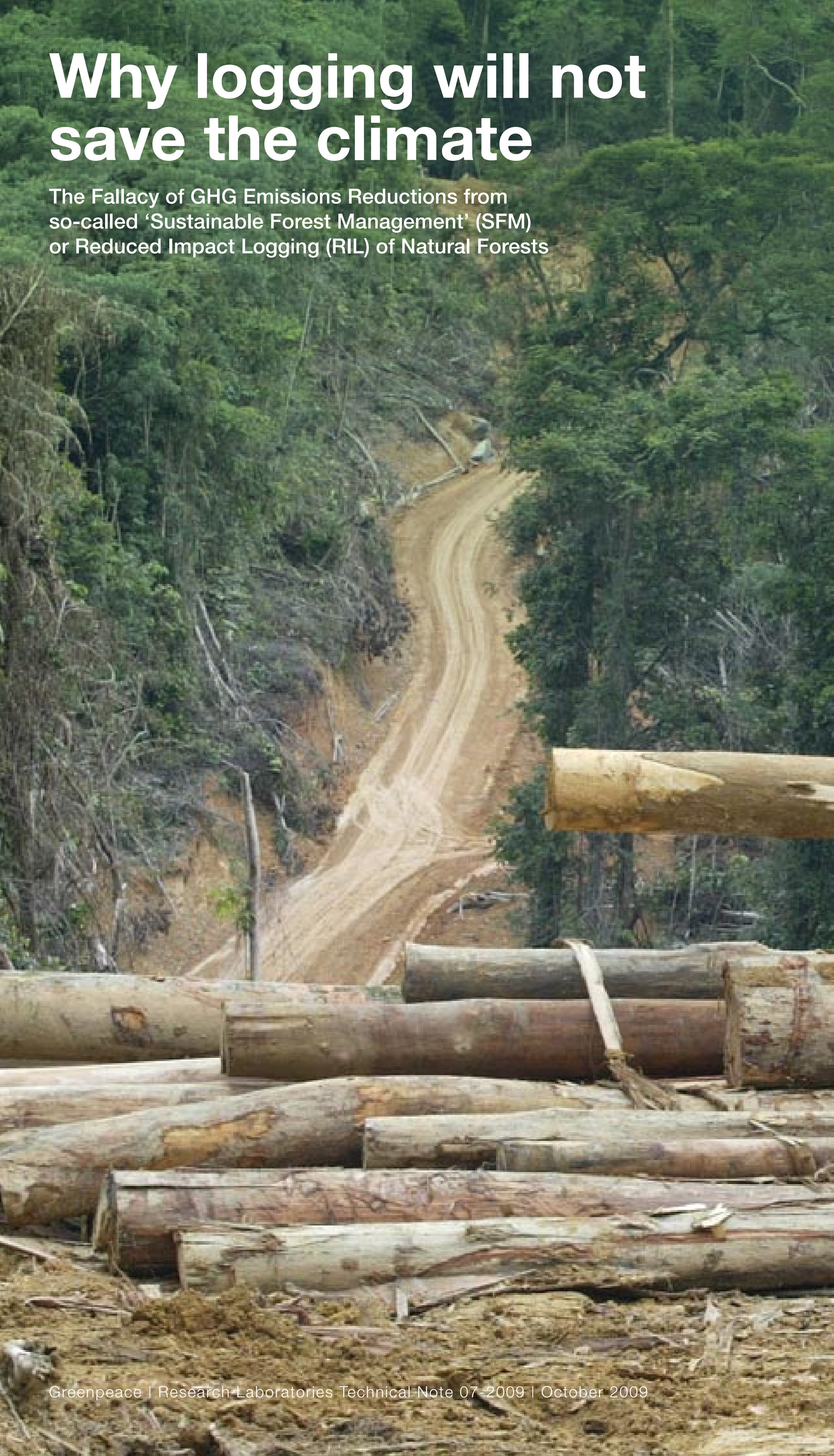
Why logging will not save the climate

The Fallacy of GHG Emissions Reductions from so-called 'Sustainable Forest Management' (SFM) or Reduced Impact Logging (RIL) of Natural Forests



