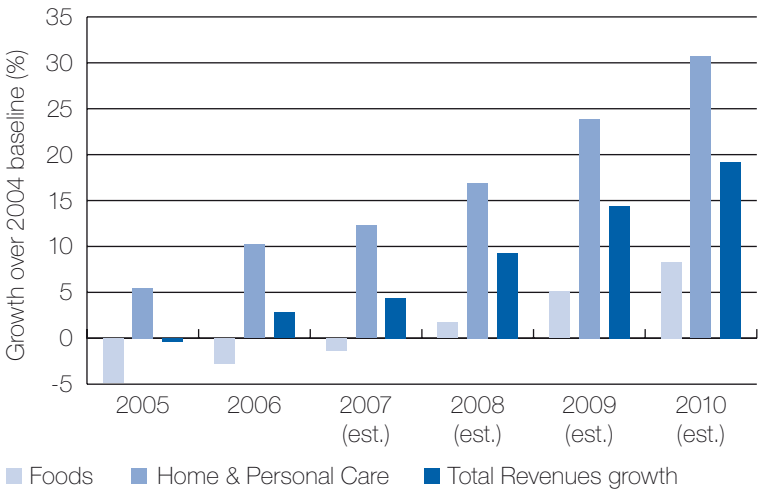
According to a December 2007 Bank of America Equity Research report:[36] 'In 2006, Personal Care contributed approximately 50% of overall growth. […] As a result, Unilever is growing faster than the market and faster than its competitors.'[37] 'Globally-inspired branded communications'[38] are said to have driven this, with *Dove* singled out for attention. *Dove* has nearly doubled its global sales share from 2002 to 2006,[39] and the brand 'has trickle down effects on the growth rates in all other businesses where *Dove* competes'.[40]

Home Care is 'the fastest-growing category within Unilever'.[41] Within this €7.2 billion category, the *Dirt is Good* brand is valued at €3 billion.[42]

What does this mean? That Unilever's main growth is in Home and Personal Care products. And Unilever is leading the market expansion in these sectors.

Dove and *Dirt is Good*, as well as other leading Unilever Home and Personal Care brand platforms use oleochemicals derived from palm oil, so it follows that Unilever's use of these derivatives is expanding in line with the brands' market shares.

'It is our big global brands that offer the greatest growth and profit potential and which therefore attract the lion's share of our resources.'
Unilever Chief Financial Officer Jim Lawrence, 2008



Unilever % growth sales forecasts over 2004 baseline: Food vs Home and Personal Care (2004–2010)

Source: Banc of America Securities LLC (BAS) (2007)

'We share the same concerns as everyone else about the expansion of palm oil production… The problem is simply that demand of [sic] palm oil has exploded. This is due partly to growing demand from India and China.'
Unilever (2008) 'Sustainable palm oil', faxed statement to Greenpeace, 21 April 2007

'Consumer spending is growing faster in [developing and emerging] markets than in developed markets. Over the next ten years, around one billion new consumers will emerge with disposable incomes commensurate with developed world lifestyles and consumption patterns. And the good news is that increasing disposable income leads to disproportionate growth in per capita consumption for Unilever products.'
Unilever Chief Financial Officer Jim Lawrence, 2008

UNILEVER IS LEADING EXPANSION WITH HOME AND PERSONAL CARE BRANDS INTO NEW GLOBAL MARKETS INCLUDING INDIA AND CHINA

The biggest growth region for demand for surfactants globally is in Asia Pacific (principally China) – over three times the growth expected for the EU or the USA.[43]

Unilever's incursion into developing and emerging markets (so-called D&E) is dramatic. As a proportion of revenue, these markets have risen from 36% of sales in 2004 to 44% in 2007, [44] and by 2010 could represent more than half of company revenue.[45] As Unilever's Chief Financial Officer told the Consumer Analyst Group of New York in February 2008: 'Not surprisingly, our D&E businesses are a major driver of our top-line growth. They grew by 10% in 2007. And it is profitable growth.' [46]

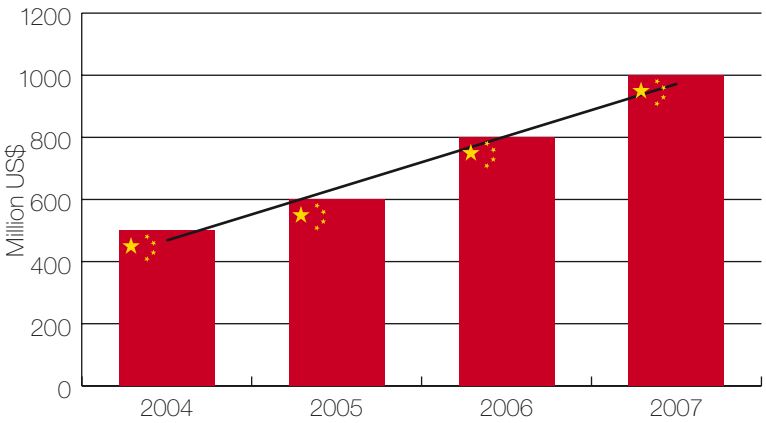
In China, for instance, Unilever has doubled the size of its business in just three years, from $500m in 2004 to $1 billion in 2007. [47] Bank of America estimates between 25 and 30% growth in 2007 alone and predicts 25+% in 2008.[48] This success is in part attributed to 'the recent *Knorr* bouillon cube launch'. [49] *Lux* is also making a notable entry into China's market, recently seeing a 60% growth in sales taking it to 8% of the market share for body washes.[50] Both of these brands include products that contain palm oil derivatives.[51]

For Unilever, its penetration of the Chinese market represents 'still a long way to go, when you consider the $3 billion sales of our India business, or even our $1.5 billion of sales in Indonesia. But we are confident that we are building a secure future in this vitally important market.' [52]

In India, Unilever boasts 'unrivalled scale': 'We have strong share positions in most if not all of our categories and an unrivalled depth of distribution.' [53] According to Bank of America, 'India is a big market, growing approximately 10% per year and has the best shares of any market we track… The biggest opportunity we see for Unilever in India is rising disposable incomes. Unilever already has significant shares, so as sales [in Home and Personal Care Products such as skin care, bath and shower products, dishwashing and laundry products] grow, Unilever should benefit disproportionately.' [54] Unilever currently claims 55% of the market share for face care products in India,[55] and sees India as 'a big laundry market where Unilever has clear leadership'.[56]

Unilever projected sales growth in China (2004–2007)

Unilever has doubled the size of its business in China in just three years.

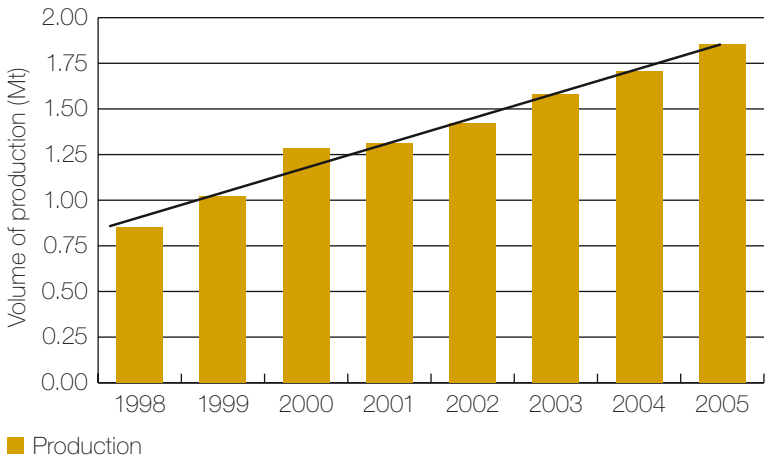


Source: Banc of America Securities LLC (BAS) (2007)

Unilever itself identifies the central role of Home and Personal Care products in emerging markets, 'where we can build on leadership positions, for example in Laundry, while bringing the very best of Unilever's brands and products to new customers'.[57] India, China and Indonesia are singled out as key opportunities for growth in both detergents and shampoo.[58]

While Unilever is the biggest 'staples' player in developing and emerging markets including Brazil, Russia, India and China (the key BRIC countries that are leading expansion globally in resource consumption), its competitors include Procter & Gamble, Avon and Colgate. [59]

This business-as-usual growth strategy carries a two-fold risk: dependence on an expanding palm oil sector in Indonesia, and consequently dependence on empires of largely privately-controlled conglomerates whose multiple commodity interests are financially dependent on deforestation. This spells significant supply chain liability, including substantial carbon, biodiversity and governance risks.

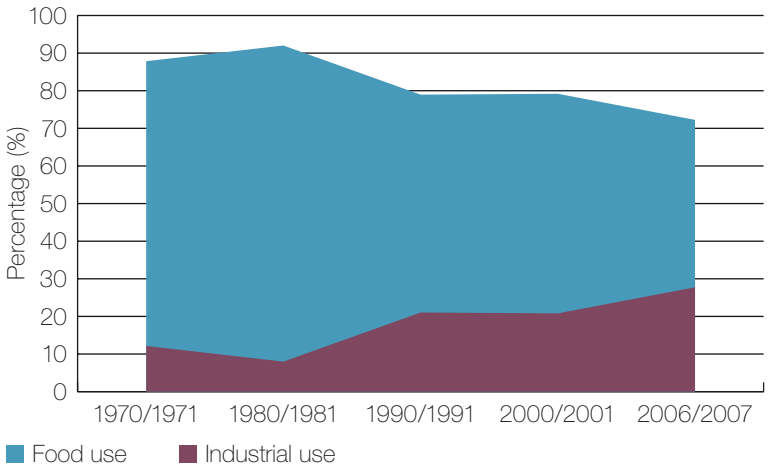


Growth in oleochemical production in Malaysia (1998–2005)

Source: Malaysia Palm Oil Board (2006)

Food and industrial share of palm oil use – CPO and PKO (1970–2007)

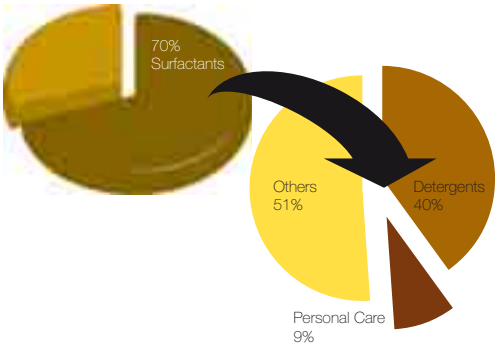
The growth in oleochemical sectors has decreased the proportion of global palm oil used in the food sector



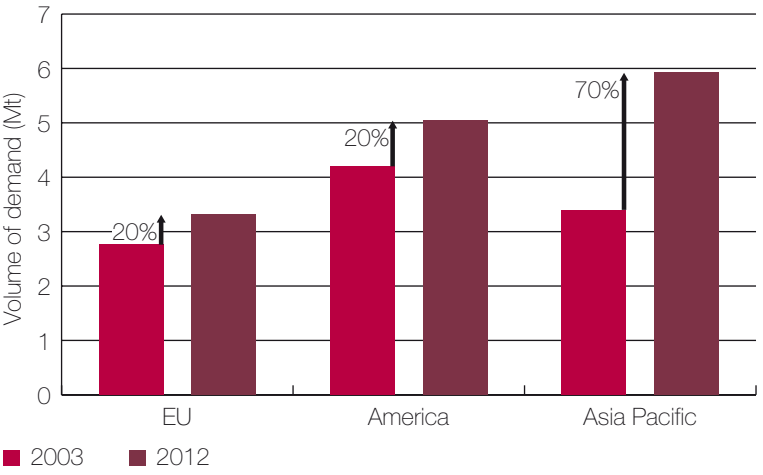
Source: USDA (2008)

Forecast for global surfactant demand growth (2003 and 2012)

Some 70% of oleochemical use is in surfactants. Currently, half of all surfactants, including oleochemicals, are used in the growing markets for personal care and detergents.



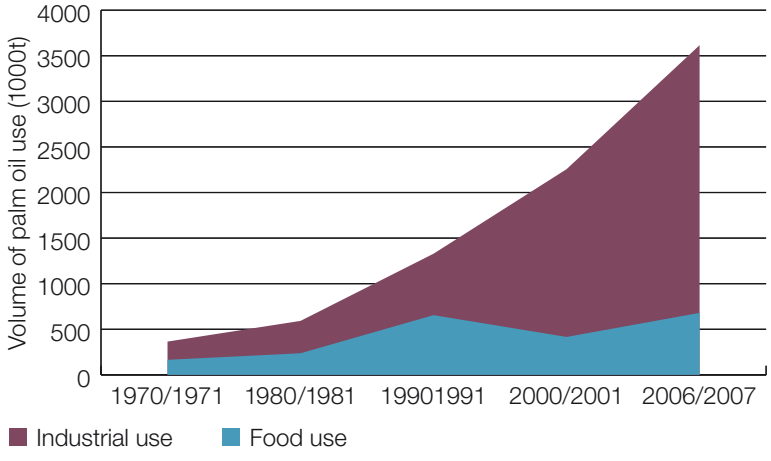
Source: Malaysia Palm Oil Board (2006)



Source: Malaysia Palm Oil Board (2006)

Food and industrial share of palm oil use – PKO only (1970–2007)

PKO is increasingly used for industrial purposes



Source: USDA (2008)

WHAT IS DRIVING EXPANSION OF THE OIL PALM SECTOR?

Unilever has warned that increased demand for biofuels is driving 'macro-level' expansion in the oil palm industry.[60]

This critique applies equally to other new or expanding uses for palm oil, of which the Home and Personal Care sector is a key driver.

Roughly 500,000 tonnes[61] of Unilever's annual palm oil use is palm oil based oleochemicals for non-food uses.

According to a 2005 United States Department of Agriculture (USDA) report, demand for oleochemicals has been a key driver of palm oil expansion.[62] Some 70% of oleochemical use is in surfactants. Currently, half of all surfactants, including oleochemicals, are used in the growing markets for personal care and detergents – ie in products such as *Dove* soap or *Omo* laundry detergent.[63]

Companies involved in CPO production also produce palm kernel oil (PKO) from the oil palm fruit bunches. PKO is the largest feedstock for oleochemical production.[64] The production of 1 tonne of PKO takes about eight times the land area of CPO, leaving a markedly larger footprint, particularly as market demand for these chemicals increases as a proportion of overall production.

In early 2008, PKO was 20% more expensive than CPO,[65] indicating high market demand. In this way, in addition to the growing global food and bioenergy demand for palm oil, growing global demand for oleochemicals derived from palm oil represent a major driver of plantation expansion.

Consequently, the impact of its expansion into developing and emerging markets and its growing demand for industrial palm oil derivatives such as oleochemicals must be viewed at the 'macro level' – ie in terms of its overall environmental impact, not just at a concession level.

Thus, meeting Unilever's total annual demand for CPO of 800,000 tonnes would require 220,000ha of oil palm plantation at average Indonesian production rates.[66] By contrast, meeting Unilever's total annual demand for 500,000 tonnes of oleochemical from PKO would require around 1 million ha.[67]

This shows that, in reality, Unilever's consumption of oleochemicals from PKO is likely to have a much bigger effect, in terms of its carbon footprint, than its consumption of palm oil for food use.[68]

'The real sustainability issue… is that it leads to a (macro-) expansion of feedstock production. Certification [at micro-production level] will not change the fact that for each ton of oil that is made unavailable for traditional users, an additional ton of oil needs to be grown elsewhere. The rush for land use [through new oil demand] will increase pressure on ecosystems and biodiversity… Deforestation, particularly in the case of palm oil and soybeans, could lead to the devastation of the last remaining rainforests in Borneo and the Amazon region.'

Unilever's contribution to Review of EU Biofuels Directive Public Consultation Exercise, April–July 2006

SECTION TWO:
INDONESIAN PALM OIL SUPPLIERS CARRY HUGE LIABILITIES

- **Unilever's revenue and reputation are concentrated in 12 'billion € brands'. Through use of palm oil products, many of these are exposed to carbon liability and collateral risks associated with palm oil suppliers in Indonesia.**

  - Carbon liability – Degradation of Indonesia's peatlands by the palm oil sector is responsible for 1% of annual global GHG emissions. Unilever's share of Indonesian oil palm plantation peatland emissions could account for 23.8Mt, nearly half of Unilever's total estimated supply chain emissions. Were Unilever to seek to offset these emissions, at predicted carbon trading prices of €30 per tonne of CO_2, Unilever would be liable for €714m annually.

  - Species extinction – Unilever suppliers are rapidly deforesting and clearing orang-utan habitat, helping drive the species towards extinction.

  - Poor governance – Unilever suppliers are illegally clearing peatlands with depth over 2 metres, with fire hotspots on concessions prevalent, although use of fire for clearance is illegal.

- **The Roundtable on Sustainable Palm Oil (RSPO) has failed to bring Indonesian palm oil traders and producers under control.**

- **Greenpeace analysis and field investigations show risks associated with Unilever's Indonesian palm oil supply chain:**

  - Carbon liability – were Unilever to seek to offset the emissions associated with peatland palm oil production, CPO from certain of its suppliers could carry a financial premium of €2400/tonne, or more than 400% of the cost of the palm oil itself.

  - Species extinction – between 2005 and 2007, Greenpeace has evidence of scores of orang-utan relocations from Central Kalimantan concessions now controlled by Unilever suppliers.

  - Lack of governance – one Unilever supplier has been draining peatlands that are over 8 metres deep; peatlands over 2 metres depth are legally protected.

'We have a number of large global brands, including 12 with an annual turnover greater than €1 billion, which often depend on global or regional development and supply chains. Any adverse event affecting consumer confidence or continuity of supply of such a brand could have an impact in many markets. The carrying value of intangible assets associated with our brands is significant, and depends on the future success of those brands. There remains a risk that events affecting one or more of our global brands could potentially impair the value of those brands.'
Unilever Annual Report 2007

'How much sustainable palm oil actually is there in the world at the moment?'
'Today there is pretty well nothing.'
Gavin Neath, Unilever, April 2008

BRAND RISK FROM INDONESIAN PALM OIL SUPPLY CHAINS

CARBON LIABILITY: Riau – Home to 25% of Indonesia's current oil palm plantations and 40% of Indonesia's peatland carbon stores. 40% of Riau's oil palm plantations are on peat. Unilever suppliers are expanding on to peat swamp forests, causing massive emissions of GHG as peat is drained and burned. Papua is home to Indonesia's largest remaining area of intact primary forest, where Unilever suppliers are grabbing vast areas of forest.

SPECIES EXTINCTION: Kalimantan – The Indonesian portion of the island of Borneo, home to most of the world's endangered orang-utans. Unilever suppliers are expanding into remaining orang-utan forest habitat.

POOR GOVERNANCE: Indonesia – Unilever suppliers are linked to illegal burning, land grabbing, social conflict and illegal clearance of peatland with depth greater than 2 metres.

THE FAILURE OF THE RSPO TO PREVENT EXPANSION

The RSPO is a powerful coalition of major multi-nationals

The RSPO initiative accounts for an estimated 40% of global palm oil production.[68] Corporate members include global food giants such as Cadbury's, Nestlé and Tesco, and global agricultural commodity traders including Cargill and ADM, as well as many palm oil producers.[69]

The RSPO does not prohibit groups from being involved in forest conversion and does not segregate sustainable sources of palm oil from unsustainable ones

While the stated aim of the RSPO is to develop a global definition of sustainable palm oil production and better management practices, the organisation's impact on the ground in terms of halting industry expansion into rainforest and peatlands has been negligible. At present the RSPO scheme does not prohibit palm oil producers from being involved in forest conversion and has no assessment of, or limits on, GHG emissions from the development of oil palm plantations. Furthermore, it has no system to segregate palm oil that meets RSPO criteria from palm oil coming from deforestation. Thus, even among the RSPO's own members, 'unsustainable' oil continues to dominate the market.[70]

Many oil palm producers who are RSPO-members are aggressively expanding into critical forest habitat, and palm oil is sold unsegregated on the world market. Unilever's RSPO palm oil suppliers include ADM-Kuok-Wilmar, Asian Agri, Cargill, Duta Palma, IOI, Musim Mas, Sime Darby and Sinar Mas. These are some of the biggest companies in the market and are leading expansion of palm oil production.

The palm oil supply chain offers no traceability

These companies have control over much of the palm oil supply chain within Indonesia. The traders are also processors, blending palm oil which originates from deforestation, critical habitat and peatland destruction through their refineries and biofuel facilities. Consequently, as a major food retailer told Greenpeace, efforts towards sustainability of palm oil are hampered because 'the global palm oil industry is unable at present to provide anyone with evidence of traceability beyond processor to plantation level'. Therefore palm oil consumer companies, such as Unilever, have no way of knowing whether or not the palm oil they are using is from rainforest destruction and conversion of peatlands. However, the impacts of the sector are well-known.

RSPO criteria do not address GHG emissions from deforestation and peatland degradation

By failing to ensure RSPO principles and criteria are applicable to traders and producers at group level, Unilever has failed to bring the rapidly expanding palm oil sector under control. Further, the RSPO criteria do not address the GHG emissions linked to deforestation and peatland degradation. Consequently, as it stands, Unilever suppliers are driving climate change through the significant GHG emissions linked to deforestation and peatland destruction, species extinction, and land conflict with forest-dependent communities.

RSPO
Roundtable on Sustainable Palm Oil

'We are the leaders in the search for solutions to achieving sustainable palm oil. We chair the Roundtable on Sustainable Palm Oil… It is essential that all those involved sign up to agreed criteria to make sustainability work on the ground – but this is not an easy process and is taking longer than we would all like. Nevertheless, we remain absolutely committed to finding a solution.'
Unilever (2008) 'Sustainable palm oil', faxed statement to Greenpeace, 21 April 2008

'The majority of the GHG emissions associated with our products occur in our supply chains.'
Unilever's response to Carbon Disclosure Project questionnaire, 2005

INDONESIA PALM OIL SUPPLY CHAIN RISKS

SPELLING OUT THE RISKS

Unilever brands are exposed to colossal carbon liability and collateral risks through the palm oil supply chain, which is heavily implicated in deforestation and peatland conversion. The risks are manifold:

Carbon liability risks (quantifiable and unquantifiable)

- carbon debt linked to upfront and long-term GHG emissions from peatland conversion and degradation
- carbon debt linked to the GHG emissions from forest clearance
- raw material supply vulnerability linked to El Niño drought cycles, changes in climate patterns, the susceptibility of degraded peatland to fire, the vulnerability of converted peatland to soil exhaustion rendering it unproductive as agricultural land
- liability for health and economic impact of haze resulting from fire

Collateral risk of species extinction (quantifiable and unquantifiable)

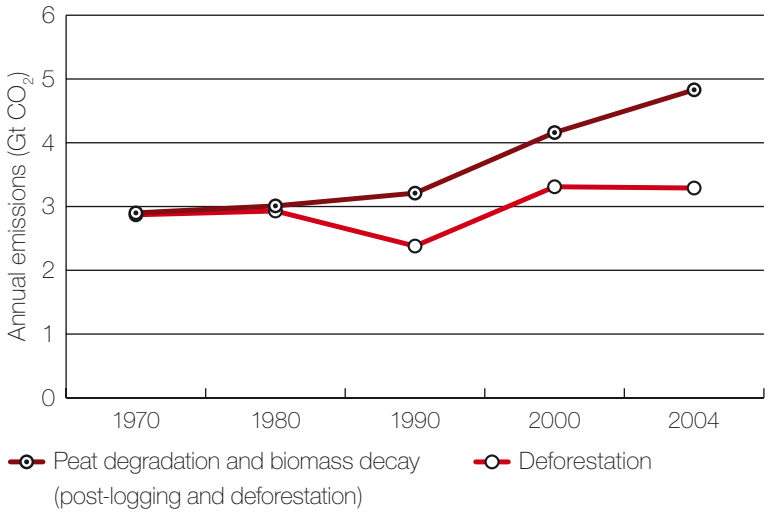
- risk of species extinction

Collateral risk of poor governance (quantifiable and unquantifiable)

- lack of community participation in land use planning leads to land grabbing
- illegal granting of concessions on protected peatlands
- illegal forest fires associated with land clearance
- social conflict resulting from land grabbing

Annual CO_2 emissions from peat degradation, biomass decay and deforestation (1970–2004)

Indonesia is the 3rd largest GHG emitter, after China and the USA. The vast majority originates from the degradation of its peatlands, accounting for 4% of global GHG emissions.



Source: IPCC (2007)

CARBON LIABILITY RISKS

With the palm oil sector, corporate end-users cannot have it both ways: indiscriminate supply chains are incompatible with low carbon liability including insulation from collateral risks associated with deforestation and peatland degradation such as species extinction and poor governance.

Over the coming decades, palm oil is predicted to be the fastest-growing vegetable oil with Indonesia the preferred destination for production. Demand for palm oil is predicted to more than double by 2030 compared to 2000, and to triple by 2050.[71]

To meet this demand, all major producers in Indonesia, including Unilever suppliers, are expanding.[72] According to one Unilever supplier, a Malaysian government-owned palm oil producer: 'Indonesia is the preferred destination for many Malaysian plantation companies to increase their plantation size as much of the most sought-after and fertile plantation land in Malaysia is already planted.'[73]

As Unilever admits, Indonesian oil palm expansion involves 'the reduction in carbon stocks through land use change'[74] through expansion directly or indirectly into forests and peatlands. A 2007 United Nations Environment Program (UNEP) report recognises that oil palm plantations are now the leading cause of rainforest destruction in Indonesia.[75] Between 1991 and 2006, almost 5 million ha of new oil palm concession areas have been established in Indonesia alone,[76] equivalent to over 50 football pitches an hour. Much of this area was previously forest or peatland. The Indonesian Palm Oil Research Institute (IOPRI) estimates that two-thirds of all currently productive oil palm plantations involved deforestation.[77]

In 2006, there were around 6 million ha planted with oil palms in Indonesia.[78] Wetlands International estimates that by 2006 there were 2.8 million ha of degraded peatlands within oil palm concession areas.[79] Average annual degradation emissions from these peatlands represent at least 476Mt CO_2[80] – equivalent to 1% of global emissions.[81]

More expansion of oil palm plantation area – particularly into peatlands and forests – means more GHG emissions linked to palm oil suppliers.

This is not the only serious risk associated with Indonesian palm oil suppliers.

'Our view about risks and opportunities arising from climate change is influenced first by the assumption that external changes can be significant but are unlikely to be cataclysmic on a broad scale… Structural changes in climate patterns could significantly impact our supply chains. Over 2/3rds of our raw materials come from agriculture, forestry and plantations… In terms of our supply chains,] the most important business judgement in these circumstances is to be ready to respond to the new circumstances, but to make the adaptations at the right time: not too far ahead of consumers or suppliers.'
Unilever's response to Carbon Disclosure Project questionnaire, 2005

COLLATERAL RISK OF SPECIES EXTINCTION

From a wildlife perspective, Indonesia's remaining rainforests are critical habitat for endangered species such as orang-utan, gibbon, sun bear, and the Sumatran tiger.[82] Covering virtually all of the island of Borneo as recently as 1950, Bornean orang-utan habitat has shrunk dramatically in recent decades and is set to virtually disappear within the next decade. Greenpeace has documented the destruction of orang-utan habitat on concessions controlled by Unilever suppliers,[83] and has evidence of scores of orang-utans being relocated from concessions controlled by Unilever suppliers.[84]

COLLATERAL RISK OF POOR GOVERNANCE

Oil palm plantation expansion takes place with little oversight from central or local government. Procedures for environmental impact assessment, land-use planning and ensuring a proper process for development of concessions are neglected.[85]

Many new plantations are located on peat that should be off-limits to development or degradation according to Indonesian law.[86] This stipulates that land should not be allocated for oil palm plantations on peat soils deeper than 2 metres; in addition, activities that damage upstream natural swamp forests with deep peat (more than 3 metres) are prohibited.[87] In other words, palm oil development on such peatlands is illegal. Greenpeace has documented such clearance on concessions controlled by Unilever suppliers.[88]

The use of fire in Indonesia for forest clearance is the largest single source of GHG emissions in the world.[89] The practice has been illegal in Indonesia since 1999,[90] yet is still commonly used to clear land under development for oil palm plantations. Greenpeace has identified thousands of fire hotspots (areas visible on satellite images used to monitor fires) on concessions controlled by Unilever suppliers during the period 2006–2007.[91]

Social conflict, including land rights and resource conflicts, is often associated with oil palm plantation expansion.[92] Greenpeace has evidence of such conflicts resulting from the establishment of concessions belonging to Unilever suppliers.[93]

INDONESIAN PALM OIL SUPPLIERS REPRESENT AN UNQUANTIFIED RISK TO BRAND IMPRINT

Unilever acknowledges that it is unable to identify 20% of its palm oil supplies. Of the remaining 80%, it knows the group supplying the palm oil.[94] By maintaining a business-as-usual relationship with the industry, Unilever is leaving its brands exposed to manifold risks.

Palm oil producers with known links to Unilever include ADM-Kuok-Wilmar, Asian Agri, Astra Agro, Duta Palma, IOI, Musim Mas, Sime Darby and Sinar Mas.[95]

Many of the largest producers in Indonesia that supply Unilever directly are also traders. This means that a significant portion of the palm oil they sell may come from third parties as well as their own operations. In this way, the identity of groups heavily reliant on deforestation and peatland clearance in their palm oil operations is lot in the supply chain.

Another significant palm oil refiner and trader, [96] RSPO member,[97] and supplier to Unilever is the agricultural commodity giant Cargill. In 2006, it was the second largest privately-owned company in the world.[98] Cargill is a major plantation owner, trader, refiner and distributor of palm oil and palm oil products including biodiesel.[99]

TABLE ONE: SUMMARY OF IDENTIFIED RISKS OF GROUPS SUPPLYING PALM OIL TO UNILEVER

	Share of CPO production in Indonesia (2007)	Oil palm expansion on protected peatland in Indonesia (over 2m)**	Oil palm expansion on orang-utan habitat in Central Kalimantan**	Fire hotspots on oil palm concessions 2006–2007	Expanding into palm oil based biofuels	Expanding into palm oil based oleochemicals	Pulpwood concessions on protected pealands	Total projected carbon liability from group-level Riau operations (oil palm + pulpwood)	Equivalent national annual CO_2 emissions (2004)
Sinar Mas Group (including Sinar Mas oil palm and APP pulpwood operations)	10%	×	×	×	×	×	×	2,255Mt CO_2	India x 2
RGM Group (including Asian Agri oil palm and APRIL pulpwood operations)	9%	×	×	×	×	–	×	1,925Mt CO_2	Germany x 2
Wilmar	3.2%	×	×	×	×	×	–	131Mt CO_2	Portugal x 2
Duta Palma	0.9%*	×	–	×	×	–	–	126Mt CO_2	Belgium
Musim Mas	2%	×	×	×	×	×	–	69Mt CO_2	Portugal
Sime Darby	4.7%	×	–	×	×	×	–	47Mt CO_2	Switzerland
Astra Agro	5.5%	×	×	×	–	–	–	19Mt CO_2	⅛ Sweden
IOI	1.1%	×	×	×	×	×	–	–	–
Total	**36.4%**							**4,572Mt CO_2**	**EU25 + Canada**

* based on a minimum of 42,000ha of planted area and 3.75t of CPO per hectare per year

** cut off: 5km^2

'Unfortunately, not every palm developer operates responsibly. Forests have been logged (sometimes illegally) to make room for palm plantations. Destroying forests to plant palm is a net negative for trapping carbon and mitigating climate change.'
Cargill News 2007

'In Indonesia it is estimated that producing 1 tonne of palm oil on peatland will cause emissions of between 15 and 70 tonnes of CO_2 over the life cycle of 25 years as a result of forest conversion, peat decomposition and emission from fires associated with land clearance.'
J Rieley 'Life-cycle analysis of land use change on tropical peatlands' (2008)

Carbon stored within peatlands on Unilever suppliers' oil palm concession areas in Riau

KNORR'S TRADE LINKS WITH RSPO MEMBER CARGILL: A CASE STUDY IN EXPOSURE TO CARBON LIABILITY AND PRODUCER ILLEGALITY

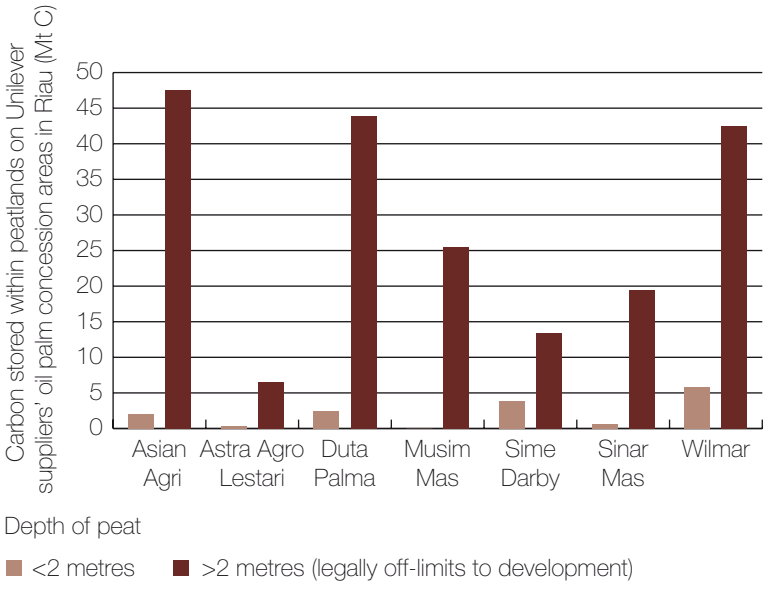
TRADING WITH COMPANIES BENEFITTING FROM LACK OF GOVERNANCE

Knorr's trade links with Cargill serve as an example of Unilever's exposure to carbon liability. Cargill itself acknowledges that some producers operate illegally, with a negative impact on the climate.[100]

Industry sources confirm that roughly half of the palm oil imported into Europe by Cargill comes from Indonesia.[101] According to export data for 2007, Cargill's Singapore trading arm exported palm oil from 15 different oil palm concession holders in Indonesia.[102] These include some of the largest palm oil producers in Indonesia.[103]

Greenpeace has traced palm oil from a Cargill refinery in Europe to *Knorr*, one of Unilever's high profile brands. Cargill is also one of Unilever's European suppliers of palm oil for ice cream.[104]

If *Knorr* were to incorporate carbon liability for peatland conversion into its brand LifeCycle analyses, it would pay a heavy price premium to offset emissions linked to palm oil from traders such as Cargill (see diagram).



Source: Greenpeace analysis

KNORR IS UNILEVER'S BIGGEST BRAND

Unilever's food processing plant in Poznan, Poland – the main production facility for Knorr brand products, which are exported all over the world, including Germany, the UK, Sweden, Belgium, The Netherlands, Russia, and the USA.[123] The facility uses palm oil in over 150 different products, mainly dehydrated food products like instant soup.[124]

Every week, Unilever in Rotterdam places an order for about 100 tonnes of refined palm oil with Cargill.[125]

Cargill has European refineries in Hamburg and Rotterdam.

In 2006 and 2007, almost 60% of Cargill's palm oil exports through the port of Dumai in Riau were destined for Cargill facilities in Europe (The Netherlands, Germany and Italy).

Nearly 80% of this came from just 6 companies: Asian Agri, Astra Agro, Duta Palma, Musim Mas, Sinar Mas, Wilmar – some of Indonesia's largest palm oil producers.

All these companies have oil palm concessions on peatlands in Riau.

BOX TWO: TROPICAL PEATLAND CARBON BUDGETS

PEATLAND CARBON STORE (UNDEGRADED)

PEAT BY NUMBERS

600 tonnes of carbon per hectare (equivalent to 2,200 tonnes CO_2) per metre depth of peat

Calculation for peatland carbon store within a given area.[108]

ANNUAL INDONESIAN PEATLAND CARBON LOSS THROUGH CONVERSION AND FIRES

1.8Gt CO_2 annual emissions nationally on degraded peatlands

Average gross annual emissions in Indonesia from peatland degradation and peatland fire,[109] equivalent to 4% of total GHG emissions.[110] Fires account for about 70% of Indonesia's annual emissions from peatland.[111] Degraded peatlands in Indonesia cover 10 million ha, less than 0.1% of the world's land surface.[112]

ANNUAL OIL PALM PLANTATION SECTOR PEATLAND CARBON LOSS

476Mt CO_2 annual emissions nationally on degraded peatlands within oil palm concessions

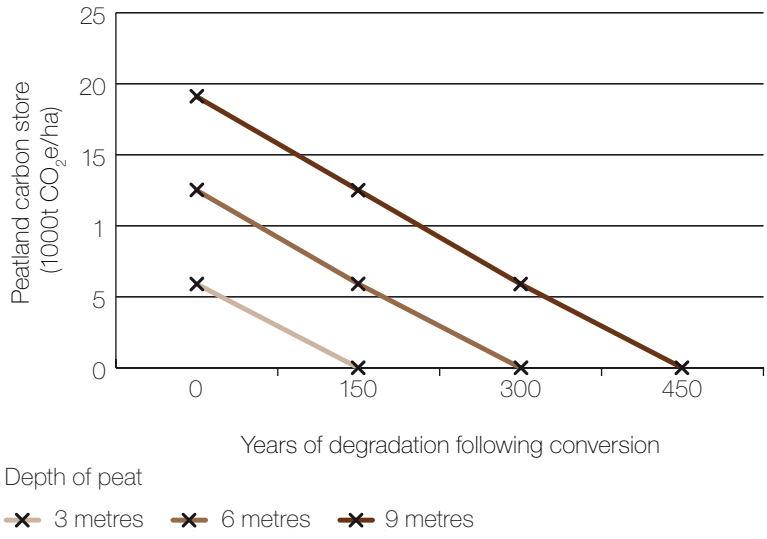
Average net annual carbon loss within Indonesia from conversion of the 2.8 million ha of forest on peatland within oil palm plantations (accounts for deforestation, drainage, peatland degradation and emissions associated with fire for land clearance as well as carbon fixation through plantation development).[113]

170 tonnes CO_2 annual emissions per hectare

Average net annual carbon loss through conversion of forest on peatland to oil palm plantation in the first 25 years (accounts for deforestation, drainage, peatland degradation and emissions associated with fire for land clearance as well as carbon fixation through plantation development).[114]

GHG emissions commitment period and carbon loss through development of deep peat

Three metres of peat stores 1,800 tonnes of carbon per hectare (equivalent to 6552 tonnes of CO_2). Palm oil development commits the majority of this carbon to degradation over a 150 year timeframe.



Source: Germer and Sauerborn (2007)

LONG-TERM CARBON DEBT

1,632 tonnes CO_2 equivalent emissions per hectare per metre depth of peat

PROJECTED PEATLAND EMISSIONS THROUGH OIL PALM DEVELOPMENT

Gross projected emissions through peatland degradation per hectare (ie GHG emissions to which oil palm development commits the land, hereafter expressed as CO_2).

Peatlands have varying depths of peat. The depth of peat on which the plantation is established determines the gross CO_2 emissions from degradation. Excluding the impacts from fire, converted peatland degrades at the rate of 0.5 metres depth every 25 years, losing 816 tonnes CO_2 per hectare over that period for oil palm plantations.[115] Degradation continues to deeper depths over time. Long-term carbon debt amounts to 1,632 tonnes CO_2 per metre depth of peat.[116]

These figures exclude the considerable emissions associated with forest clearance including emissions from fire used for forest clearance.[117] They exclude the relatively minor loss of carbon sequestration services (peatlands can act as carbon sinks as well as stores)[118] and carbon fixation in oil palm plantation biomass.[119]

74 tonnes CPO per hectare

CRUDE PALM OIL YIELD

Indonesian national average palm oil yield per hectare over 25-year economic lifecycle.

Average Indonesian oil palm harvest yields 3.7 tonnes of CPO per hectare.[120] Oil palms take about 5 years to mature, giving a 20-year productive period out of the 25-year economic life of a plantation.[121]

22 tonnes CO_2 emissions per metre depth of peat

PROJECTED CARBON DEBT EXPRESSED PER TONNE OF PALM OIL

Gross projected carbon debt per tonne of palm oil produced on peatland (1,632 tonnes CO_2/ha divided by 74 tonnes CPO/ha multiplied by depth of peat)

For example, every tonne of CPO produced on peatland with an average depth of 3 metres thus carries a mean embedded carbon debt of 66 tonnes CO_2 over 150 years.

€30 per tonne CO_2 emissions

FINANCIAL IMPLICATIONS OF CONVERSION

Carbon offset prices predicted by Point Carbon under Phase II of the Kyoto Protocol (2008–2012)[122]

€580 per tonne of CPO

Average 2007 market price of CPO per tonne[123]

€660 per metre depth of peat

Gross potential financial liability (notional cost premium for carbon offset) per tonne of CPO at predicted carbon prices (22 tonnes CO_2 multiplied by €30).

For example, gross potential financial liability (notional cost premium for carbon offset) per tonne of CPO from peatland of average 3 metre depth (22 tonnes CO_2 multiplied by 3 metres depth multiplied by €30): €1980/tonne.

These numbers are likely to be considerable underestimates, notably in terms of the speed at which the carbon will be lost as CO_2 emissions. Studies in press show much more rapid degradation through deep drainage, fire and peatland collapse in the initial stages of development. This supports our approach of looking at the gross projected carbon debt for an area.

'The moment that peatswamp forests are 'reclaimed' by drainage for agriculture, the clock starts ticking and it is only a matter of time before the peat is completely destroyed [through] subsidence, irreversible drying and oxidation – not to mention fire… Sustained agriculture on drained peat soils is thus a myth. […As one expert notes] "You end up with a complete wasteland, not suitable for anything including forestry".'
Howard Sargeant 'Vegetation fires in Sumatra, Indonesia. Oil palm agriculture in the wetlands of Sumatra: destruction or development?' (2001)

CARGILL'S MASSIVE CARBON DEBT PORTFOLIO: THE CASE OF DUTA PALMA

One of Cargill Europe's main suppliers in 2006 and 2007 was RSPO member[124] Duta Palma.

In 2006–2007, Duta Palma group subsidiaries in Riau[125] sold about 30% of their palm oil to Cargill and about 15% to ADM-Kuok-Wilmar – also a Unilever supplier.[126] The primary European port destination was Rotterdam, where both Cargill and ADM-Kuok-Wilmar have refineries. A small volume also went to Hamburg in Germany, where both Cargill and ADM have refineries.

Duta Palma is rapidly expanding its landbank and rapidly deforesting existing concession areas, some on legally-protected peatlands over 2 metres deep. Duta Palma is known to control 200,000ha in Indonesia,[127] of which 104,000ha are in Riau.[128] Since 2001, 7 out of Duta Palma's 12 Riau concessions have been or continue to be deforested.[129] Fire hotspots have been documented on all 12 concessions between 2005 and 2007.[130] The company is also expanding into biofuels.[131]

Maps compiled by Wetlands International, which form the basis for Riau's provincial government's current land-use plan, show 28,600ha of Duta Palma's concession area[132] is on peatland, of which 85% is on peatland marked as 2–4 metres deep.[133] These peatlands are legally off-limits to development or degradation according to Indonesian law.[134] The law stipulates that land should not be allocated for oil palm plantations on peat soils deeper than 2 metres; in addition, activities that damage upstream natural swamp forests with deep peat (more than 3 metres) are prohibited.[135]

Clearance, drainage and conversion of these peatlands results in significant GHG emissions.