Greenpeace | Research Laboratories Technical Note 07-2009 | October 2009

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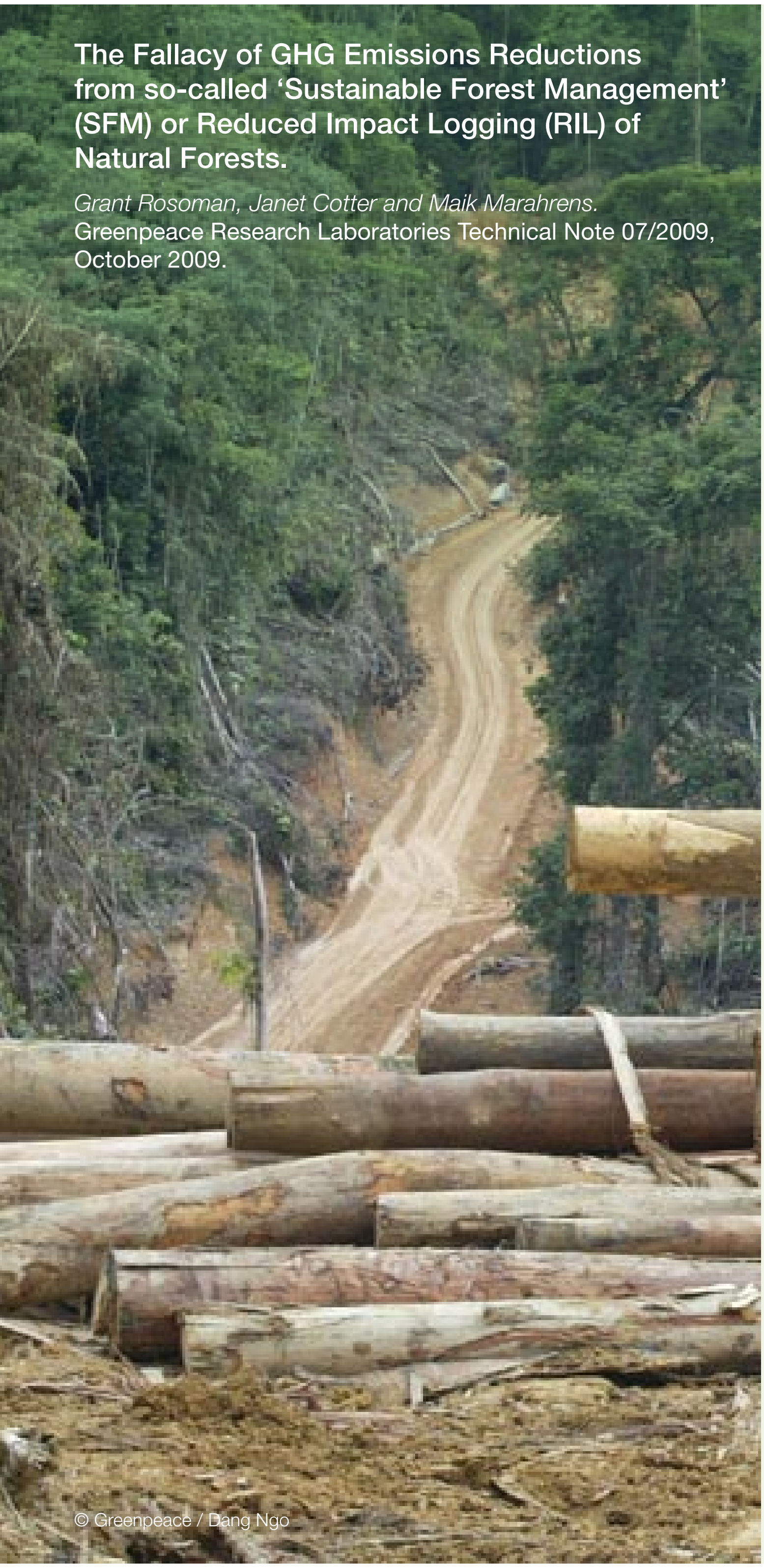
The Fallacy of GHG Emissions Reductions from so-called 'Sustainable Forest Management' (SFM) or Reduced Impact Logging (RIL) of Natural Forests.

Grant Rosoman, Janet Cotter and Maik Marahrens.
Greenpeace Research Laboratories Technical Note 07/2009, October 2009.