Various authoritative studies seek to evaluate the emissions debt for oil palm development, often framing this within the first 25-year economic lifecycle of an oil plantation (see appendix for an example of this calculation).[136]

However, at the end of this 25-year period, the land may well be abandoned, leaving an ongoing emissions 'legacy' and large carbon liability. According to a joint UK Government – Indonesia Forestry Ministry report, 'it is only a matter of time before the peat is completely destroyed… you end up with a complete wasteland'.[137] Consequently, as a 2008 European Commission report acknowledges: 'Plantations are often abandoned [after one 25-year plantation cycle] because of soil exhaustion and new areas of forest are drained instead.'[138]

Ultimately, therefore, the carbon stored within these peatlands effectively represents a 'carbon debt' which has to be paid off over the 25-year life of the plantation – a financially unviable option. The generic figures used to calculate this forecast carbon debt are provided in 'Box two: Tropical peatland carbon budgets'. Applying them to Duta Palma, we see the following results:

DUTA PALMA
TOTAL PEATLAND CARBON STORE

170Mt of CO_2

Total peatland carbon store (expressed in CO_2 equivalence) within the concession area; some 95% of the carbon is in areas which are in theory legally off-limits to development because the peat is over 2 metres deep.[139] The area in question is tiny: 0.0006% of global land area[140] – less than half the size of the city of Jakarta.[141]

GROSS FORECAST CARBON DEBT INCLUDING THE CONTINUED DEGRADATION OF PEATLANDS AFTER PLANTATION DEVELOPMENT

126Mt of CO_2 emissions

In the case of Duta Palma, the gross forecast carbon debt associated with palm oil development on its peatland areas equates to more than twice the annual emissions for Sweden.[142]

€1790 per tonne of CPO to offset CO_2 emissions at projected carbon trading prices – a 310% premium

Assuming financial responsibility for offsetting the forecast carbon debt at predicted carbon trading prices within the first (and probably the only) economic lifecycle of the plantation, gives a 310% premium on top of current palm oil trading prices.

These estimates of Duta Palma's peatland carbon debt may be grossly conservative. In 2007, Greenpeace's measurement of peat depths by drilling and by visual observation of drainage canals showed that substantial areas of these concessions are on very deep peat – in places greater than 8 metres – suggesting that the carbon liability for palm oil production in this area is far greater.[143]

Duta Palma is not an exception. Significant carbon liability can be found within the operations of all the main producers in Riau, as well as peatland operations in Kalimantan – where the industry is currently expanding.

Over half of Indonesia's current oil palm production is concentrated in just two provinces in Sumatra. Riau province accounts for the greatest volume of production and export. A quarter of Indonesia's oil palm plantations are located in Riau – 1.4 million ha in 2005. A high percentage of these oil palm plantations are on peatland. Data from the Riau Plantation Service suggest that nearly 40% of oil palm concessions in Riau – planted and unplanted – are on peat.[144]

Despite grave levels of degradation, Riau has the largest remaining area of natural forest on peat in Sumatra,[145] making it attractive for plantation expansion. Local governments in Riau collectively have plans to expand oil palm plantations by 3 million ha.[146] Further, as shown by the operations of conglomerates such as Sinar Mas and RGM, oil palm is not the only industry impacting Riau's peatlands.

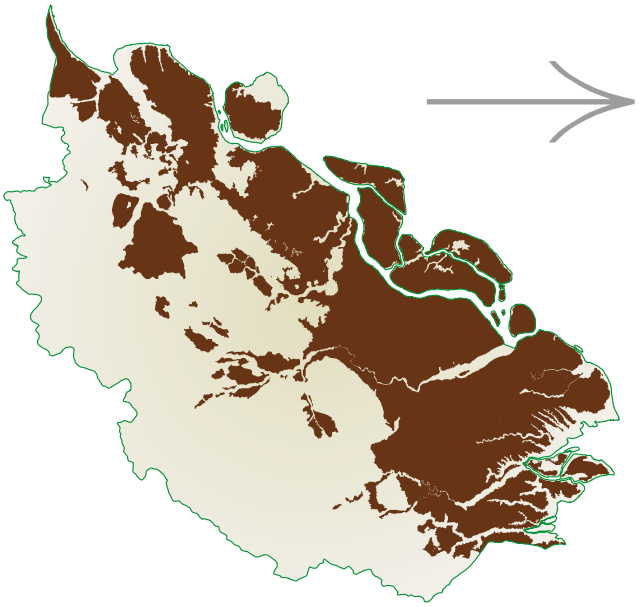
The 2007 draft provincial land-use plan shows that many hundreds of thousands of hectares of peatland have been designated for conversion. Most of these forests are on peat soils with depths of over 2 metres.[147]

This leads to other significant governance issues for the sector.

PEATLAND DISTRIBUTION IN RIAU: PROJECTED IMPACT OF 2006–2007 FIRE HOTSPOTS IN RELATION TO CURRENT OIL PALM CONCESSIONS

Peatlands
Fire hotspots
Oil palm concessions

These maps overlay several data sets: peatland distribution maps, oil palm concession boundaries based on 2006 work by Forest Watch Indonesia, and fire hotspots identified by NASA satellite imagery. The first map shows peatland distribution in Riau. The second map overlays this with 2006 – 2007 fire hotspot data. The third map overlays this with oil palm concessions, showing where they all overlap.



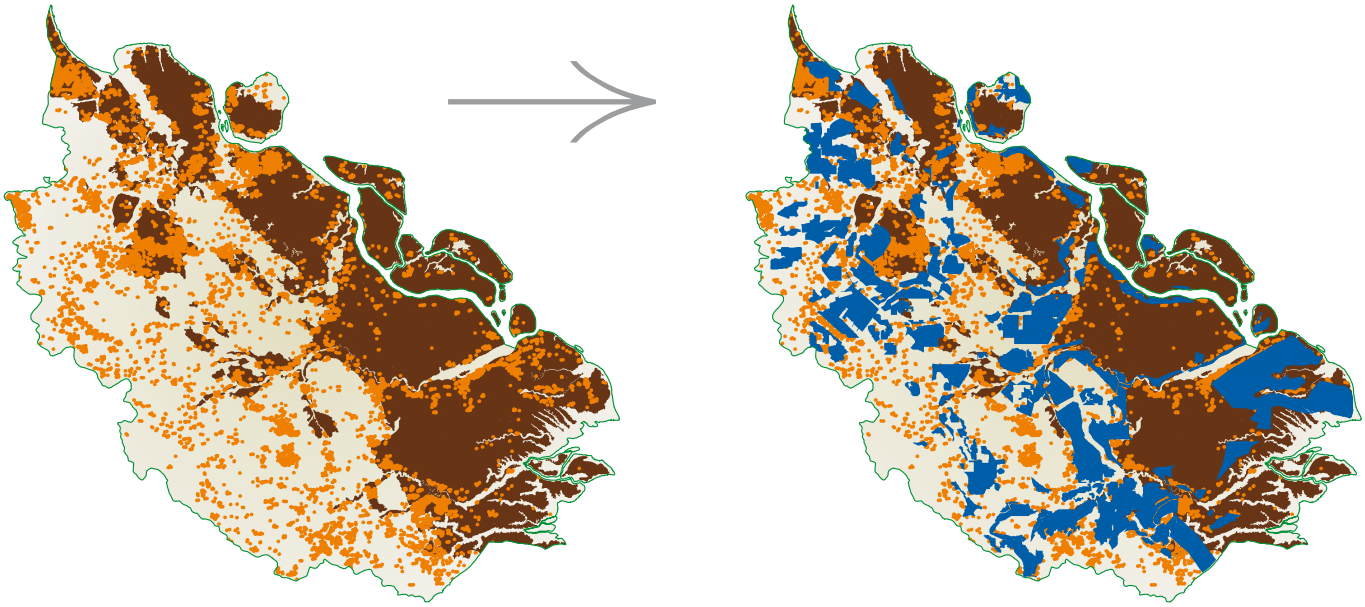
Riau 2005

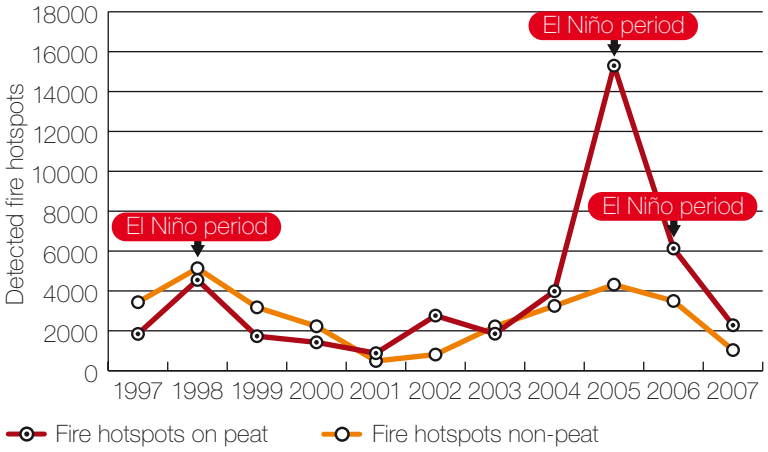
Fire hotspots

Through satellite monitoring, NASA registers incidents of fires globally on a daily basis – identifying the locations of 'fire hotspots' including forest and peatland fires.

While the practice of burning forest areas has been illegal in Indonesia since 1999,[148] in the subsequent decade large peat areas have been burned every year as deliberate use of fire for forest clearance continues unchecked. In the El Niño drought years of 2005–2006 alone, when dry conditions make fires more likely to spread uncontrollably, NASA recorded over 21,400 fires in peatland areas in Riau.[149] In 2005–2006, for instance, all of Cargill's known suppliers with Riau operations had fire hotspots on one or more of their concession areas. In 2007, all but one of Cargill's known suppliers had fire hotspots within concession areas, with Duta Palma holding the record with 1,020 hotspots in seven concessions.[150]

In 1997–1998, Indonesia witnessed an abnormally long, El Niño-influenced, dry season. Uncontrollable fires across millions of hectares of degraded peatlands and forest[151] released forest carbon equivalent to up to 40% of annual global CO_2 emissions from energy production from fossil fuels for the 1990s.[152] The practice of peatland conversion for agriculture degrades the peatland making it susceptible to fire. Together with El Niño drought conditions and other climatic changes as a result of a fire, this peatland development is setting up the conditions for a similar 'climate bomb', leading not only to massive GHG emissions, but also significant disruption to the palm oil supply chain.

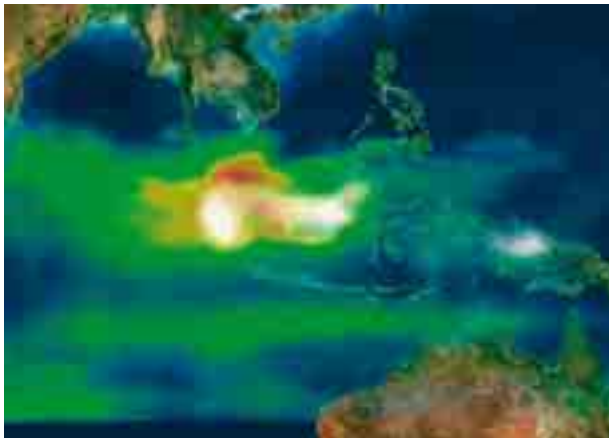




Source: Uryu et al (2008)

Fire hotpots detected on areas of peatlands in Riau (2006–2007)

In the El Niño drought years of 2005–2006 alone, when dry conditions made fires more likely to spread uncontrollably, NASA recorded over 21,400 fires in peatland areas in Riau.



1997 Haze

TABLE TWO: CLIMATE IMPACTS OF UNILEVER'S PALM OIL SUPPLIERS IN RIAU[153]

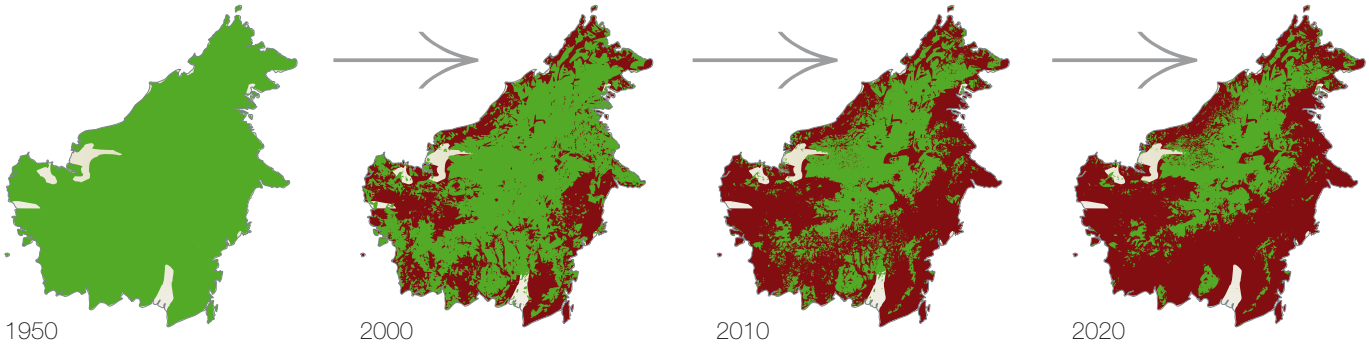
OIL PALM GROUPS	Asian Agri	Astra Agro	Duta Palma	Musim Mas	Sime Darby	Sinar Mas	Wilmar
Share of CPO production in Indonesia (2007)	9%	5.5%	0.9%*	2%	4.7%	10%	3.2%
IDENTIFIED OIL PALM CONCESSIONS IN RIAU							
Total number of oil palm concessions	8	6	12	1	3	12	5
Total area (ha)	108,000	77,000	104,000	31,000	70,070	109,000	51,000
OIL PALM CONCESSIONS ON PEATLAND AREAS							
Number of concessions on peatland	5	2	5	1	1	6	3
Actual area on peat (ha)	24,830	3,150	28,560	14,170	11,810	14,480	25,030
Number of concessions on deep peat >2m	3	1	4	1	1	2	3
Area of concessions on deep peat >2m (ha)	20,080	2,730	24,370	14,170	7,470	10,620	18,340
Number of concessions with deforestation on peatland (2000 to July 2007)**	2	1	4	1	1	0	2
Number of concessions with remaining forest on peatland in July 2007**	3	0	3	0	0	0	2
FIRE HOTSPOTS ON PEATLAND AREAS WITHIN OIL PALM CONCESSIONS (2006–2007)							
Number of fire hotspots and number of concessions with hotspots 2006	64 fire hotspots on 5 concessions	87 fire hotspots on 4 concessions	740 fire hotspots on 12 concessions	2 fire hotspots on 1 concession	45 fire hotspots on 2 concessions	17 fire hotspots on 2 concessions	68 fire hotspots on 3 concessions
Number of fire hotspots and number of concessions with hotspots 2007	47 fire hotspots on 4 concessions	4 fire hotspots on 3 concessions	1020 fire hotspots on 7 concessions	0 fire hotspots	8 fire hotspots on 1 concession	5 fire hotspots on 2 concessions	7 fire hotspots on 2 concessions

OIL PALM GROUPS	Asian Agri	Astra Agro	Duta Palma	Musim Mas	Sime Darby	Sinar Mas	Wilmar
PEATLAND CARBON BUDGET							
Total peatland carbon store / GHG equivalent (CO_2)	50Mt (182Mt CO_2)	7Mt (25Mt CO_2)	46Mt (170Mt CO_2)	26Mt (93Mt CO_2)	17Mt (64Mt CO_2)	20Mt (73Mt CO_2)	48Mt (177Mt CO_2)
Average peatand carbon store per ha / GHG equivalent (CO_2)	2,000t (7,310t CO_2)	2,200t (7,310t CO_2)	1,620t (5,900t CO_2)	1,800t (6,600t CO_2)	1,470t (5,380t CO_2)	1,380t (5,070t CO_2)	1,930t (7,080t CO_2)
ANNUAL EMISSIONS FROM DEGRADATION OF PEATLAND UNDER OIL PALM DEVELOPMENT							
Average annual emissions from peatland degradation within oil palm concessions (CO_2)	4.2Mt CO_2	0.5Mt CO_2	4.9Mt CO_2	2.4Mt CO_2	2Mt CO_2	2.5Mt CO_2	4.2Mt CO_2
GROSS EMISSIONS FROM PEATLAND DEGRADATION							
Projected total peatland degradation emissions (CO_2)	135Mt CO_2	19Mt CO_2	126 Mt CO_2	69Mt CO_2	47Mt CO_2	55Mt CO_2	131Mt CO_2
Projected average peatland degradation emissions per hectare (CO_2)	5,430t CO_2	5,980t CO_2	4,420t CO_2	4,900t CO_2	4,000t CO_2	3,760t CO_2	5,250t CO_2
POTENTIAL FINANCIAL LIABILITY OF CARBON DEBT PER TONNE OF PALM OIL							
Average carbon offset costs per tonne of CPO (€)	2,200	2,420	1,790	1,980	1,620	1,530	2,130
Average carbon offset premium per tonne of CPO (%)	380%	420%	310%	342%	280%	263%	367%

* based on a minimum of 42,000ha of planted area and 3.75t of CPO per hectare per year

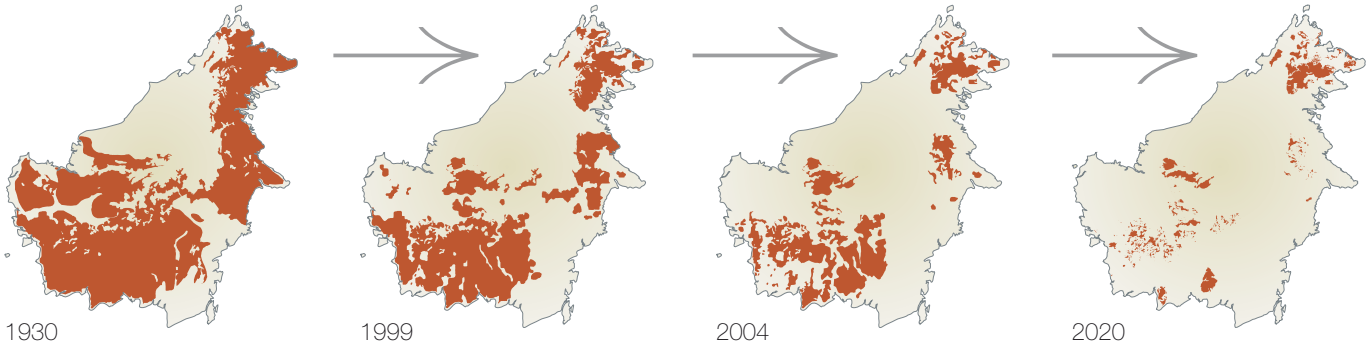
** cut off: 5km^2

PALM OIL PRODUCERS' AGGRESSIVE EXPANSION INTO THE 'LAST REMAINING RAINFORESTS IN BORNEO' IS TAKING ORANG-UTANS TO THE BRINK OF EXTINCTION



Forest cover in Borneo: deforestation 1950–2020

Maps and projections based on 2005 maps compiled by WWF.[154] Forest loss projections are placed around existing road network. WWF estimates that over the period 2000–2020 about 17,280,000ha of forest cover will have been lost.



Orang-utan distribution in Borneo: population loss 1930–2020

Maps and projections based on 2005 maps compiled by WWF.[155] The 2020 map shows probable orang-utan distribution only in areas where distribution of 2004 matches predicted forest cover 2020.

'A scenario released by UNEP in 2002 suggested that most natural rainforest in Indonesia would be degraded by 2032. Given the rate of deforestation in the past five years, and recent widespread investment in oil palm plantations and biodiesel refineries, this may have been optimistic. New estimates suggest that 98% of the forest may be destroyed by 2022, the lowland forest much sooner.'
UNEP, 2007

Indonesia now has the fastest deforestation rate of any major forested country.[156] Losing 2% of its remaining forest every year, Indonesia has earned a place in the Guinness World Records.[157]

According to World Bank estimates, between 1985 and 1997 alone, 60% of the lowland rainforest of Kalimantan and Sumatra was destroyed.[158] UNEP estimates that 98% of Indonesia's lowland forest may be destroyed by 2022.[159]

On top of Indonesia's existing 6 million ha under oil palms,[160] the country's central government has plans for another 4 million ha by 2015 dedicated to biofuel production alone.[161] Provincial governments are even more ambitious in terms of oil palm expansion, planning for an additional 20 million ha.[162]

Kalimantan, the Indonesian portion of the island of Borneo, which it shares with Malaysia and Brunei, has some of Indonesia's largest remaining areas of forest habitat. This is home to most of the world's remaining orang-utans.

Orang-utans – one of our nearest biological relatives – survive only in the dwindling tropical rainforests of Borneo and northern Sumatra:[163] they depend on the forest for food and nesting sites.[164] Cutting down forest for timber or conversion to plantations is the main cause of their decline, [165] and today orang-utans are at high risk of extinction in the wild.

As orang-utans and other species lose their rainforests to oil palm plantations, they are deprived of their natural source of food. Seeking to survive off young palm plants, hungry orang-utans can become 'pests' to oil palm producers, and they are commonly killed to protect the crop. [166] According to the Centre for Orangutan Protection, at least 1,500 orang-utans were deliberately killed on plantations in 2006.[167]

Greenpeace has evidence that between 2005–2007 scores of orang-utans were relocated from concession areas now controlled by Unilever suppliers.[168]

'The Bornean orang-utan is classified as Endangered… indicating that it has a very high risk of extinction in the wild in the near future. The Sumatran orang-utan is classified as Critically Endangered… indicating that it has an extremely high risk of extinction in the wild in the near future. Since 1900, the number of Sumatran orang-utans is thought to have fallen by about 91%, with a rapidly accelerating loss towards the end of the twentieth century.'
UNEP, 2007

'Peat swamp forests, which host high densities of orang-utans, are targeted for palm oil production. Palm oil plantations are also being developed on logged-over forest land, preventing recovery.'
UNEP, 2007

PALM OIL PRODUCERS PUSHING EXTINCTION

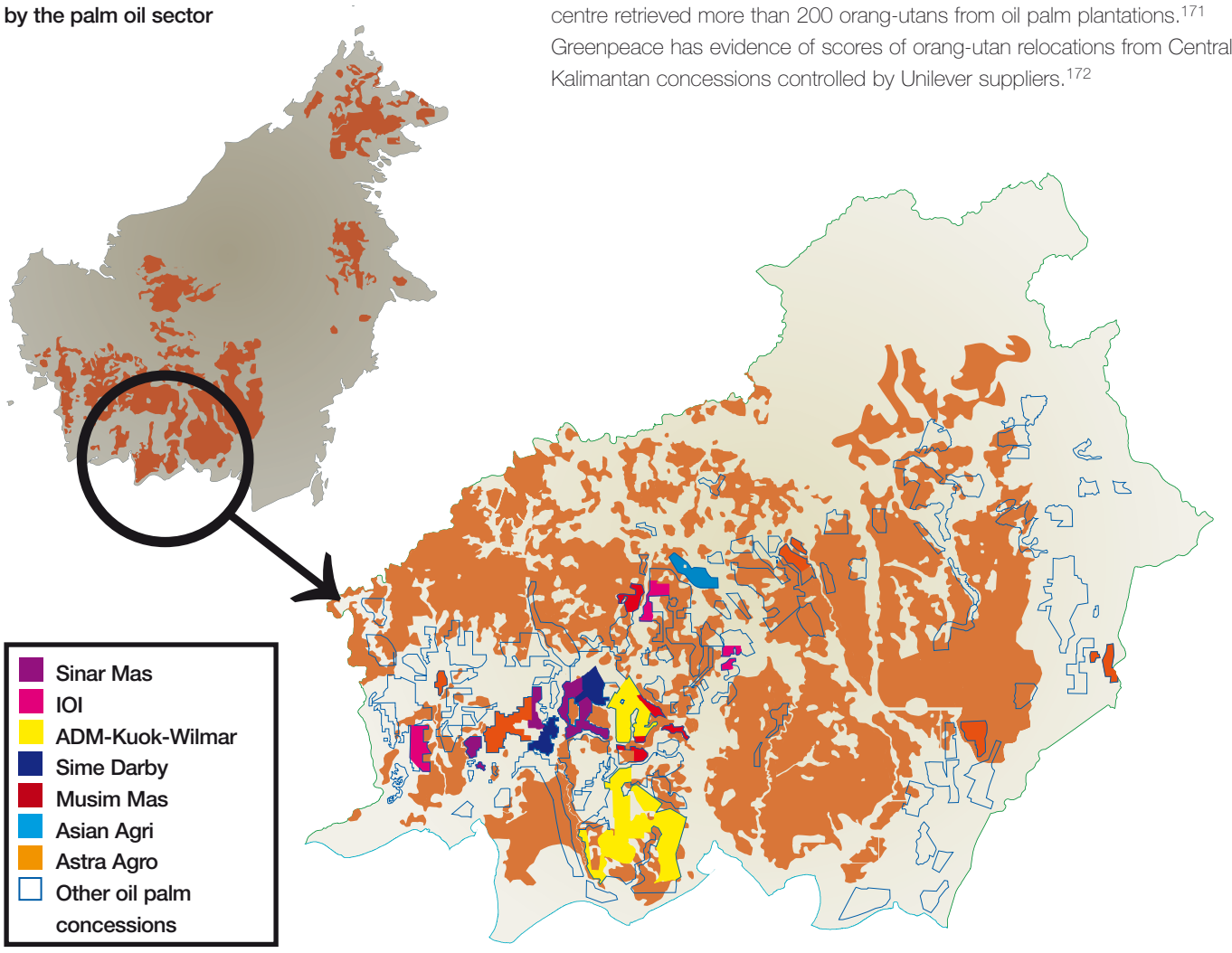
While oil palm plantations in Riau create quantifiable carbon debt, Kalimantan shows these companies in expansion mode – building up landbanks, clearing forest and building processing infrastructure. In simple terms, company growth is increasing the sector's carbon debt portfolio. It also leads to significant collateral damage, including the destruction of remaining orang-utan habitat.

While most current palm oil production is concentrated in Riau and North Sumatra, oil palm groups are rapidly expanding their landbanks and clearing new areas. In West Kalimantan, by 2007 oil palm concessions had been granted on more than 3.2 million ha.[169] In Central Kalimantan, by 2006 oil palm concessions had been granted on 1.1 million ha.[170]

As a 2008 Greenpeace investigation reveals, much of this area – which overlaps critical orang-utan habitat – is being cleared of valuable forest, the peatlands drained and the land burned as oil palm plantation area expands. Greenpeace analysis and investigations confirm that expansion in oil palm plantations by Unilever suppliers is having a serious impact on their habitat.

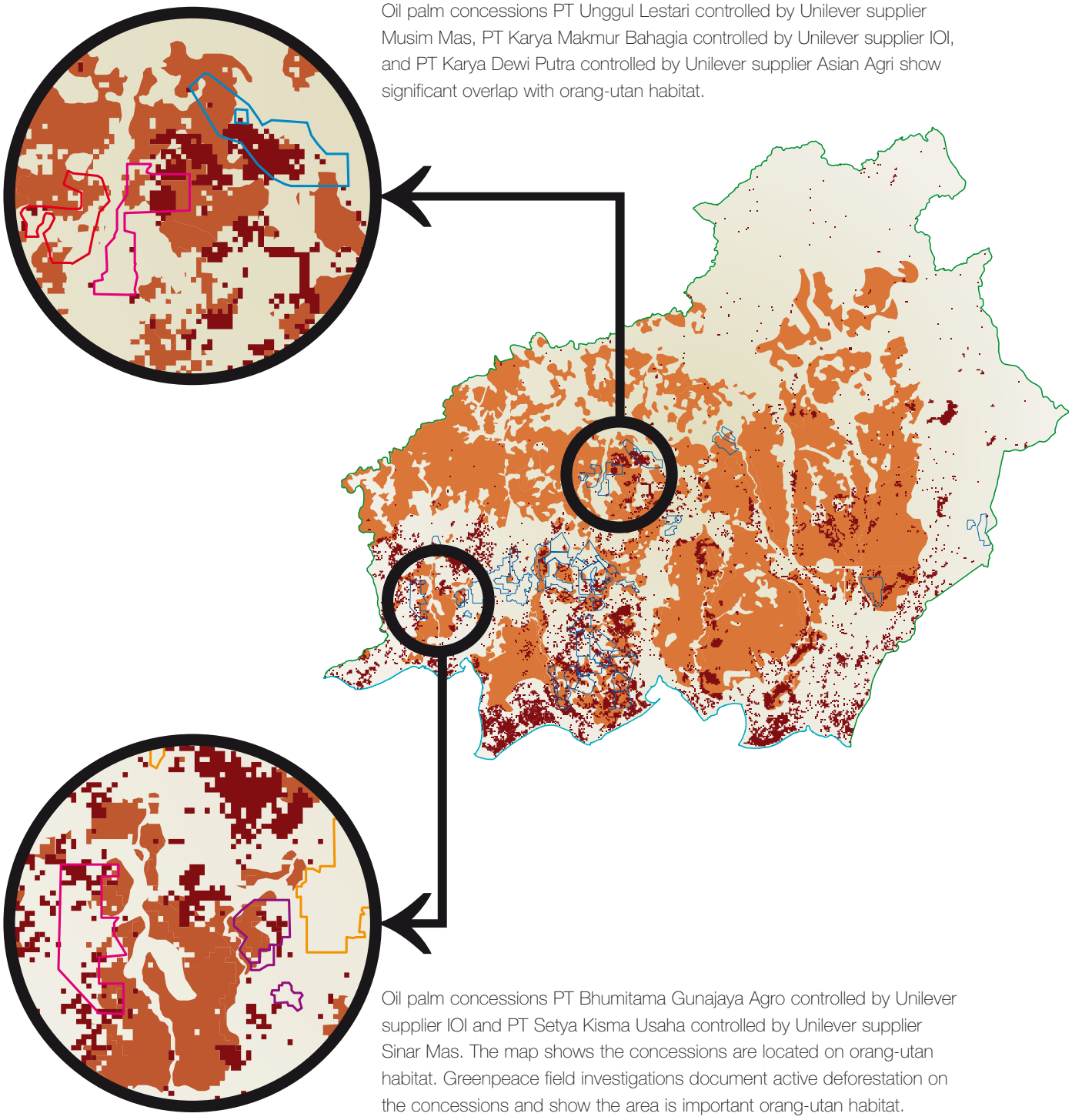
In Central Kalimantan, between 2006 and 2007, one orang-utan rescue centre retrieved more than 200 orang-utans from oil palm plantations.[171] Greenpeace has evidence of scores of orang-utan relocations from Central Kalimantan concessions controlled by Unilever suppliers.[172]

Orang-utan habitat is being targeted by the palm oil sector



ORANG-UTAN DISTRIBUTION IN CENTRAL KALIMANTAN: IMPACT OF OIL PALM CONCESSIONS CONTROLLED BY UNILEVER SUPPLIERS

Oil palm concessions PT Unggul Lestari controlled by Unilever supplier Musim Mas, PT Karya Makmur Bahagia controlled by Unilever supplier IOI, and PT Karya Dewi Putra controlled by Unilever supplier Asian Agri show significant overlap with orang-utan habitat.



Oil palm concessions PT Bhumitama Gunajaya Agro controlled by Unilever supplier IOI and PT Setya Kisma Usaha controlled by Unilever supplier Sinar Mas. The map shows the concessions are located on orang-utan habitat. Greenpeace field investigations document active deforestation on the concessions and show the area is important orang-utan habitat.

- Orang-utan habitat 2004
- Deforestation 2000–2007
- Asian Agri
- IOI
- Musim Mas
- Sinar Mas
- Oil palm concession controlled by Unilever suppliers

TABLE THREE: CLIMATE AND BIODIVERSITY IMPACTS OF UNILEVER'S PALM OIL SUPPLIERS IN CENTRAL KALIMANTAN[173]

OIL PALM GROUPS	Asian Agri	Astra Agro	IOI	Musim Mas	Sime Darby	Sinar Mas	Wilmar
Share of CPO production in Indonesia (2007)	9%	5.5%	1.1%	2%	4.7%	10%	3.2%
OIL PALM CONCESSIONS IN CENTRAL KALIMANTAN							
Number of identified oil palm concessions	1	7	4	6	3	6	15
Total area (ha)	26,437	111,810	48,779	38,925	49,086	68,845	255,714
PEATLAND AREAS							
Number of concessions on peatland	0	1	1	4	1	3	12
Actual area on peat (ha)	0	23,269	2,981	10,039	1,626	8,067	57,591
Total peatland carbon store / CO_2) equivalent (CO_2e)	0	58.4Mt (214Mt CO_2e)	3.6Mt (13.2Mt CO_2e)	11.7Mt (42.9Mt CO_2e)	0.73Mt (2.7Mt CO_2e)	12.1Mt (44.5Mt CO_2e)	35.7Mt (131.4Mt CO_2e)
Number of concessions on deep peat >2m	0	1	1	0	0	2	2
Area (ha)	0	23,269	1,685	2,283	0	6,597	6,693
Number of concessions with deforestation on peatland (2000 to July 2007)*	0	1	1	4	0	1	9
Number of concessions with remaining forest on peatland in July 2007*	0	0	1	3	0	2	7
ORANG-UTAN HABITAT							
Number of concessions on 2004 orang-utan habitat	1	4	2	6	2	5	15
Number of concessions with deforestation on orang-utan habitat (2000 to July 2007)*	0	1	1	4	0	1	9
Number of concessions with significant remaining forest on orang-utan habitat in July 2007*	1	3	2	5	0	3	8
FIRE HOTSPOTS (2006–2007)							
Number of concessions 2006	266 fire hotspots on 1 concession	442 fire hotspots on 7 concessions	180 fire hotspots on 4 concessions	135 fire hotspots on 3 concessions	70 fire hotspots on 3 concessions	260 fire hotspots on 5 concessions	1117 fire hotspots on 4 concessions
Number of concessions 2007	12 fire hotspots on 1 concession	264 fire hotspots on 7 concessions	33 fire hotspots on 4 concessions	53 fire hotspots on 3 concessions	3 fire hotspots on 2 concessions	62 fire hotspots on 3 concessions	13 fire hotspots on 7 concessions

* cut off: 5km^2

SECTION THREE:
GROUPS SUPPLYING PALM OIL HAVE A VESTED INTEREST IN CONTINUED DEFORESTATION RATHER THAN SUSTAINABILITY

- **Unilever is part of the CDP's 'Supply Chain Leadership Collaboration' which aims to look at the whole carbon footprint of businesses that form part of the supply chain as part of a strategy to reduce overall climate emissions.**

- **Family-controlled conglomerates RGM and Sinar Mas, both suppliers of palm oil to Unilever, own two of the world's largest pulp mills, relying on timber from 160,000ha every year – much of this is supplied through deforestation. When the combined impact of oil palm and pulp wood plantation concessions is viewed together, the projected peatland carbon debt (cumulative emissions commitment over about 150 years, the approximate time it takes 3 metres of peatland to degrade) within Riau of these two groups alone is 4.2Gt CO_2, on a par with the annual emissions of the EU25. Their current annual emissions from peatland degradation within plantations they control in Riau are 210Mt CO_2, more than the Netherlands.**

- **Agricultural commodity traders such as ADM and Cargill, as well as palm oil producers such as Sinar Mas, are also heavily involved in the development of biofuel infrastructure and other new markets for palm oil**

- **Unilever is doing business with conglomerates responsible for some of the most carbon intense land-use emissions in the world. These groups are also members of the RSPO – showing why the initiative either needs dramatic reform or to be replaced by another body.**

THE CARBON DISCLOSURE PROJECT PERSPECTIVE

The CDP is seeking to assess supply chains CO_2 emissions and climate disclosure for key sector leaders that make up institutional investor portfolios.[174]

As a member of the 'Supply Chain Leadership Collaboration', Unilever is one of 15 corporate groups tasked to respond to the CDP pilot information request in the first quarter of 2008. The company is assessing emissions linked to up to 50 of its suppliers. The aim is to 'help customers and suppliers to work together to develop strategies to reduce their carbon footprints'. [175] According to the CDP: 'The Supply Chain Leadership Collaboration is a key step towards a unified business approach to climate change. By bringing together the purchasing authority of some of the largest companies in the world, CDP will encourage suppliers to measure and manage their greenhouse gas emissions.' [176]

Critically, the CDP process for assessing supply chain emissions 'focuses on a company's complete carbon footprint and total emissions, rather than emissions generated through particular products'.[177] That means, in principle, assessment of the carbon footprint of a supplier needs to be at the group or conglomerate level, not simply at say the level of the individual palm oil plantation.

In this way, members of the Supply Chain Leadership Collaboration such as Unilever and Procter & Gamble should be adopting a business-to-business approach to addressing supply chain emissions, 'work[ing] with suppliers to better understand their own total emissions, with the aim of making the key areas and opportunities where actions can have the greatest reduction benefits more easily identified.' [178]

As Unilever points out in the case of biofuels, supply chain emissions need to be addressed at the 'macro-level'.

ASSESSING THE GROUP-LEVEL CARBON LIABILITY OF SINAR MAS AND RGM INTERESTS IN RIAU

Evaluation of the carbon footprint of the group level operations in Riau of two of Unilever's palm oil suppliers shows how, within Indonesia, conglomerate interests may be heavily dependent on ongoing deforestation.

Today, Riau is the largest producer of two of Indonesia's most important export commodities based on forest destruction: paper and palm oil.[179]

Palm oil producers Sinar Mas and RGM (parent company of Asian Agri) control two of the world's largest pulp and paper companies, APRIL and APP, which have their mills in Riau. Lucrative demand for pulp by these two mills is a clear financial incentive for the oil palm and pulp industries to continue to clear forest areas when establishing new plantation areas.

Here is a breakdown of the key numbers linked to group level deforestation and carbon liability, both in terms of forecast liability and as a share of annual emissions:

160,000ha every year — **DEFORESTATION**

Sinar Mas and RGM pulp mills jointly require the timber from 160,000ha every year.[180]

In 2006, WWF estimated that around 450,000ha of natural forests had been cleared since 2001 to supply APP's pulp mill in Riau.[181] Accordingly, wherever deforestation occurs, including the expansion of oil palm into natural forest, the majority of the timber harvested is sold for pulp.

Development is illegal on 80% of peatland concession — **PEATLANDS**

Analysis by Greenpeace of peatland maps overlaid with these groups' pulp wood concessions reveals that approximately 58% of APP plantations and 50% of APRIL plantations in Riau are on peat (see table). For both groups, 80% of this is on peatlands over 2 metres depth, thus development on them is illegal.

4.2Gt CO_2 emissions — **FORECAST CARBON DEBT FOR BOTH OIL PALM AND PULPWOOD PLANTATIONS IN RIAU**

When the combined impacts of oil palm and pulp wood plantation concessions are viewed together, the projected peatland carbon debt (cumulative emissions commitment over about 150 years) within Riau of these two groups alone is 4.2Gt CO_2,[182] on a par with the annual emissions of the EU25.[183] Their current annual emissions from peatland degradation within plantations they control in Riau are 210Mt CO_2,[184] more than the Netherlands.[185]

This calculation discounts emissions embedded within third-party pulp supply chains and fails to take into account the rapid expansion since 2005 in land controlled by these conglomerates.

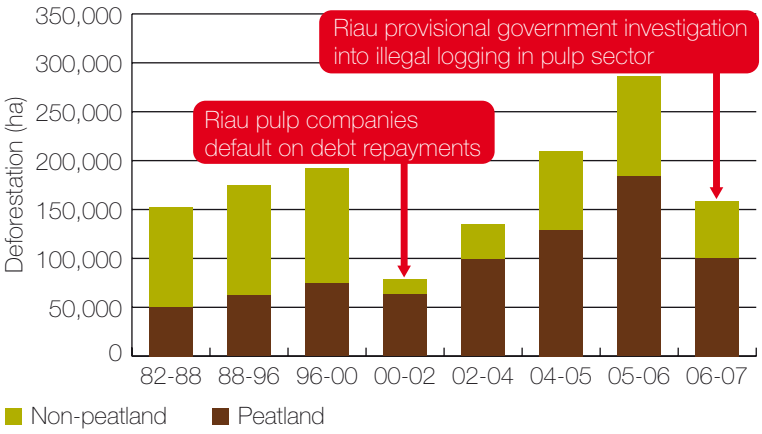
SHARE OF ANNUAL EMISSIONS FROM PEATLAND DEGRADATION AND FIRE

135Mt CO_2 emissions

Together, [186] as of 2005–2006, their Riau operations covered 7.5% of Indonesia's 10 million ha of degraded peatlands.[187] According to Wetlands International, average annual emissions from Indonesia's degraded peatlands amounts to 1.8Gt CO_2. Straight maths would suggest therefore that these two suppliers historically share responsibility for average annual emissions from peatland degradation alone on the order of 135Mt CO_2 annually – equivalent to the combined annual emissions from the 77 least-emitting countries in the world.[188]

What this demonstrates is the need to assess suppliers at the group level. Purchasing palm oil from Sinar Mas or RGM acts as a perverse subsidy for clearance to feed these groups' pulp mills.

Peatland and non-peatland deforestation in Riau

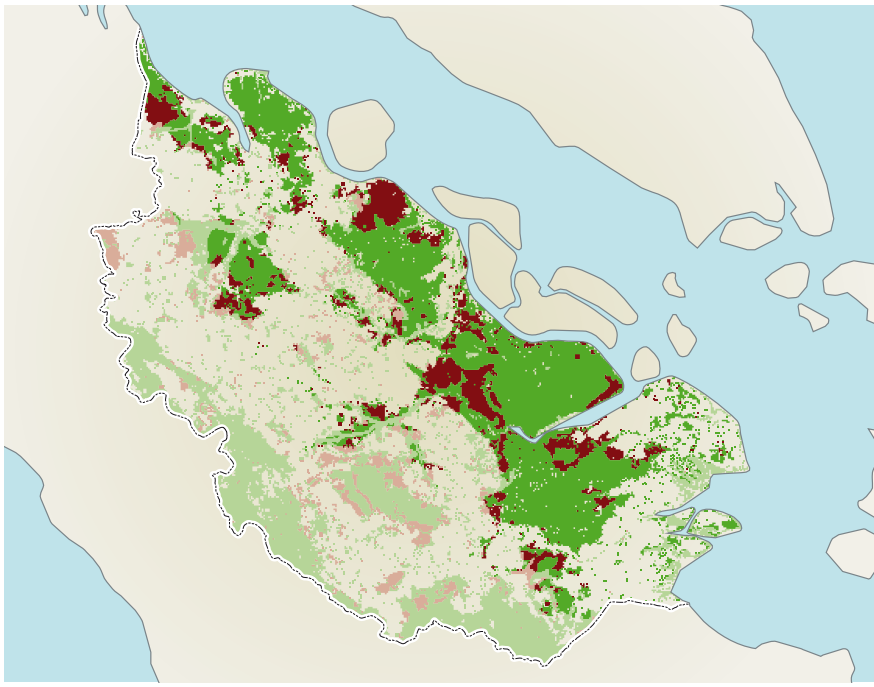


Source: Uryu et al (2008)

Deforestation on peat forests in Riau (2000–2007)

Source: Deforestation data based on maps developed by Sarvision-Wegeningen University in collaboration with the Indonesia Ministry of Forestry (2007)

In 2006, WWF estimated that around 450,000ha of natural forests had been cleared since 2001 to supply APP's pulp mill in Riau. Accordingly, wherever deforestation occurs, including the expansion of oil palm into natural forest, the majority of the timber harvested is sold for pulp.