Contents

Glossary of Terms:

CBD....Convention of Biological Diversity
ITTO ...International Tropical Timber Organisation
IFM .....Improved Forest Management
RIL......Reduced Impact Logging
SMF....Sustainable Management of Forests
SFM....Sustainable Forest Management
HWP ...Harvested Wood Products.
VCS ....Voluntary Carbon Standard

Executive Summary

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Consideration of options for the inclusion of Reduced Emissions from Deforestation and Degradation (REDD) often gives reference to the potential of 'sustainable management of forests' as an avenue for achieving emissions reductions. The forest industry and some governments with vested interests in the logging sector, as well as several international organisations, are pushing a narrow interpretation and reframing of this under so-called 'Sustainable Forest Management' (SFM).

Primary (ancient or old growth) intact forests are the most resilient to climate change, contain the biggest carbon stock and have the highest biodiversity value of all forests. The amount of carbon taken up by all primary tropical forests (located in Asia, Africa and America) is thought to approximately balance the carbon emitted by deforestation – which in itself is more than the entire transport sector. The conservation of existing forests and especially intact forest landscapes (IFLs), which are largely unaffected by logging, is essential to prevent future greenhouse emissions from deforestation, as well as for conserving biodiversity.

Selective logging affects 28% of tropical forests worldwide. Vast areas of primary forest have also been allocated for future selective logging. Typical stand damages in conventional logging in many developing countries range from 10% to 70% of the residual trees, depending on logging intensity. In one major Papua New Guinea (PNG) logging concession it was found that there is a huge carbon liability as a result of the logging carbon emissions. Furthermore, if the indirect impacts of logging are considered - such as edge effects increasing drought sensitivity and the likelihood of being burnt, or improved access increasing the risk of degradation or conversion - then the climate impacts of selective logging would be considerably greater.

It has been suggested that improved tropical forest management could retain at least 0.16 gigatonnes of carbon (GtC) a year or equivalent to approximately 10% of tropical deforestation emissions globally. However, a study by the International Tropical Timber Organisation (ITTO) found that the potential emission reductions from SFM were only 3% of the mitigation potential of REDD and forest restoration. In whatever way it is assessed, so-called SFM or Reduced Impact Logging (RIL) is a major forest degradation activity. If a full life-cycle analysis was completed that included all the carbon emissions from harvesting, road-making, transport, processing and waste, then it is almost certain that there would be no net carbon storage in Harvested Wood Products (HWP).

Proponents of emissions reductions from SFM compare it with a business-as-usual scenario of conventional logging rather than with forest conservation and restoration options, and do not take account of most logging occurring in primary forests. Given the importance of tropical forests for mitigating climate change, particularly IFLs, conservation and protection options that retain and store the most carbon as well as protect the most biodiversity should be the priority objective. Degradation of primary forest through logging, whether it be conventional or SFM, limits the ability of these forests to absorb anthropogenic CO_2, while increasing their vulnerability to climate change.

Any potential carbon storage benefit from so-called SFM or RIL would be limited to restoration of secondary forests or those already heavily degraded by logging (where low-impact management interventions are used to restore the carbon stocks and biodiversity) and in support of indigenous peoples and local community rights. However, it is questionable whether a logging sector that is production and profit-driven, and riddled with illegalities and corruption, is able or can be trusted to deliver real emission reductions.

Therefore, SFM involving industrial logging of forests will not reduce GHG emissions from forests, nor make a positive contribution to slowing climate change. With SFM often providing a smokescreen for business-as-usual destructive forestry, REDD-incentivised SFM may in turn end up being a subsidy for the expansion of industrial logging into primary forests and IFLs.

Forest degradation should be included in any REDD frameworks. But, there should be no carbon credits or offsets given for industrial logging including SFM.

Greenpeace is calling for zero deforestation by 2020. Climate change and deforestation are a vicious cocktail – only zero deforestation can sufficiently increase the resilience of forests to climate change. Zero deforestation means an end to all forest degradation and deforestation - including an end to the industrial logging of primary and intact forest landscapes. It also means establishing comprehensive networks of protected areas at all scales consisting of strictly protected areas and core zones, as well as community protected areas and buffer zones allowing small-scale and low-impact forest use. Outside the protected area networks, the forest management standards of the Forest Stewardship Council (FSC) should, as a minimum, be applied to any forestry in secondary or regrowth natural forests to ensure an adequate level of conservation.

Introduction

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Consideration of options for the inclusion of Reduced Emissions from Deforestation and Degradation (REDD) often gives reference to the potential of 'sustainable management of forests' as an avenue for achieving emissions reductions[i]. The broad term of 'sustainable management of forests' (SMF) - which may include forest conservation, Non-Wood Forest Product harvest, or low impact community management - is often confused and used interchangeably with 'Sustainable Forest Management' (SFM)[ii], a more specific term given to improved logging and management of natural forests.