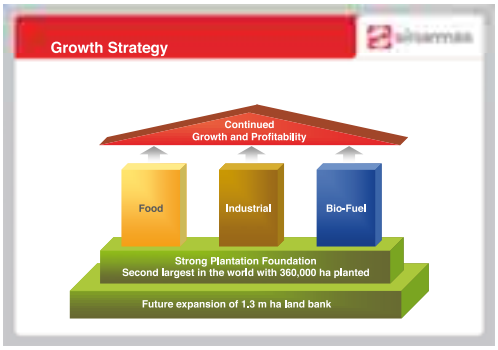
BIOFUELS ARE A NEW OPPORTUNITY TO EXPAND

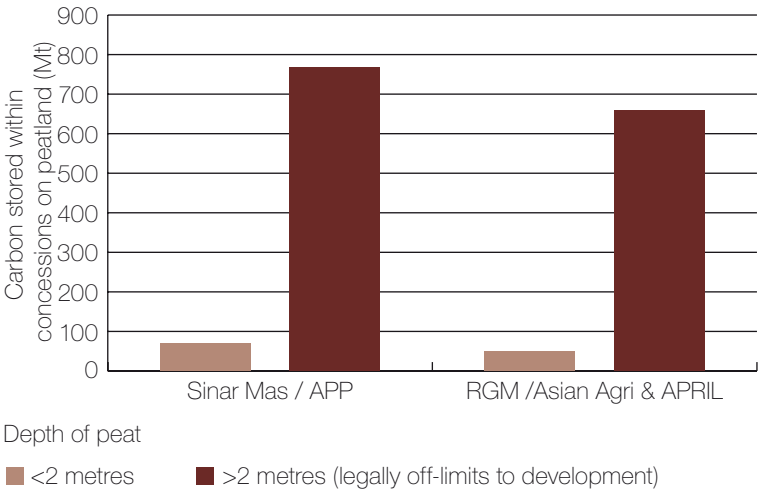
The diversification of both of these conglomerates into biofuels[189] is a market potentially demanding significant expansion in production and significant opportunity to deforest new areas. This underlines the growing carbon footprint of many of Unilever's palm oil suppliers through expansion in new markets such as biofuels and other sectors reliant on deforestation.

Many of Unilever's main palm oil suppliers see biofuel as an opportunity to expand their palm oil market share, and are currently building biofuel infrastructure. For example, ADM-Kuok-Wilmar sees biofuel and energy security issues as representing 'tremendous opportunities for oilseed growers and processors.'[190]

Cargill stated to a UK Government committee: 'Our biodiesel investments are additional to and not at the expense of our food business and we recognise the paradox of managing both food and fuel supplies out of the same raw materials.'[191]

Despite these expansion plans, an alliance, of which Cargill is part, has been quick to identify 'the food industry and population growth'[192] as the main driver of palm oil demand.





Source: Greenpeace analysis

Carbon stored within peatlands on RGM group and Sinar Mas group pulpwood and oil palm concession areas in Riau

SINAR MAS AND RGM GROUP COMPANIES CURRENT OIL PALM AND PULPWOOD CONCESSIONS ON PROTECTED DEEP PEATLANDS LEGALLY OFF-LIMITS TO DEVELOPMENT

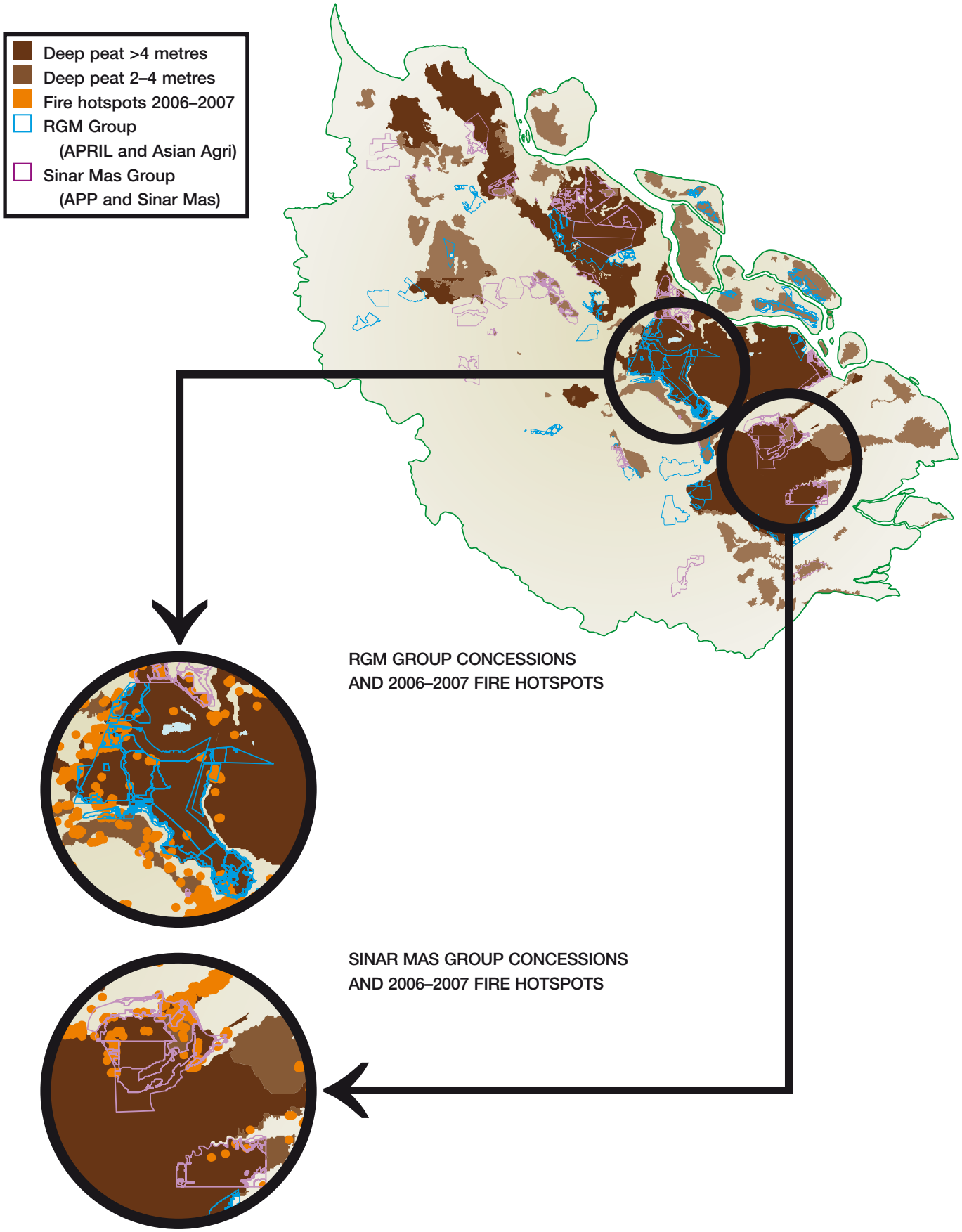


TABLE FOUR: GROUP-LEVEL CLIMATE IMPACTS OF SINAR MAS AND RGM INTERESTS IN RIAU[193]

FAMILY CONTROLLED GROUPS ENGAGED IN DEFORESTATION IN RIAU	**Tanoto family controlled RGM Group**	**Widjaja family controlled groups**
Group companies engaged in deforestation in Riau	Asian Agri (oil palm) and APRIL (pulpwood)	Sinar Mas (oil palm) and APP (pulpwood)
IDENTIFIED OIL PALM & PULPWOOD CONCESSIONS IN RIAU CONTROLLED BY GROUPS		
Total area of palm oil concession (ha)	108,000	109,000
Total area of acacia pulpwood concessions (ha)	697,400	679,420
Total area of oil palm and acacia pulpwood concessions (ha)	805,400	788,420
CONCESSIONS ON PEATLAND AREAS		
Total area of palm oil concession on peatland (ha)	24,850	14,480
Total area of acacia pulpwood concessions on peatland (ha)	335,380	397,020
Total area of oil palm and acacia pulpwood concessions on peatland (ha)	360,230	411,500
CONCESSIONS ON PEATLAND AREAS ABOVE 2 METRE LEGAL LIMIT		
Total area of oil palm concessions on deep peat >2m (ha)	20,080	10,620
Total area of pulpwood concessions on deep peat >2m (ha)	271,110	322,850
Total number of oil palm and acacia pulpwood concessions on deep peat (ha)		
Total area of oil palm and acacia pulpwood concessions on deep peat (ha)	291,190	333,470
PEATLAND CARBON BUDGET		
Total peatland carbon stored on oil palm concessions/GHG equivalent (CO_2)	50Mt (182Mt CO_2)	20Mt (73Mt CO_2)
Total peatland carbon stored on acacia pulpwood concessions/GHG equivalent (CO_2)	657Mt (2,410Mt CO_2)	810Mt (2,970Mt CO_2)
Total peatland carbon stored on oil palm and acacia pulpwood/GHG equivalent (CO_2)	707Mt (2,690Mt CO_2)	830Mt (3,040Mt CO_2)
Average peatland carbon stored on oil palm and acacia pulpwood concessions per hectare/GHG equivalent (CO_2)	1,960t (7,200Mt CO_2)	2,020t (7,390Mt CO_2)
GROSS ANNUAL EMISSIONS FROM DEGRADATION OF PEATLAND UNDER PLANTATION DEVELOPMENT		
Average annual emissions from degradation on oil palm concessions (CO_2)	4.2Mt CO_2	2.5Mt CO_2
Average annual emissions from degradation on acacia pulpwood concessions (CO_2)	93Mt CO_2	111Mt CO_2
Total average annual emissions from degradation on oil palm and acacia pulpwood concessions (CO_2)	97.2Mt CO_2	113.5Mt CO_2
GROSS EMISSIONS FROM PEATLAND DEGRADATION		
Total projected peatland degradation emissions from oil palm concessions (CO_2)	135Mt CO_2	55Mt CO_2
Average projected peatland degradation emissions from oil palm concessions per hectare (CO_2)	5,430t CO_2	3,760t CO_2
Total projected peatland degradation emissions from acacia pulpwood concessions (CO_2)	1,790Mt CO_2	2,200Mt CO_2
Average projected peatland degradation emissions from acacia pulpwood concessions per hectare (CO_2)	5,320t CO_2	5,350t CO_2
POTENTIAL FINANCIAL LIABILITY OF CARBON DEBT FROM CONCESSIONS ON PEAT		
Total projected peatland degradation emissions from oil palm and acacia pulpwood concessions (CO_2)	1,925Mt CO_2	2,255Mt CO_2
Total potential offset costs of projected emissions from oil palm and acacia pulpwood concessions (€)	€58 billion	€68 billion

'[In terms of our supply chains,] the most important business judgement in these circumstances is to be ready to respond to the new circumstances, but to make the adaptations at the right time: not too far ahead of consumers or suppliers, but not too far behind to lose markets or consumers… [This] may mean we need sometimes to resist some of the rhetoric calling for more radical change, even though we may recognise it as the rational future.'

Unilever's response to Carbon Disclosure Project questionnaire, 2005

SECTION FOUR:
THE WAY AHEAD: A PEAK IN GHG EMISSIONS BY 2015 AND DRASTIC REDUCTION BY 2050

- **If investors and corporate groups like Unilever intend to make a difference in terms of GHG emissions, they need to look at the carbon footprint of the group as well as the sector – looking at the 'macro-level' climate impact as opposed to the product supply chain.**

- **The recent moratorium in the Amazon on deforestation for soya offers a model for Indonesia where the work of NGOs, industry and government can collaborate at the group and sector level towards a common goal.**

THE BUSINESS-AS-USUAL APPROACH IS INADEQUATE WHEN IT COMES TO CORPORATE GROWTH STRATEGIES, INVESTMENT DECISIONS AND SCREENING PALM OIL SUPPLIERS

PUTTING PALM OIL ON THE CARBON BALANCE SHEET

GROWTH IN THE PALM OIL SECTOR IS UNDERMINING EFFORTS TO LIMIT GHG EMISSIONS

In April 2008, Unilever called for an immediate moratorium on deforestation and peatland destruction. This is the first step on the road to halting deforestation, and must be supported by other major players like Nestlé, Procter & Gamble, and Kraft.

As part of a strategy to reduce overall emissions, Unilever and other major players need to reassess their business relations with palm oil suppliers. Shareholders would be right to ask what efforts they are making to shed the carbon debt embedded within their palm oil supply chains.

Unilever's pilot supply chain emissions assessment, originally scheduled for release in May 2008, needs to assess and disclose the brand imprint of growth in Personal and Home Care products and knock-on palm oil supply chain demands.

Through its critique of biofuels, Unilever calls for the impact of expanding demand for palm oil to be assessed at the 'macro level' – ie to look at the ecosystem impacts of expansion and conversion.

'The real sustainability issue… is that it leads to a (macro-) expansion of feedstock production. Certification [at micro-production level] will not change the fact that for each ton of oil that is made unavailable for traditional users, an additional ton of oil needs to be grown elsewhere. The rush for land use [through new oil demand] will increase pressure on ecosystems and biodiversity… Deforestation, particularly in the case of palm oil and soybeans, could lead to the devastation of the last remaining rainforests in Borneo and the Amazon region.'[194]

It is clear that Unilever accepts in principle that continued expansion of agriculture into forested areas represents significant carbon and collateral risks.[195] The company recognises that certification of a limited portion of production (ie specific concessions) will not limit the impact of the growth (eg 'leakage' into rainforests or peatlands). This is sound analysis by Unilever.

Further – at least when it comes to biofuels – Unilever argues: 'Policies which aim to reduce GHG emissions should contain full life cycle assessments for individual applications. This should include previous land use with regard to the carbon balance.'[196]

UNILEVER'S TARGETS FOR GHG EMISSIONS REDUCTIONS ONLY TARGET DIRECT EMISSIONS FROM MANUFACTURING

Through the CDP, Unilever has stated targets for GHG emission reductions. These focus on direct energy use and represent no dramatic paradigm shift in how it does business or assesses climate risk.

According to information provided to the CDP, Unilever has targets for direct emission reductions for manufacturing of 50% from 1995 levels by 2010.[197] The company's Annual Report is rather more cautious: 'We continue to improve our performance… having reduced our CO_2 emissions from energy by 33.5% per tonne of production over the period 1995 – 2006. In 2007 we set ourselves the further goal of achieving a 25% reduction in CO_2 emissions by 2012 (from a 2004 baseline), to give a total reduction of around 43% since 1995.'[198]

The company estimates 2006 direct emissions through manufacturing at 3.3Mt CO_2.[199] This would suggest that over the period 1995–2012, it anticipates a reduction in annual direct emissions in the order of 2.1Mt CO_2 (based on constant 2006 production levels).

These reductions represent less than 5% of Unilever's own estimated carbon liability through its supply chain and around 1–2% of its own estimated products' liability in terms of total lifecycle analysis linked to its brands' imprints.

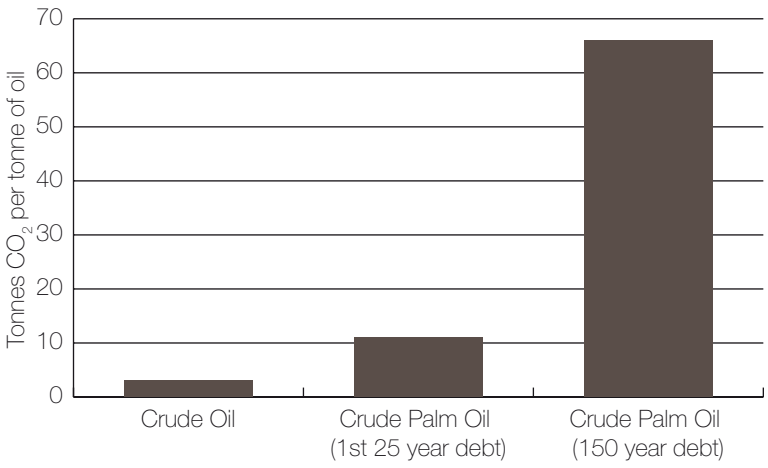
Unilever estimates its supply chain emissions alone at 50Mt CO_2,[200] on a par with Sweden's annual CO_2 emissions.[201] Unilever estimates that its total carbon footprint for raw material supply, distribution, consumption and disposal of its products is 30 to 60 times greater than its direct manufacturing emissions – on the order of 120-240Mt CO_2 annually,[202] on a par with the annual CO_2 emissions from the Netherlands.[203] Without knowing Unilever's methodology for this calculation it is not clear whether it intends to include emissions from deforestation and peatland degradation. If it does not, it is leaving a vast source of carbon liability off its balance sheet.

DRASTIC GLOBAL GHG EMISSIONS REDUCTIONS ARE NEEDED

Supply and total product lifecycle CO_2 emissions are linked to Unilever brand imprint. The IPCC warns that by 2050, a reduction in GHG emissions by as much as 85% from 2000 levels is imperative (see appendix 'The bottom line'). This would mean that Unilever has a responsibility to reduce emissions linked to its products by up to 210Mt CO_2, with 43Mt CO_2 of that coming from supply chain emissions (based on Unilever's own estimate of its current supply chain emissions at 50Mt CO_2).

CARBON LIABILITY ASSOCIATED WITH PALM OIL IS COSTLY

If GHG emissions linked to brand imprint were a genuine priority for Unilever, shedding supply chain liability through avoidance of carbon intensive palm oil suppliers is essential for meeting its targets and would deliver far more dramatic savings on the emissions 'bottom line': palm oil produced on peat with a depth of 3 metres (the mean average for Unilever suppliers' peatland operations) carries a carbon burden more than twenty times the emissions linked to crude oil (66 tonnes of CO_2 per tonne of CPO[204] vs 3.1t/CO_2 per tonne of crude oil[205]).



Source: Greenhouse gas protocol initiative (2008) and Germer and Sauerborn (2007)

Emissions associated with use of crude oil and production of crude palm oil (CPO) from peatland development

Palm oil produced on peat with a depth of 3 metres carries a carbon burden more than twenty times the emissions linked to crude oil

There are several ways to start to quantify the magnitude of Unilever's historic carbon liability for its Indonesian palm oil supply chain.[206] These are indicative of a scale of emissions liability which dwarfs Unilever's manufacturing efficiencies.

On the basis of analysed Unilever suppliers operating in Riau – the largest palm oil producing region in Indonesia as well as focus for future expansion – Greenpeace estimates the mean average peatland depth for palm oil plantations on peat at 3 metres.[207] This gives an average projected carbon debt (emissions burden) of 4,900t CO_2 per hectare.[208] Factored up for the Indonesian palm oil sector as a whole, this gives a total emissions liability of 13.7Gt CO_2 across the 2.8 million ha of deforested peatlands within oil palm concessions. As Unilever's historic share of production from the Indonesian palm oil sector is 5%, its logical share of the carbon burden is also 5%, equivalent to 685Mt CO_2. This is on a par with the combined annual CO_2 emissions for the UK and Belgium.[209]

Were Unilever to offset these emissions to which degradation of peatlands within oil palm concession areas has committed the land, this would give Unilever a liability of €20.6 billion at predicted carbon trading prices of €30 per tonne of CO_2, payable over the 20 year productive period of an oil palm plantation – about €1 billion a year.

In terms of annual emissions liability (an immediate perspective), historical degradation of peatlands within oil palm concession areas is responsible for 476Mt CO_2 annually, of which Unilever's share is 5% – some 23.8Mt of CO_2. Were Unilever to seek to offset these annual emissions at predicted carbon trading prices of €30 per tonne of CO_2, it would pay an annual premium of €714m. For comparison, this would be equal to the raw material costs of 1.2Mt of CPO at 2007 market prices.[210]

Put in another context, this means that through the Indonesian palm oil sector, the Indonesian share of Unilever's palm oil supply chain carries an annual carbon liability representing nearly half of Unilever's own estimate of its total supply chain emissions. This liability is more than seven times direct emissions from manufacturing.

From an investor perspective, this equals almost 14% of operating profit in 2007.[211]

Unilever states that: 'The reputation of companies will be judged fundamentally by their response and actions towards climate change which is widely recognised as the most critical challenge facing our planet.'[212]

In terms of real action on climate change, therefore, it is clear that another approach is needed.

'A moratorium will be a strong signal. [It] can be a first step in countering peatland degradation… to buy time to maximise the new opportunity of carbon finance. A moratorium needs to be part of a longer-term strategy of land-use planning.'
Yogyakarta statement, endorsed by the Indonesian Minister of the Environment, August 2007

'The simplest and most effective measure to prevent a further increase in fires and CO_2 emissions is by conservation of remaining peat swamp forests and rehabilitation of degraded peat swamp forests.'
Wetlands International, 2006

THE SOLUTION: ZERO DEFORESTATION IN INDONESIA'S RAINFORESTS AND PEATLANDS

In April 2008, Unilever joined with Greenpeace in calling for an end to deforestation in Indonesia – the country with the highest GHG emissions from deforestation.

Protecting the world's remaining forests is crucial to efforts to stabilise the climate, to preserve global biodiversity and to ensure the livelihoods of millions of people who depend on forests.

Forest destruction is responsible for about one fifth of global GHG emissions – Indonesia and the Amazon are by far the two largest sources of GHG emissions from deforestation. Emissions from Indonesia's degraded peatlands represent 4% of global GHG emissions, but the area of degraded peatlands involved is relatively small – about 10 million ha or less than 0.1% of the Earth's land surface.

If we are to prevent dangerous global climate change, we need a global effort to halt forest destruction as well as bringing about a drastic reduction in our use of coal, oil and gas by using energy more efficiently and utilising cleaner sources of energy.

A halt to further rainforest destruction in Indonesia is also vital to ensuring the future for critically endangered species such as the orang-utan.

The CDP recognises that if investors and global companies like Unilever intend to make a difference in terms of GHG emissions, they need to move beyond their own direct emissions and address the liabilities within their supply chains at the business-to-business level. This entails assessment of the carbon footprint of the corporate groups with whom they trade or in whom they invest, as well as the impact of the commodity sector.

Given the profound carbon liability and other collateral risks associated with the palm oil sector and the corporate groups involved, Unilever has called for a coalition between major palm oil consumers such as Nestlé, Procter & Gamble and Kraft, and traders and producers such as Cargill and Sinar Mas to drive forward an immediate moratorium on deforestation, and bring real and urgent change to the palm oil sector on the ground.

Many signatories to the CDP are also significant shareholders in corporate groups whose supply chains include palm oil. CDP signatories who are also investors in Unilever, Nestlé, Procter & Gamble and Kraft include AXA, Barclays, Blackrock, BNP Paribas, Credit Agricole, Credit Suisse, F&C Asset Management, Fortis, Goldman Sachs, Henderson Global Investors, HSBC, ING, JP Morgan, Legal & General, Morgan Stanley, Standard Life and UBS

Responsible investors and buyers need to take a macro-level approach to reducing carbon liability. They should use their significant influence to support an immediate moratorium on further deforestation, including the threat of market sanctions and financial disinvestment from corporate groups involved in forest conversion and peatland degradation.

WHAT DOES THE INDONESIAN GOVERNMENT NEED TO DO?

STOP THE PROBLEM: ZERO DEFORESTATION

Establish a moratorium on forest clearance and peatland degradation and ensure enforcement of the moratorium.

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.

START THE SOLUTION: CUT ONGOING EMISSIONS

Rehabilitate degraded peatland areas with natural and native flora.

WHAT DO COMPANIES INVOLVED IN THE PALM OIL SECTOR NEED TO DO?

STOP THE PROBLEM: SUPPORT ZERO DEFORESTATION

Support a moratorium on forest clearance and peatland degradation.

START THE SOLUTION: CLEAN UP THE TRADE

Set and disclose targets for reducing GHG emissions in the supply chain from deforestation.

Do not trade with those engaged in deforestation and peatland degradation. Inform suppliers that purchasers will no longer buy from companies engaged in forest conversion and peatland degradation.

'The Government of Indonesia should regard its peatlands as a 'bank' because they are worth more as biodiversity and carbon stores than oil palm or pulp tree plantations. As a first step it should rescind ALL concession licenses that have been (and still are being) granted for new plantations on its peatland.'

Dr Susan Page, head of the EU-funded CARBOPEAT project, February 2008

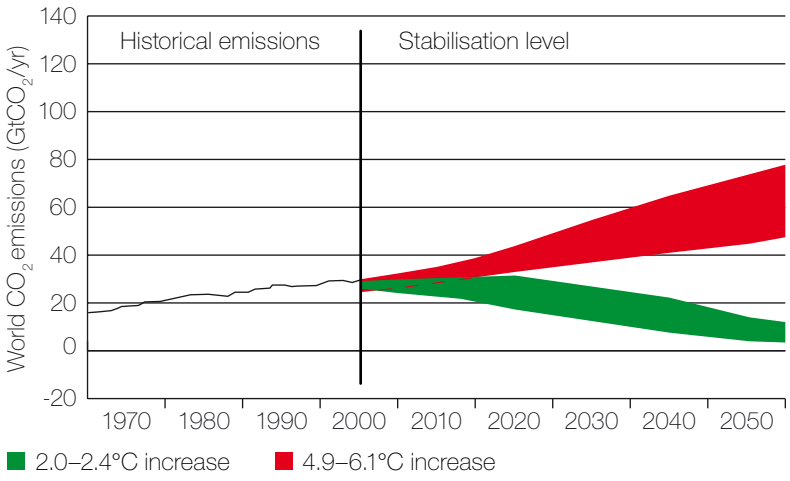
APPENDICES

I. THE BOTTOM LINE PERSPECTIVE

An average global warming above 2°C above pre-industrial levels could result (according to different studies) in dangerous and irreversible impacts:[213]

- **water shortages:** more than 3 billion people would be at risk
- **food insecurity:** more frequent droughts would lead to lower crop yields
- **health impacts:** 300 million people would be at greater risk of malaria and other vector- and waterborne diseases
- **climate refugees:** 1 billion people will be forced to flee from their homes by 2050
- **biodiversity loss:** 20–30% of plant and animal species assessed so far are likely to be at increased risk of extinction
- **economic losses:** a reduction in global Gross Domestic Product of 5–20% is to be expected

There is now a broad scientific consensus that we need to prevent temperatures from rising by more than 2°C above their pre-industrial level. In the 2007 assessment by the IPCC, different cuts in GHG emissions are linked to likely temperature rises.[214] The only scenario likely to allow the world to stay below 2°C envisages a peak in global emissions by 2015 and stabilisation of GHG concentrations at 445–490ppm CO_2-e (or 350–400ppm CO_2).[215] Such a stabilisation will, in this scenario, require a reduction in global emissions across all sectors (energy, agriculture and land use change) of 50 to 85% by 2050 (below 2000 levels), and in particular will need industrialised countries to reduce their emissions by 25% to 40% before 2020 and by 80% to 95% before 2050.



Source: IPCC (2007)

Global annual CO_2 emissions – climate stabilisation at 2ºC versus business-as-usual

To keep global average temperature rise to 2°C above pre-industrial levels, assessments by the IPCC show the need for a peak in CO_2 emissions by 2015 and drastic reductions by 2050.

IPCC climate scenarios: climate stabilisation at 2ºC versus business-as-usual

CO_2 concentration in parts per million	Global mean temperature increase above pre-industrial levels (ºC)	Peaking year for global CO_2 emissions	Global change in CO_2 emissions in 2050 (% of 2000 emissions)
350–400	2.0–2.4	2000–2015	-85 to -50
400–440	2.4–2.8	2000–2020	-60 to -30
440–485	2.8–3.2	2010–2030	-30 to +5
485–570	3.2–4.0	2020–2060	+10 to +60
570–660	4.0–4.9	2050–2080	+25 to +85
660–790	4.9–6.1	2060–2090	+90 to +140

Even these IPCC figures may be underestimates. In a footnote beneath the table, the panel admits that 'emission reductions … might be underestimated due to missing carbon cycle feedbacks'.

What this means is that scientists have not been able satisfactorily to factor in to their predictions the impact of the biosphere's response to global warming. At a certain point, rising global temperatures will tip the planet's ecological balance, disrupting ecosystems in ways that provoke feedback of more GHG emissions and a catastrophic acceleration of climate change.

Two examples of positive feedback illustrate the risk: as soil temperatures rise, soil bacteria respire more, generating more CO_2. As air temperatures rise, tropical forests die back, releasing the carbon they contain to the atmosphere, thereby accelerating the temperature rise. A recent study estimates that such feedbacks already account for about 18% of global warming.[216]

So what is to be done? In plain English: a low carbon economy. Considerable reductions in GHG emissions from manufacturing, heating, electricity, transport, fertiliser. Zero deforestation, rapid reforestation. A radical transformation in agriculture. And we need the systemic change resulting in big emissions cuts fast. NASA's climate scientists warn us that 'continued rapid growth of CO_2 emissions and infrastructure for another decade' may make halting high-risk increase in global temperatures 'impractical if not impossible'.

A critical hurdle stands in the way of real, effective long-term action: short-term economic and political interests pushing carbon-intensive economic growth.

Indeed, the world is not just moving too slowly, it is going in the wrong direction.

Confronted by the reality of climate change, with its threats of economic, social and environmental turmoil, global energy demands and emissions from deforestation and peatland degradation are increasing rapidly. Since the Kyoto Protocol was signed, there has been an acceleration in global emissions.

Failing to act immediately and radically on this urgent vision, allowing business to continue as usual, will lead to increasing global insecurity as climate change intensifies, with significant species extinctions, widespread ecosystem collapse, major coastal flooding as well as extensive damage to agriculture and water supplies. Serious social conflict in such insecure conditions seems inevitable.

It is the investments we make today that will shape the future. Keeping the global temperature increase below 2°C means that global emissions of GHGs must peak by 2015 and by this time the world must be set on track for rapid and drastic reductions in overall emissions.

As NASA's climate scientists observe: 'The task is to achieve a transition… without pushing the climate system beyond a level where disastrous irreversible effects become inevitable.'

II. NET 25-YEAR EMISSIONS ASSOCIATED WITH OIL PALM DEVELOPMENT ON PEATLANDS

This calculation includes emissions associated with forest clearance (including burning) but excludes forecast carbon debt associated with continued degradation of peatlands after plantation development and excludes carbon sequestration services (peatlands can act as carbon sinks)

- **Net peatland carbon loss resulting from forest conversion over 25-year economic lifecycle of an oil palm plantation**[217]
  Land clearance (emissions from destruction of forest biomass, including fire used for forest clearance):
  648 tonnes CO_2/ha (+/-337 tonnes)

  Emissions from peat degradation through drainage:
  816 tonnes CO_2/ha (+/-393 tonnes)

  Carbon fixation in oil palm plantation biomass: 35 tonnes carbon/ha, equivalent to **129 tonnes CO_2/ha** (+/- 40 tonnes).

  Therefore, mean net emissions change over 25 years:
  1,335 tonnes CO_2/ha

- **CPO production**[218]
  Mean CPO production per hectare over 25-year economic lifecycle of an Indonesian oil palm plantation (based on annual harvest of 3.7 tonnes CPO/ha x 20 year maturity):
  74 tonnes CPO/ha

- **CO_2 emissions per tonne of CPO**
  Dividing emissions by average palm oil harvest over the period shows the actual carbon debt incurred over the lifecycle of the plantation:
  18 tonnes/CO_2

- **Financial implications of conversion**
  At predicted carbon trading prices of €30 per tonne of CO_2, 25-year economic lifecycle average carbon offset cost per tonne of palm oil produced on peatland amounts to **€540 – a 90% premium** on top of palm oil trading prices of €580.

III. PROFILES OF ASSESSED PALM OIL TRADERS AND PRODUCERS

ADM-WILMAR-KUOK IS ONE OF THE WORLD'S LARGEST PRIVATELY OWNED GROUPS

The ADM-Kuok-Wilmar alliance is a major player in the palm oil sector and is a member of the RSPO

Wilmar is a RSPO member. It claims to be the world's largest producer of palm oil based biodiesel.[219] The Group – effectively a shareholder alliance between ADM[220] and the Kuok family[221] – also controls about 570,000ha of concession area (just over a third of this has been cleared and planted), palm oil refineries and biodiesel plants across Indonesia and Malaysia.[222] Of this, some 493,000ha is in Indonesia.[223]

In 2007, Indonesian production for the Wilmar Group was around 540,000 tonnes of CPO, accounting for more than 3% of Indonesia production.[224] Although Wilmar owns substantial concession areas, more than 55% of its palm oil production comes from third-party plantations.[225]

The Kuok Group was founded by Robert Kuok Hock-Nien, the uncle of William Kuok, one of Wilmar's founders. According to Forbes, in 2005, Robert Kuok Hock-Nien was the richest man in Asia.[226]

The US-headquartered ADM claims to be the world's leading processor of agricultural crops and Europe's leader in biofuels.[227] The company also trades CPO on the Chicago futures market (meaning contracts are signed and traded months ahead of delivery).[228] ADM is one of Cargill's main competitors in the palm oil sector,[229] although through Wilmar, the alliance also trades with Cargill.[230]

Unilever's links to ADM-Kuok-Wilmar

In a 2006 declaration to institutional investors, Wilmar announced that its key international customers include Procter & Gamble, Cargill, Unilever, Nestlé and China Grains & Oils Group Corporation.[231]

In the UK, most if not all of Unilever's palm oil is supplied by ADM.[232] The company operates a refinery immediately next door to Unilever's margarine factory outside London. Reported as the largest margarine factory in the world,[233] the Unilever factory produces brands such as Flora and Bertolli.[234] The ADM refinery handles more than 300,000 tonnes of edible oils a year, including palm oil.[235] In addition to supplying products to the Unilever factory, the company delivers products to a wide range of food factories around the UK and overseas.[236]

Unilever also has trade links to the Kuok Group. For instance, Unilever Pakistan purchased almost 100 tonnes of PKO from the Group in August 2007.[237] Kuok Group is known to source palm oil from Astra Agro as well as other third-party suppliers.[238]

In 2008, Unilever named Kuok-Wilmar as one of its principle suppliers.[239]

ASIAN AGRI

Asian Agri is a major player in the palm oil sector and is a member of the RSPO

RSPO member Asian Agri[240] is part of the Raja Garuda Mas Group, which owns the pulp and paper giant APRIL.[241] Raja Garuda Mas is controlled by Sukanto Tanoto, whom *Forbes* lists as the richest man in Indonesia.[242] *The Jakarta Post* reports that Asian Agri is currently under investigation for evasion of taxes worth up to Rp1.3 trillion ($140 billion), with the possibility of criminal charges against its top executives.[243]

Asian Agri controls over 160,000ha of planted plantation land in Riau, Jambi and North Sumatra:[244] 100,000ha in concessions and 60,000ha in smallholder areas.[245]

In 2007, the Group refined about 1.5Mt of CPO, about 9% of Indonesia's production.[246]

Unilever's links to Asian Agri

Unilever trader Cargill is known to source palm oil from the Asian Agri Group in Indonesia.[247]

In 2008, Unilever named Asian Agri as one of its principle suppliers.[248]

'Asian Agri has a very strict no-burn policy. During either initial planting (land clearing) or replanting, Asian Agri utilises mechanical means to clear land.'
Asian Agri website

ASTRA AGRO

Astra Agro is a major player in the palm oil sector

Astra Agro is controlled by Indonesia's car manufacturer PT Astra International.

During 2007, the Group increased its landholdings by 70% to nearly 400,000ha.[249] Of this, some 235,000ha is planted[250] (90,000ha in Kalimantan, 107,000ha in Sumatra and 38,000ha in Sulawesi).[251] Some 40% remains to be planted.

In 2007, the Group produced 921,000 tonnes of CPO, accounting for 5.5% of Indonesia's production.[252]

Unilever's links to Astra Agro

Unilever trader Cargill is known to source palm oil from the Astra Agro Group in Indonesia.[253]

'The proposed Joint Venture is in line with the Group's strategy of growing its core palm oil business… It will provide immediate addition to planted hectarage as well as substantial suitable land bank for sustained business growth, hence providing the Group with the opportunity to capitalise on the very favourable outlook for the oil palm industry. The plantations… shall be cultivated in compliance with sustainable agricultural practices and principles in accordance with the principles and criteria of the Roundtable on Sustainable Palm Oil.'
IOI Announcement, 2007

IOI HAS A LONG HISTORY OF SELLING TO UNILEVER

IOI is a major player in the palm oil sector and is a member of the RSPO

The IOI Group has a plantation land holding of nearly 170,000ha in Malaysia (of which 149,000ha is planted) and another 152,000ha in Kalimantan in Indonesia (of which 43,000ha is planted) via a joint venture,[254] with 72% of its Indonesian holdings yet to be planted. These holdings include 63,000ha in Central Kalimantan.[255]

IOI has been involved in oleochemicals since 1980.[256] In 2006, IOI emerged as the world's largest producer of oleochemicals – chemicals often derived from palm oil that are used in cosmetics, laundry detergents and other household products. IOI has a total fatty acid production capacity of 700,000 tonnes a year.[257]

In 2007, the Group produced 790,000 tonnes of CPO representing more than 2% of global production.[258] It also produced 185,000 tonnes of PKO,[259] representing more than 4% of global production.[260]

In 2007, IOI is estimated to have produced around 180,000 tonnes of CPO,[261] accounting for just over 1% of Indonesian production.

Unilever's links to IOI

IOI has had a long association with Unilever. In 2002–2003, IOI bought the palm oil refining company Loders Croklaan from Unilever[262] at the same time as it acquired Unilever's Malaysian oil palm plantations.[263] Announcing the deal, Unilever stated: 'Loders Croklaan will continue to supply Unilever with specialty products.'[264]

In 2007 and 2008, IOI Rotterdam confirmed that it supplies Unilever from its Dutch refineries.[265]

In 2008, Unilever named IOI as one of its principle suppliers.[266]

MUSIM MAS

Musim Mas is a major player in the palm oil sector and is a member of the RSPO

In 2006, Musim Mas had 126,000ha of landholdings in Indonesia,[267] over half of these in Central Kalimantan.[268]

In 2007, the Group produced around 300,000 tonnes of CPO, accounting for 2% of Indonesia's production.[269]

The company seeks RSPO certification for all of its operations. This includes certification of the Central Kalimantan concession PT Globalindo Alam Perkasa in September 2009. As of December 2007, 2,531ha of this concession (15%) was reported planted.[270] Greenpeace has evidence that in December 2007, a baby orang-utan was captured in this concession area, indicating that it has high conservation values (HCV). The concession is located on peat,[271] in some areas over 4 metres deep, and had fire hotspots in 2006,[272] implying recent clearance.

Unilever's links to Musim Mas

Unilever supplier Golden Hope is known to source palm oil from the Musim Mas Group in Indonesia.[273]

Unilever trader Cargill is known to source palm oil from the Musim Mas Group in Indonesia.[274]

In 2008, Unilever named Musim Mas as one of its principle suppliers.[275]

'We are the first plantation company in Malaysia to receive the Global 500 Award by the United Nations Environment Programme (UNEP) for our "Zero Burning" practices.'
Golden Hope (now part of Sime Darby) 2006

SIME DARBY – THE WORLD'S LARGEST PALM OIL PRODUCER

Sime Darby is a major player in the palm oil sector and is a member of the RSPO

The 2007 merger of Sime Darby, Golden Hope Plantations and Kumpulan Guthrie established Sime Darby Plantation as the world's largest palm oil producer, with the potential of producing 8% of the world's total palm oil output.[276] This publicly-listed group, which runs plantations, refineries and biodiesel plants across Indonesia and Malaysia,[277] is controlled by the Malaysian government.[278]

Sime Darby is a RSPO member. [279]

The Group is focusing on Indonesia for expanding its business.[280]

With total plantation assets of nearly 550,000ha, Sime Darby's nearly 200,000ha of oil palm concessions in Indonesia makes up for more than a third of its total holdings.[281] Prior to the merger, Golden Hope controlled a total area of 60,000ha in West Kalimantan, Indonesia, of which 13,000ha were planted with oil palms.[282] Kumpulan Guthrie owned and operated 56 plantation estates in Indonesia with a total land area of 220,000ha spread over Sumatra, Kalimantan and Sulawesi,[283] of which 175,000ha had been planted.[284]

In 2007, Indonesian production for the Sime Darby Group was around 800,000 tonnes of CPO, accounting for nearly 5% of Indonesia production.[285]

Unilever's links to Sime Darby

The Group is a major supplier to Unilever.[286]

There is a long standing relationship between Unilever and companies now part of Sime Darby Group.

In 2002, Golden Hope bought Unimills, Unilever's oil refinery in Rotterdam in the Netherlands.[287] Unimills is the second largest diversified oil and fats blend manufacturer in Europe[288] – an industry that uses large quantities of palm oil. A recent announcement by Sime Darby confirmed that Unilever is a major customer of the Golden Hope (now Sime Darby) Unimills refinery in Rotterdam.[289]

In 2008, Unilever named the Sime Darby Group, including Golden Hope and Kumpulan Guthrie, as one of its principle suppliers.[290]

Golden Hope is known to trade palm oil sourced from the Musim Mas Group in Indonesia.[291]

SINAR MAS IS INDONESIA'S LARGEST OIL PALM PLANTATION COMPANY

Sinar Mas is a major player in the palm oil sector and is a member of the RSPO

Sinar Mas is a RSPO member through its oil palm plantation subsidiary PT SMART.[292]

The Sinar Mas Group accounts for almost 10% of palm oil production in Indonesia.[293] The Group produces not just CPO, but also PKO and a wide range of refined products for both food and industrial purposes. [294]

In 2008, Sinar Mas branded itself 'No. 1 in Indonesia'[295] for total planted plantation area. This empire includes 360,000ha of plantation: some 213,000ha in Sumatra, 135,000ha in Kalimantan and 12,000ha in Papua.[296]

Sinar Mas claims to have 'the largest land bank in the world for new plantations'[297] and has publicly announced plans to expand its holdings by 1.3 million ha in the heavily-forested province of Papua and in Kalimantan.[298] However, an internal company presentation obtained by Greenpeace indicates that the company plans to develop a rainforest area of up to 2.8 million ha in Papua.[299]

The Sinar Mas Group is involved in 'aggressive plantations expansion'[300] – 'the most aggressive new planting programme among the plantation companies'[301] – planting 53,000ha in 2007 with plans to plant at least 60,000ha in 2008,[302] representing a growth in plantation area of over a third in a two-year period. [303] Judging by past operations and known landbank, the vast majority of this will involve deforestation, some on peatlands and in critical orang-utan habitat.

Unilever's links to Sinar Mas

Despite Sinar Mas' 'legacy issues'[304] – including defaulting on most of the $13.4 billion debt of its APP subsidiary in 2001[305] – Unilever has maintained a long-standing relationship with the company. A 1999 Sinar Mas document states: 'Our major customers include Cargill and Unilever. These sales were made through foreign brokers or directly to the importer located in the countries to which the products were exported.'[306] The Sinar Mas 2004 and 2006 Annual Reports[307] also indicate that Unilever has been an important client in 2003–2006, along with Nestlé and Carrefour.[308]

IV. CDP SIGNATORIES WHO ARE ALSO SHAREHOLDERS IN UNILEVER, NESTLÉ, PROCTER & GAMBLE AND KRAFT

Many signatories to the CDP are also significant shareholders in corporate groups whose supply chains include palm oil. CDP signatories who are also investors in Unilever, Nestlé, Procter & Gamble and Kraft include AXA, Barclays, Blackrock, BNP Paribas, Credit Agricole, Credit Suisse, F&C Asset Management, Fortis, Goldman Sachs, Henderson Global Investors, HSBC, ING, JP Morgan, Legal & General, Morgan Stanley, Standard Life and UBS.

All names	Unilever PLC no. of shares	%	Unilever NV no. of shares	%
Total CDP investor signatories who are also Unilever shareholders	472,285,324	36.4	273,443,741	15.9
Total CDP investor signatories	472,285,324	36.4	273,443,741	15.9
Aberdeen Asset	5,224,241	0.40	1,561,267	0.09
Acuity	-	-	-	-
AEGON	-	-	-	-
AGF	-	-	-	-
AIG	127,696	0.01	190,238	0.01
Allianz	16,611,808	1.28	7,502,146	0.44
ATP	3,176,854	0.24	-	-
Aviva	16,914	0.00	1,473,711	0.09
AXA	17,775,410	1.37	11,188,378	0.65
Axiom	-	-	-	-
Baillie Gifford	40,000	0.00	191,138	0.01
Bank Sarasin	-	-	119,015	0.01
Bank Vontobel	-	-	6,100	0.00
Barclays	44,786,749	3.45	23,504,125	1.37
Beutel Goodman	-	-	133,145	0.01
BlackRock	18,334,023	1.41	25,724,990	1.50
BMO	77,633	0.01	-	-
BNP Paribas	4,608,683	0.35	4,617,197	0.27
Boston	23,340	0.00	24,820	0.00
BP	1,980,000	0.15	-	-
BT	-	-	-	-
California State	-	-	-	-
Calvert	-	-	-	-
Canada Pension Plan	1,405,000	0.11	2,630,000	0.15
Carl Domino	-	-	-	-
Carlson Capital LP	-	-	-	-
Carmignac Gestion	876,000	0.07	2,592,000	0.15
CCLA	2,072,000	0.16	688,821	0.04
CI Investments	-	-	-	-
CIBC	126,395	0.01	32,975	0.00
Citizens Investment Advisors	-	-	106	0.00
ClearBridge	10,150,059	0.78	483,311	0.03
Close International	-	-	-	-
Credit Agricole	-	-	-	-
Credit Suisse	5,382,664	0.41	651,988	0.04
Daiwa	276,000	0.02	9,650	0.00
Deka	738,090	0.06	3,054,832	0.18
Delta Lloyd	1,237,000	0.10	100,000	0.01
Deutsche Bank	3,131,053	0.24	100,869	0.01
Deutsche Postbank	214,000	0.02	1,110,070	0.06
Dexia	5,853,147	0.45	99,727	0.01
DnB	304,993	0.02	977,698	0.06
DWS	-	-	438,905	0.03
ELM	-	-	-	-
Epworth	357,000	0.03	-	-
Eurizon	250,000	0.02	1,703,892	0.10
Evli	-	-	9,388	0.00
F&C	10,932,224	0.84	7,917,484	0.46
FirstMerit	-	-	-	-
Fisher	-	-	-	-
Fixed Income	-	-	-	-
Folksam Omsesidig Livforsakring	-	-	123,135	0.01
Fortis	7,406,514	0.57	4,226,400	0.25
Frankfurt-Trust	620,000	0.05	411,209	0.02
Franklin Templeton	1,746,475	0.13	2,551,100	0.15
Fred Alger	-	-	-	-
Gartmore	-	-	-	-
Generation Investment	-	-	-	-
GLG	-	-	-	-
Goldman Sachs	11,938,478	0.92	25,070,895	1.46
Harrington	-	-	-	-
Harvard Management	-	-	-	-
Heleba	237,694	0.02	735,104	0.04
Henderson Global	-	-	2,832,349	0.17
Hospitals of Ontario Pension Plan	-	-	-	-
HSBC	13,029,206	1.00	3,094,466	0.18
ING	1,147,640	0.09	28,677,280	1.67
Insight Investment	9,741,000	0.75	147,701	0.01
Investec	1,979,000	0.15	4,042,916	0.24

P&G shares	P&G % O/S	Kraft shares	Kraft % O/S	Nestlé shares	Nestlé % O/S
553,946,629	18.0	297,410,672	19.5	32,687,480	8.3
589,001,567	19.1	335,969,321	22.1	35,009,091	8.9
4,205,112	0.14	2,503,202	0.16	48,125	0.01
-	-	-	-	1,460	0.00
1,171,713	0.04	443,053	0.03	111,300	0.03
325,700	0.01	76,200	0.01	415	0.00
1,882,621	0.06	1,339,512	0.09	127,530	0.03
2,757,145	0.09	13,273,056	0.87	2,253,905	0.57
576,829	0.02	-	-	435,579	0.11
235,402	0.01	300,000	0.02	105,471	0.03
1,312,530	0.04	466,165	0.03	823,503	0.21
7,173	-	-	-	-	-
-	-	-	-	118,515	0.03
83,000	0.00	2,630	-	279,139	0.07
1,920	-	-	-	446	0.00
129,547,328	4.21	67,922,341	4.46	2,593,337	0.66
-	-	-	-	-	-
23,158,263	0.75	4,234,709	0.28	1,479,490	0.38
2,063,996	0.07	888,640	0.06	-	-
2,105,158	0.07	1,388,000	0.09	399,822	0.10
90,033	0.00	55,602	0.00	-	-
620,000	0.02	282,000	0.02	-	-
-	-	8,369	0.00	17,379	0.00
5,163,092	0.17	-	-	-	-
183,380	0.01	8,787	0.00	-	-
4,478,068	0.15	2,124,819	0.14	280	0.00
27,814	0.00	-	-	-	-
-	-	754,700	0.05	-	-
-	-	-	-	-	-
80,553	0.00	-	-	67,575	0.02
880,099	0.03	-	-	330	0.00
421,806	0.01	394,631	0.03	350	0.00
-	-	23,155	0.00	-	-
14,850,472	0.48	12,541,773	0.82	-	-
-	-	91,699	0.01	-	-
3,382,708	0.11	697,440	0.05	513,065	0.13
16,326,790	0.53	7,894,538	0.52	3,106,572	0.79
298,737	0.01	-	-	6,490	0.00
505,006	0.02	168,484	0.01	731,270	0.19
19,159	0.00	-	-	249,297	0.06
8,556,691	0.28	7,488,668	0.49	-	-
83,700	0.00	-	-	-	-
952,800	0.03	828,904	0.06	-	-
2,377,991	0.08	107,502	0.01	10,400	0.00
900,855	0.03	156,794	0.01	730,415	0.19
10,105	-	-	-	-	-
-	-	-	-	-	-
820,885	0.03	506,092	0.03	285,831	0.07
-	-	-	-	1,100	0.00
856,083	0.03	163,863	0.01	166,494	0.04
394,859	0.01	-	-	-	-
5,511,069	0.18	-	-	-	-
43,206	0.00	-	-	-	-
125,057	0.00	-	-	13,595	0.00
4,690,712	0.15	2,952,845	0.19	548,680	0.14
46,025	0.00	-	-	-	-
11,654,015	0.38	11,076,964	0.73	-	-
-	-	52,317	0.00	-	-
56,607	0.00	-	-	-	-
481,712	0.02	-	-	-	-
-	-	6,998	-	-	-
14,494,198	0.47	9,267,180	0.61	408,446	0.10
60,573	0.00	-	-	-	-
-	-	149,459	0.01	-	-
142,886	0.01	-	-	-	-
778,915	0.03	182,028	0.01	274,491	0.07
-	-	-	-	-	-
2,108,216	0.07	747,811	0.05	289,016	0.07
9,275,468	0.30	6,585,300	0.43	897,058	0.23
720,931	0.02	43,233	0.00	399,252	0.10
48,569	0.00	-	-	2,983	0.00

All names	Unilever PLC no. of shares	%	Unilever NV no. of shares	%
Jarislowsky Fraser	4,177	0.00	100,582	0.01
JPMorgan	10,674,719	0.82	10,050,623	0.59
Jupiter	2,796,798	0.22	3,670,456	0.21
KLP	173,000	0.01	436,445	0.03
La Banque Postale	-	-	-	-
LBBW	-	-	3,273,323	0.19
Legal & General	54,184,916	4.17	-	-
Legg Mason	2,583,239	0.20	128,331	0.01
Lombard Odier	163,000	0.01	1,085,000	0.06
Macif	40,676	0.00	12,498	0.00
MEAG	415,584	0.03	3,473,115	0.20
Meeschaert	-	-	-	-
Meiji Dresdner	-	-	-	-
Merrily Lynch	178,493	0.01	392,769	0.02
Metzler	1,444,650	0.11	859,363	0.05
Mitsubishi	-	-	-	-
Mizuho	2,699,000	0.21	-	-
Monte Paschi	851,318	0.07	19,159	0.00
Morgan Stanley	10,318,797	0.79	14,093,333	0.82
Morley	32,488,000	2.50	675,746	0.04
Natcan	2,444	0.00	3,198	0.00
Natixis	2,606,387	0.20	8,330,891	0.49
Neuberger Berman	23,122	0.00	100,948	0.01
Neuflize OBC	-	-	-	-
New Jersey Division of Investment	7,097,170	0.55	54,714	0.00
New York State	1,565,360	0.12	292,631	0.02
Newton Investment	5,703,373	0.44	3,016,211	0.18
NFU	1,566,500	0.12	211,000	0.01
Nikko	23,058	0.00	539,539	0.03
Northern Trust	9,075,189	0.70	491,861	0.03
Oddo	30,000	0.00	276,362	0.02
Old Mutual	-	-	39,000	0.00
Ontario Municipal Employee Retirement System	-	-	2,833,358	0.17
Ontario Teachers' Pension	-	-	2,833,358	0.17
Pax World	-	-	-	-
Phillips, Hager & North	-	-	-	-
Pictet	1,015,116	0.08	62,000	0.00
Pioneer	7,285,963	0.56	3,309,338	0.19
Portfolio 21	-	-	-	-
Prudential	137,000	0.01	-	-
Rathbone	7,100,000	0.55	52,000	0.00
Robeco	-	-	3,344,749	0.20
Royal Bank Of Canada	864	0.00	24,000	0.00
SAM	940,132	0.07	1,500	0.00
Sanlam	12,260	0.00	-	-
Schroders	14,104,000	1.09	8,536,132	0.50
Scottish Widows Investment	16,120,000	1.24	4,921,525	0.29
SEB	1,678,207	0.13	475,097	0.03
Seligson	-	-	123,827	0.01
Siemens	401,252	0.03	29,670	0.00
Signal Iduna	-	-	808,330	0.05
SNS	-	-	1,741,375	0.10
Societe Generale	602,042	0.05	4,876,956	0.28
Solaris	-	-	-	-
Sompo	-	-	-	-
Standards Life	13,030,000	1.00	2,236,915	0.13
State Street	25,814,925	1.99	7,738,090	0.45
Storebrand Kapitalforvaltning	479,507	0.04	35,129	0.00
Sumitomo Mitsui	74,500	0.01	103,500	0.01
Sun Life	-	-	-	-
Swedbank	411,000	0.03	1,220,042	0.07
Swisscanto	176,417	0.01	1,627,319	0.09
T&D	3,278	0.00	22,106	0.00
The Royal Bank of Scotland	-	-	-	-
Trillium	-	-	-	-
UBS	20,718,081	1.60	2,221,240	0.13
Universities Superannuation	8,106,000	0.62	-	-
Wachovia Bank	428,704	0.03	376,203	0.02
West Yorkshire Pension Fund	2,281,000	0.18	-	-
WestLB	146,595	0.01	-	-
Zuercher Kantonalbank	134,500	0.01	-	-

P&G shares	P&G % O/S	Kraft shares	Kraft % O/S	Nestlé shares	Nestlé % O/S
4,619,177	0.15	-	-	40,881	0.01
28,345,455	0.92	21,229,884	1.40	609,350	0.16
27,700	0.00	37,000	0.00	-	-
613,579	0.02	55,989	0.00	101,993	0.03
217,000	0.01	-	-	98,268	0.02
11,600	-	6,159	-	48,522	0.01
9,237,415	0.30	-	-	224,432	0.06
2,295,593	0.08	-	-	966	0.00
94,485	0.00	-	-	430,597	0.11
-	-	-	-	-	-
420,679	0.01	452,300	0.03	102,121	0.03
3,655	-	1,572	-	-	-
6,400	-	12,900	0.00	-	-
11,555,887	0.38	6,114,491	0.40	899	0.00
102,949	0.00	-	-	123,736	0.03
-	-	-	-	59,175	0.02
35,800	0.00	207,100	0.01	20,800	0.01
118,370	0.00	-	-	152,874	0.04
14,637,294	0.48	36,028,409	2.37	1,299,710	0.33
1,913,959	0.06	606,898	0.04	116,126	0.03
16,970	0.00	-	-	61,141	0.02
2,976,197	0.10	1,091,652	0.07	307,384	0.08
12,603,529	0.41	4,882,139	0.32	11,800	0.00
85,775	0.00	-	-	-	-
8,419,370	0.27	3,826,893	0.25	-	-
9,757,343	0.32	-	-	-	-
1,221,040	0.04	2,524	-	212,272	0.05
-	-	-	-	-	-
62,074	0.00	411,154	0.03	88,769	0.02
48,250,150	1.57	18,213,072	1.20	130,306	0.03
54,894	0.00	1,903	-	6,822	0.00
-	-	-	-	-	-
-	-	-	-	210,959	0.05
1,066,124	0.04	61,725	0.00	938,269	0.24
612,100	0.02	-	-	-	-
65,788	0.00	-	-	-	-
1,365,629	0.04	485,325	0.03	1,967,801	0.50
1,364,895	0.04	6,142,113	0.40	101,500	0.03
1,191	-	55	-	-	-
-	-	-	-	-	-
89,547	0.00	137,236	0.01	-	-
6,073,276	0.20	2,820,974	0.19	426,232	0.11
9,612	-	-	-	-	-
685,899	0.02	12,900	0.00	125,460	0.03
12,729	-	53,839	0.00	9,287	0.00
2,176	-	449,035	0.03	1,495,312	0.38
323,214	0.01	-	-	35,147	0.01
315,239	0.01	638,857	0.04	241,615	0.06
49,008	0.00	-	-	-	-
44,615	0.00	123,809	0.01	23,026	0.01
76,000	0.00	-	-	46,664	0.01
-	-	7,029	-	8,164	0.00
515,477	0.02	91,600	0.01	141,894	0.04
-	-	400	-	-	-
17,102	0.00	-	-	-	-
1,476,322	0.05	606,177	0.04	479,502.00	0.12
106,798,526	3.47	63,024,822	4.14	801,885	0.20
455,341	0.02	-	-	-	-
191,500	0.01	109,969	0.01	-	-
125,897	0.00	59,656	0.00	-	-
2,512,440	0.08	922,973	0.06	23,800	0.01
677,652	0.02	236,942	0.02	2,065	0.00
75,958	0.00	2,264	-	8,200	0.00
60,570	0.00	1,742,558	0.11	-	-
262,849	0.01	-	-	-	-
13,587,981	0.44	4,752,319	0.31	5,865,592	1.49
-	-	-	-	-	-
10,150,489	0.33	1,853,034	0.12	-	-
-	-	-	-	-	-
194,347	0.01	170,549	0.01	93,956	0.02
84,000	0.00	5,536	-	215,410	0.05

ACRONYMS, TECHNICAL TERMS AND UNITS

$ – Dollars (US)

Annex I Parties – (Kyoto Protocol) Industrialised countries that were members of the OECD (Organisation for Economic Co-operation and Development) in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States.

Carbon, CO_2 and CO_2 equivalent (CO_2e) – Climate change potential may be measured in three sets of units depending on context: weights of carbon, of CO_2 and of CO_2 equivalent. In this report, weight of carbon is used when referring to stored carbon (eg tonnes of carbon per hectare in peatlands) and weight of CO_2 when referring to emissions. 1kg of carbon converts to 3.67kg CO_2 (this is directly equivalent to the difference in weight per carbon atom: carbon has an atomic weight of 12, CO_2 a molecular weight of 44 – one carbon atom plus two oxygen atoms). CO_2 equivalent (CO_2e) is an expression of global warming potential which includes the effects of other greenhouse gases (such as methane and nitrous oxides) in terms of the weight of CO_2 required to produce the same effect.

CDP – Carbon Disclosure Project

CO_2 – Carbon dioxide

CPO – Crude Palm Oil

€ – Euro

EU – European Union

EU25 – Twenty-five member states of the EU 2004-2007

EU27 – Twenty-seven member states of the European Union (including Bulgaria and Romania from 2007)

EU ETS – European Union Emissions Trading Scheme

FAO – Food and Agriculture Organisation of the United Nations

GHG – Greenhouse gas

Gt – Gigatonnes (billion tonnes)

ha – Hectare(s)

IPCC – Intergovernmental Panel on Climate Change

Kyoto Protocol – The Kyoto Protocol, an international and legally binding agreement to reduce GHG emissions world wide, entered into force on 16 February 2005. This international agreement, which builds on the UNFCCC, sets legally binding targets and timetables for cutting the GHG emissions of industrialised countries.

Mt – Megatonnes (million tonnes)

NGO – Non-governmental organisation

OECD – Organisation for Economic Cooperation and Development

PKO – Palm Kernel Oil

RSPO – Roundtable on Sustainable Palm Oil

t – Tonnes

t/ha – Tonnes/hectare

UN – United Nations

UNEP – United Nations Environment Program

UNFCCC – United Nations Framework Convention on Climate Change

USDA – United States Department of Agriculture

ENDNOTES

1 IPCC (2007) Table SPM.6

2 The CDP provides a coordinating secretariat for institutional investors with a combined $57 trillion of assets under management. On their behalf it seeks information on the business risks and opportunities presented by climate change and GHG emissions data from the world's largest companies: 3,000 in 2008. Over eight years CDP has become the gold standard for carbon disclosure methodology and process. The CDP website is the largest repository of corporate GHG emissions data in the world www.cdproject.net

3 CDP (2007) 'Greenhouse Gas Emissions Questionnaire (SCLC1)' 1 December 2007 4

4 See Greenpeace International (2007)

5 Responses to CDP 5 questionnaire 31 December 2006: Provide estimates in metric tonnes CO_2e for the following categories of emissions your supply chain. Procter & Gamble: 'We do not publicly disclose this information.' Nestlé: 'We encourage our agricultural raw material suppliers to optimise their energy usage, as part of sustainable agriculture practices. It should be noted that agricultural raw materials used to manufacture food products absorb CO_2 during their growth.' Kraft: 'Information not available.' (Source: www.cdproject.net/responses/cdp5/index.asp) For information on volumes of palm oil consumption see Greenpeace International (2007)

6 Greenpeace International (2007)

7 Mean average peatland depth for suppliers is 3 metres, carrying a carbon debt per tonne of CPO of 66t CO_2 (see 'Box two: Tropical peatland carbon budgets'). Crude oil holds 0.85t carbon per tonne = 3.1CO_2 (Source: Greenhouse gas protocol initiative (2008)

8 Hooijer et al (2006): 29

9 IPCC WGIII (2007): 3

10 Based on emissions from deforestation of 8.52Gt.IPCC WGIII (2007): 104 'Figure 1.2: Sources of global CO_2 emissions, 1970-2004 (only direct emissions by sector)'. Indonesia's peatland emissions are 1.8Gt/year. Hooijer et al (2006): 29. There are 27.1 million ha of peatlands in SE Asia, 83% of this is in Indonesia. 10.6 million ha (39%) of peatland in SE Asia was deforested in 2000. Accounting for continued deforestation at a rate of 1.5%/year, the deforested peatland area in 2006 is around 45% of total peatland area, or 12.1 million ha. 83% of 12.1 = 10 million ha of peatland deforested and degraded. Source: Hooijer et al (2006): 9, Wetlands International (2006a, 2006b). CIA (2007) gives global land area as 15 billion ha. So Indonesia's degraded peatlands equal 0.07% of the Earth's land surface.

11 Hooijer et al (2006): 13

12 Extrapolated from Rieley et al (2008)

13 IPCC (2007)

14 Hooijer et al (2006): 13 citing Sargeant (2001)

15 Wetlands International (2007)

16 Unilever uses 1.3Mt of palm oil or palm oil derivative every year. Of this, about 800,000 tonnes is for food use and the remainder is for industrial use, of which approximately 300,000 tonnes comes from palm kernel oil (Personal communication, 10 April 2008). This represents about 3% of global palm and palm kernel oil production in 2007 (42.4Mt). Source: Oilworld ISTA Mielke (2008) 'Oilworld statistics update' 14 March 2008' together with an estimate of palm kernel oil based on FAO (2006)

17 Clay (2005)

18 Clay (2005)

19 Unilever (2008)

20 Unilever (2008)

21 WRI (2008) 'Total GHG Emissions in 2004 (excludes land use change and international bunkers) CO_2 only': the Netherlands = 187Mt

22 Unilever (2008)

23 WRI (2008) 'Total GHG Emissions in 2004 (excludes land use change and international bunkers) CO_2 only': Sweden = 56Mt

24 Unilever (2008)

25 Total value €23.3 billion (Source: Banc of America (2007)); value of brands identified as having products containing palm oil €19.3 billion (Greenpeace analysis)

26 The Indonesian palm oil industry is responsible for 476Mt CO_2 emissions annually, based on average emissions 1997-2006 (source: Hooijer et al (2006) and extrapolation from Rieley et al (2008). As recently as 2005, Unilever purchased 5% of Indonesian palm oil production (source: Clay (2005)), thereby giving it a liability for 23.8Mt CO_2 emissions.

27 Milner (2008) quoting Henrik Hasselknippe, Point Carbon; and www.pointcarbon.com/article.php?articleID=27161
In the longer term, the price of carbon offsetting will be determined by targets negotiated under post-Kyoto agreements.

28 Operating profit = €5.2 billion in 2007. Source: Unilever (2007b): 2

29 Unilever uses 1.3Mt of palm oil or palm oil derivative every year. Of this, about 800,000 tonnes is for food use and the remainder is for industrial use, of which approximately 300,000 tonnes comes from palm kernel oil (Personal communication, 10 April 2008). This represents about 3% of global palm and palm kernel oil production in 2007 (42.4Mt). Source: Oilworld ISTA Mielke (2008) 'Oilworld statistics update' 14 March 2008' together with an estimate of palm kernel oil based on FAO (2006)

30 Clay (2005)

31 Banc of America Securities LLC (BAS) (2007): 27

32 Banc of America Securities LLC (BAS) (2007)

33 46% Source: Banc of America Securities LLC (BAS) (2007)

34 Lawrence (2008): 3

35 Lawrence (2008): 12

36 Banc of America Securities LLC (BAS) (2007)

37 Banc of America Securities LLC (BAS) (2007) 7

38 Banc of America Securities LLC (BAS) (2007) 69

39 Banc of America Securities LLC (BAS) (2007) 27

40 Banc of America Securities LLC (BAS) (2007) 69

41 Banc of America Securities LLC (BAS) (2007) 73

42 Banc of America Securities LLC (BAS) (2007) 73

43 Malaysia Palm Oil Board (2006)

44 Lawrence (2008): 10

45 Banc of America Securities LLC (BAS) (2007): 6

46 Lawrence (2008): 10

47 Lawrence (2008): 14

48 Banc of America Securities LLC (BAS) (2007): 11

49 Banc of America Securities LLC (BAS) (2007): 11

50 Lawrence (2008): 51

51 eg 'What is in your products?' www.unilever.com allows a partial ingredients search for individual products. See Greenpeace International (2007) for fuller details of individual products.

52 Lawrence (2008): 14

53 Lawrence (2008): 11

54 Banc of America Securities LLC (BAS) (2007): 11

55 Lawrence (2008): 9

56 Lawrence (2008): 12

57 Lawrence (2008): 6

58 Lawrence (2008): 21

59 Banc of America Securities LLC (BAS) (2007): 6

60 Unilever (2006)

61 Personal communication with Unilever staff, 10 April 2008

62 USDA (2005)

63 Malaysia Palm Oil Board (2006)

64 Malaysia Palm Oil Board (2006): 11

65 World Bank (2008)

66 Oilworld ISTA Mielke (2008): Indonesia averaged 3.7 tonnes CPO per hectare between 2003-2007

67 Malaysian production = 0.47t PKO/ha (derived from sources: http://econ.mpob.gov.my/economy/annual/stat2006/Area1.15.htm and http://econ.mpob.gov.my/stat/web_report1.php?val=200722 on the basis of harvest rates of 1.03t palm kernel per hectare and extraction rates of 45.47%). Therefore, 500,000t PKO x 0.5t/ha = 1 million ha.

68 Adam Harrison, WWF, letter to Greenpeace, 19 October 2007; this is equivalent to 17Mt CPO given that global production for 2007 is 38.13Mt (Source: Oilworld ISTA Mielke 'Oilworld statistics update' 14 March 2008)

69 RSPO member search
www.rspo.org/member_search.aspx?catid=37&ddlID=161

70 See Greenpeace International (2007)

71 FAO (2006): 56

72 cf Annual Reports Sinar Mas, Asian Agri (RGM), Wilmar, Musim Mas, Genting, IOI and others

73 Unimills, '3 Malaysian government-linked palm oil entities to fuse, creating world's largest producer' Press release 9 January 2007 www.unimills.com/searchnews_en.html?id=49&articleType=2

74 Unilever (2007a)

75 Nelleman et al (2007): 28

76 FAOSTAT (2008) accessed April 2008

77 Cited in IFC (2007): 208: according to the industry data 3% of all oil palm plantations are established in primary forests and 63% in secondary forest and vegetation.

78 5.5 million ha in 2005. IPOC (2006). 6.1 million ha in 2006. Suharto (2007): 4 'Area and production by category of producer, preliminary data for 2006'

79 Hooijer et al (2006): 13

80 Extrapolated from Rieley et al (2008)

81 IPCC (2007)

82 IUCN (2007)

83 See Greenpeace International (2008)

84 Evidence held by Greenpeace

85 Colchester et al (2006)

86 Decree of Minister of Forestry and Plantation Number 376/1998, dated 8 April 1998, gives criteria for choosing areas for oil palm plantations: 'plantation developments on peat soils deeper than two metres are not allowed'

87 Presidential decree no 32/1990 on 'Management of Protected Areas' 25 July 1990: Article 10 specifies that 'upstream swamp and peatlands deeper than 3 metres should be protected'. Source: Walhi et al (2006)

88 See table in this document

89 See Greenpeace International (2007)

90 Forestry Act No. 41/1999; Plantation Law 18/2004, article 26 states: 'any entrepreneur of plantation business is not allowed to open and/or manage its land by burning it, which can result in pollution and destruction of environment'. Source: Colchester et al (2006)

91 NASA/University of Maryland (2002)

92 Colchester et al (2006)

93 Evidence held by Greenpeace – eg Sinar Mas, Wilmar, Astra Agro

94 Personal communication, 10 April 2008

95 See Greenpeace International (2007), (2008) and tables within this report

96 Cargill, 'Cargill History and Current Status' www.cargill.com/news/issues/palm_current.htm#TopOfPage accessed 29 October 2007; Greenpeace investigation 2006-2007

97 Cargill, 'Cargill and Palm Oil Production' www.cargill.com/news/issues/palm_roundtable.htm accessed 29 October 2007

98 Forbes www.forbes.com/lists/2007/21/biz_privates07_Cargill_5ZUZ.html accessed 28 April 2008

99 Cargill, 'Cargill History and Current Status' www.cargill.com/news/issues/palm_current.htm#TopOfPage accessed 29 October 2007; Greenpeace investigation 2006-2007

100 Cargill, 'Cargill News, September-October 2007' www.cargill.com/files/cn_palm_sourcing.pdf accessed 31/10/07

101 Evidence held by Greenpeace

102 Evidence held by Greenpeace

103 Evidence held by Greenpeace

104 US Patent No. 20060141102 is evidence of this. Free Patents Online 'Frozen confection and process for manufacturing such' www.freepatentsonline.com/20060141102.html accessed 15 October 2007

105 Polish Information and Foreign Investment Agency (2006); see also Unilever Poland www.unilever.pl/ourcompany/Kariera/Praca_w_Unilever/Nasze_fabryki/Poznan.asp accessed 4 November 2007

106 Greenpeace investigations June-October 2007

107 Evidence held by Greenpeace

108 Hooijer et al (2006)

109 Hooijer et al (2006): 29

110 IPCC WGIII (2007): 3

111 1.26Gt CO_2 (90% of annual 1.4Gt CO_2) from peatland fires out of 1.8Gt CO_2. Source: Hooijer et al (2006): 29

112 Based on emissions from deforestation of 8.52Gt. IPCC WGIII (2007): 104 'Figure 1.2: Sources of global CO_2 emissions, 1970-2004 (only direct emissions by sector)'. Indonesia's peatland emissions are 1.8Gt/year. Hooijer et al (2006) 29. There are 27.1 million ha of peatlands in SE Asia, 83% of this is in Indonesia. 10.6 million ha (39%) of peatland in SE Asia was deforested in 2000. Accounting for continued deforestation at a rate of 1.5%/year, the deforested peatland area in 2006 is around 45% of total peatland area, or 12.1 million ha. 83% of 12.1 = 10 million ha of peatland deforested and degraded. Source: Hooijer et al (2006): 9, Wetlands International (2006a, 2006b). CIA (2007) gives global land area as 15 billion ha. So Indonesia's degraded peatlands equal 0.07% of the earth's land surface.

113 Net emissions estimated at 170t/ha. Area of degraded peatland within privately controlled oil palm concession boundaries is 2.8 million ha. Extrapolated from Rieley et al (2008)

114 Rieley et al (2008)

115 Germer and Sauerborn (2007). Published studies estimating the amount and rate of carbon lost to the atmosphere through clearance and agricultural development of forested peatlands are limited. Here we have used one of the more considered recent estimates for our calculation of carbon debt. This is based on assumptions about standard site level concession management.

116 Germer and Sauerborn (2007)

117 Emissions for land clearance, ie emissions from destruction of forest biomass, including fire used for forest clearance: 648 tonnes CO_2/ha (+/-337 tonnes) (Germer and Sauerborn (2007))

118 Mean net annual carbon change (carbon sink): +0.7 tonnes C/ha (equivalent to storing 2.6 tonnes CO_2/ha) (Rieley et al (2008))

119 Carbon fixation in oil palm plantation biomass: 35 tonnes carbon/ha, equivalent to 129 tonnes CO_2/ha (+/- 40 tonnes). (Germer and Sauerborn (2007))

120 Based on average yield per hectare 2003-2007 of 3.7 tonnes CPO/ha (Oil World ISTA Mielke)

121 Germer and Sauerborn (2007)

122 Milner (2008) quoting Henrik Hasselknippe, Point Carbon; and www.pointcarbon.com/article.php?articleID=27161

In the longer term, the price of carbon offsetting will be determined by targets negotiated under post-Kyoto agreements.

123 $780/t CPO (Malaysian), 5% bulk, CIF NW Europe. Exchange rate (yearly average for 2007) $1.37= ? Source: World Bank (2008)

124 RSPO Member search www.rspo.org/member_search.aspx?catid=37&ddlID=161

125 PT Eluan Mahkota, PT Kencana Amal Tani, PT Darmex Oil & Fats, PT Cerenti Subur and PT Taluk Kuantan Perkasa

126 Evidence held by Greenpeace

127 Greenpeace investigation

128 Sizes of concessions listed are those based on spatial analysis of the maps attached to the permits of the respective concessions.

129 PT Aditya Palma Nusantera (7,584ha), PT Kencana Amal Tani (8,766ha), PT Banyu Bening Utama (5,477ha), PT Mekar Sari Alam Lestari (15,416 ha), PT Bertuah Aneka Yasa (9.960ha), PT Palma Satu (15,505ha), PT Eluan Mahkota (7,575ha)

130 PT Aditya Palma Nusantera (7,584ha – 2005-2007), PT Cerenti Subur (8,106ha – 2006), PT Duta Palma Nusantara (3,040ha – 2005-2007 & 11,063 - 2006), PT Kencana Amal Tani (8,766ha – 2005-2007), PT Banyu Bening Utama (5,477ha – 2005-2007), PT Mekar Sari Alam Lestari (15,416 ha), PT Bertuah Aneka Yasa (9.960 ha – 2005-2007), PT Palma Satu (15,505ha – 2005-2007), PT Eluan Mahkota (7,575ha – 2005-2007), PT Johan Sentosa (6,222ha – 2005-2007), PT Wana Jingga Timur (4,883ha – 2005, 2006)

131 According to Indonesian Association of Biofuel Producers (APROBI), Duta Palma, via its subsidiary PT Darmex Oil plans to construct a 200,000t per year biodiesel facility in Indonesia, placing the company among the top producers of the countries. Source: APROBI (2007)

132 28,563ha: PT Kencana Amal Tani (8,766ha), PT Banyu Bening Utama (5,477ha), PT Bertuah Aneka Yasa (9,960ha), PT Mekar Sari Alam Lestari (15,416ha), PT Palma Satu (15,505ha)

133 24,385ha. Peat extent and peat thickness data, collected in field surveys over 1990-2002, were provided by Wetlands International – see Hooijer et al (2006)

134 Decree of Minister of Forestry and Plantation Number 376/1998, dated 8 April 1998 gives criteria for choosing areas for oil palm plantations: 'plantation developments on peat soils deeper than two metres are not allowed'

135 Presidential decree no 32/1990 on 'Management of Protected Areas' 25 July 1990: Article 10 specifies that 'upstream swamp and peatlands deeper than 3 metres should be protected'. Source: Walhi et al (2006)

136 Eg Fargione et al (2008); Rieley et al (2008)

137 Sargeant (2001)

138 De Santi et al (2008): 9

139 43.9Mt C out of 46.4Mt C is on areas mapped as 2-4 metres peat depth.

140 CIA (2007) gives global land area as 15 billion ha.

141 City Mayors, 'The largest cities in the world by land area, population and density' www.citymayors.com/statistics/largest-cities-area-125.html accessed 30 October 2007.

142 See table for methodology. WRI (2008) 'Total GHG Emissions in 2004 (excludes land use change and international bunkers) CO_2 only' Sweden = 55.4Mt

143 See Greenpeace International (2007)

144 37.7% Source: Hooijer et al (2006): 14 Figure 10

145 WWF (2001)

146 Colchester et al (2006): 25

147 Copy held by Greenpeace

148 Forestry Act No. 41/1999; Plantation Law 18/2004, article 26 states: 'any entrepreneur of plantation business is not allowed to open and/or manage its land by burning it, which can result in pollution and destruction of environment'. Source: Colchester et al (2006)

149 NASA/University of Maryland (2002)

150 Hotspots based on NASA/University of Maryland (2002)

151 5 million ha of largely forest land in ten months. Goldammer and Hoffmann (2001)

152 The report estimates that between 0.81 and 2.57Gt of carbon were released to the atmosphere in 1997 as a result of burning peat and vegetation in Indonesia, a volume equivalent to 13–40% of the mean annual global carbon emissions from fossil fuels. Source: Page et al (2002): 61

153 Analysis is based on several data sets. Palm oil concession boundaries based on FWI (2006; peatland distribution maps based on Wahyunto et al (2006); peatland carbon store based on 600 tonnes/ha/C per metre depth source Hooijer et al (2006); deforestation data based on maps developed by Sarvision–Wageningen University in collaboration with the Indonesian Ministry of Forestry (2007); hotspots based on NASA/University of Maryland (2002). Annual emissions for palm oil development on peatland (170t/ha) are based on figures provided by Rieley et al (2008). Figures are rounded and approximate.

154 WWF (2005) Forest cover 2000 is based on LANDSAT ETM imagery 1999 and 2000, modified by images from 2002. Forest cover 2010 and 2020 is a projection based on LANDSAT imagery 2000.

155 WWF (2005) Orang-utan distribution 1930 and 1999 based Rijksen and Meijaard (1999) Modified by removing occurrence above 500 m asl, except for Crocker Range National Park, Mt. Kinabalu and some areas in southeast Sabah. Orang-utan distribution 2004 and 2020 in Kalimantan based on 'Orang-utan PHVA (Population and Habitat Viability Assessment)' (2004) Modified by removing occurrence above 500 m asl. Orang-utan distribution 2004 and 2020 in Sabah based on Ancrenaz et al (2005)

156 FAO (2005)

157 Greenpeace SE Asia (2007)

158 FWI/GFW (2002): 14 citing Holmes (2000)

159 Nelleman et al (2007): 43

160 5.5 million ha in 2005. IPOC (2006). 6.1 million ha in 2006. Suharto (2007): 4 'Area and production by category of producer, preliminary data for 2006'

161 Legowo (2007)

162 Colchester et al (2006): 26, Table 1.2 'Provincial government plans to expand oil palm plantations'

163 Nelleman et al (2007): 9

164 Nelleman et al (2007): 9

165 Nelleman et al (2007): 9

166 Nelleman et al (2007): 9

167 AFP (2007)

168 Evidence held by Greenpeace

169 Painter (2007)

170 FWI (2006)

171 Michelle Desilets (2008) email communication, 8 April 2008

172 Photographic, video and rescue database evidence held by Greenpeace – examples include Wilmar, Musim Mas and Sinar Mas

173 Analysis is based on several data sets. Palm oil concession boundaries based on FWI (2006; peatland distribution maps based on Wahyunto et (2006); peatland carbon store based on 600t/ha/C per metre depth source Hooijer et al (2006); deforestation data based on maps developed by Sarvision–Wageningen University in collaboration with the Indonesian Ministry of Forestry (2007); hotspots based on NASA/University of Maryland (2002); orang-utan habitat based on WWF (2005)

174 CDP (2008) 'Carbon Disclosure Project working with corporate giants to assess CO_2 emissions and climate disclosure from supply chains in 2008' 21 January 2008 www.cdproject.net/viewrelease.asp?id=15 see also www.cdproject.net/sc_members_faq.asp?menu=4&submenu=0

175 CDP (2008) 'Carbon Disclosure Project working with corporate giants to assess CO_2 emissions and climate disclosure from supply chains in 2008' 21 January 2008 www.cdproject.net/viewrelease.asp?id=15

176 CDP (2008) 'Carbon Disclosure Project working with corporate giants to assess CO2 emissions and climate disclosure from supply chains in 2008' 21 January 2008 www.cdproject.net/viewrelease.asp?id=15

177 www.cdproject.net/sc_members_faq.asp?menu=4&submenu=0

178 www.cdproject.net/sc_members_faq.asp?menu=4&submenu=0

179 IPOC (2006)

180 Uryu (2007)

181 WWF (2006b)

182 Sinar Mas = 2.255Gt CO_2; RGM = 1.925Gt CO_2

183 WRI (2008) 'Total GHG Emissions in 2004 (excludes land use change and international bunkers) CO_2 only': EU25 = 4Gt

184 Sinar Mas = 113Mt CO_2; RGM = 97Mt CO_2

185 IPCC (2007) and WRI (2008) 'Total GHG Emissions in 2004 (excludes land use change and international bunkers) CO_2 only': the Netherlands = 187Mt

186 Sinar Mas oil palm area = 14,500ha, pulp = 397,000ha; RGM oil palm = 24,800ha, pulp = 335,400ha; total = 771,00ha

187 There are 27.1 million ha of peatlands in SE Asia, 83% of this is in Indonesia. 10.6 million ha (39%) of peatland in SE Asia was deforested in 2000. Accounting for continued deforestation at a rate of 1.5%/year, the deforested peatland area in 2006 is around 45% of total peatland area, or 12.1 million ha. 83% of 12.1 = 10m of peatland deforested and degraded. Source: Hooijer et al (2006): 9, Wetlands International (2006a, 2006b).

188 WRI (2008) 'Total GHG Emissions in 2004 (excludes land use change and international bunkers) CO_2 only'

189 Golden Agri-Resources (2008): 24, Liaw Thong Jung (2007) 'Equity Focus: KNM Group Berhad' Aseambankers Malaysia Equity Research, 15 February 2007 www.maybank2e.net/economic_library/equity_focus_150207(KNM).pdf p3, Reuters (2007) 'Massive oil palm expansion planned by Indonesia's richest man' 8 May 2007 http://news.mongabay.com/2007/0508-palm_oil.html

190 Wilmar (2006): 26

191 House of Lords (2006): 20

192 Greenergy, 'Palm oil in biodiesel – A Greenergy perspective' www.greenergy.com/perspectives/Palm.pdf accessed 24/10/07

193 Analysis is based on several data sets. Palm oil concession boundaries based on FWI (2006; peatland distribution maps based on Wahyunto et al (2006); peatland carbon store based on 600 tonnes/ha/C per metre depth source Hooijer et al (2006); deforestation data based on maps developed by Sarvision–Wageningen University in collaboration with the Indonesian Ministry of Forestry (2007); hotspots based on NASA/University of Maryland (2002); APP and APRIL pulpwood concession data held by Greenpeace. Annual emissions for palm oil development on peatland (170t CO_2e/ha) and for pulpwood development on peatland (280t CO_2e/ha) are based on figures provided by Rieley et al (2008). Figures are rounded and approximate.

194 'Unilever's contribution to Review of EU Biofuels Directive Public Consultation Exercise, April-July 2006, Energy and Transport Directorate-General, European Commission'

195 Unilever (2006)

196 Unilever (2008)

197 Unilever (2008)

198 Unilever (2007c)

199 Unilever (2008)

200 Unilever (2008)

201 WRI (2008) 'Total GHG Emissions in 2004 (excludes land use change and international bunkers) CO_2 only': Sweden = 56Mt

202 Unilever (2008)

203 WRI (2008) 'Total GHG Emissions in 2004 (excludes land use change and international bunkers) CO_2 only': the Netherlands = 187Mt

204 See 'Box two: Tropical peatland carbon budgets', based on 3 metres depth

205 0.85t carbon = 3.1CO_2 (Source: Greenhouse gas protocol initiative (2008))

206 Oil palm cultivation produces CPO, PKO and meal. Some sources would split the carbon liability between the products, attributing 87% liability to CPO (see Fargione et al (2007)). As Unilever consumes both products, for the purposes of these equations, all calculations are based on CPO alone.

207 The data comes from peat maps compiled by Wetlands International. Hooijer et al (2006) note that these maps are likely to underestimate Indonesia's true peatland carbon store: 1

208 Total CO_2 for 3 metres depth (see 'Box two: Tropical peatland carbon budgets')

209 IPCC (2007) and WRI (2008) 'Total GHG Emissions in 2004 (excludes land use change and international bunkers) CO_2 only': UK = 551Mt, Belgium = 119Mt

210 Based on €580/tonne. Source: $780/t CPO (Malaysian), 5% bulk, CIF NW Europe. Exchange rate (yearly average for 2007) $1.37= ? Source: World Bank (2008).

211 Operating profit for 2007 = €5,245m Source: Unilever (2007b)

212 Unilever (2008)

213 IPCC WGII (2007):44 Technical Summary: Box TS.5. 'The main projected impacts for systems and sectors'; IPCC WGI (2007): 543-544

214 IPCC (2007) Table SPM.6

215 IPCC (2007) Table SPM.6 Scenario one

216 Canadell et al (2007)

217 Germer and Sauerborn (2007)

218 Average yield per hectare 2003-2007. Source: Oilworld ISTA Mielke

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Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace.

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We investigate, expose and confront the trade in products causing forest destruction and climate change.

We challenge governments and industry to end their role in forest destruction and climate change.

We support the rights of forest peoples.