Further, other initiatives are promoting 'selective logging' or SFM as a way to address deforestation and forest degradation emissions, including: UNREDD (UNDP, FAO and UNEP), the World Bank Forest Carbon Partnership Facility, the Coalition for Rainforest Nations[iii], Global Environment Facility Scientific and Technical Advisory Panel (STAP), the International Tropical Timber Organisation (ITTO), and The Nature Conservancy (TNC) 'Combating Climate Change in Borneo' programme[iv]. The UN Forum on Forests is considering a voluntary global financial mechanism to finance SFM. Finally, the Voluntary Carbon Standard (VCS) is finalising a carbon trading methodology for 'Estimating GHG Emission Reductions from Planned Degradation (Improved Forest Management)'[v] after being developed by the controversial Australian company Carbon Planet[1].

It will be important in the consideration of a REDD mechanism under UNFCCC and in-country REDD architecture that there is a clear understanding of whether real emissions reductions can be achieved through this so-called SFM. This paper considers the carbon stocks held in primary forests and intact forest landscapes (IFLs), the impacts of both conventional (selective) logging and improved tropical forest management on carbon stocks, and the implications for achieving real forest degradation and deforestation emission reductions.

i E.g. At Poznan, the Subsidiary Body for Scientific and Technological Advice (SBSTA) requested its Chair to organise an expert meeting and to prepare a report for consideration at the June 2009 SBSTA in Bonn relating to inter alia "the role and contribution of conservation, sustainable management of forests, changes in forest cover and associated carbon stocks and greenhouse gas emissions and the enhancement of forest carbon stocks to enhance action on mitigation of climate change and to the consideration of reference levels…"

ii Defined by the ITTO (International Tropical Timber Organisation) as "Managing (permanent) forest to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services (e.g. carbon) without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment" (ITTO 2007)

iii Coalition for Rainforest Nations. Objectives; http://www.rainforestcoalition.org/eng/about/mission.php . Accessed 2 September 2009.

iv http://regserver.unfccc.int/sears/attachments/file_storage/in45vdfnsj5xrtpl.pdf

v http://www.v-c-s.org/methodology_eghger.html. Accessed 2nd September 2009

Importance of primary forests and Intact Forest Landscapes (IFLs) for carbon stocks and biodiversity

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Primary (ancient or old growth) intact forests are the most resilient to climate change, contain the biggest carbon stock and have the highest biodiversity value of all forests. As the Ad-Hoc Technical Expert Group (AHTEG) of the CBD (Convention on Biological Diversity) on biodiversity and climate change notes: *"Primary forests are generally more carbon dense and biologically diverse than other forest ecosystems, including modified natural forests and plantations … Evidence suggests that intact forests, particularly primary forests, will be more resistant to climate change than second-growth forests and degraded forests."*[2]

Further, recent reviews[3] and studies[4] have found that primary forests (boreal, temperate and tropical) are generally still increasing their carbon stores, contrary to the conventional equilibrium theory where carbon being lost through death is being replaced by growth. A recent long-term study has confirmed carbon stock increases for intact African tropical forests[5]. The amount of carbon taken up by all primary tropical forests globally is thought to approximately balance the carbon emitted by deforestation[6].

IFLs[vi] are critical for biodiversity (they contain landscape level groupings of biota and large areas for animals with large home ranges) as well as for climate change. IFLs are resilient to climate change because they are not fragmented and thus are not harmed by edge effects, with edges being vulnerable to drying, wind and fire. Generally, their inaccessibility protects them in the near future from degradation activities such as logging, and allows for species to better adapt to climate change.

"In largely intact forest landscapes where there is currently little deforestation and degradation occurring, the conservation of existing forests, especially primary forests, is critical both for preventing future greenhouse gas emissions through loss of carbon stocks and ensuring continued sequestration, and for conserving biodiversity."[7]

"Old-growth forests accumulate carbon for centuries and contain large quantities of it. We expect, however, that much of this carbon, even soil carbon, will move back to the atmosphere if these forests are disturbed."[8]

vi IFLs are a component of global forest cover which contains forest and non-forest ecosystems minimally influenced by human economic activity, with an area of at least 500 km2. See: Potapov, P. et al. (2008) Mapping the world´s intact forest landscapes by remote sensing. Ecology and Society 13 (2): 51

Logging and forest carbon stocks

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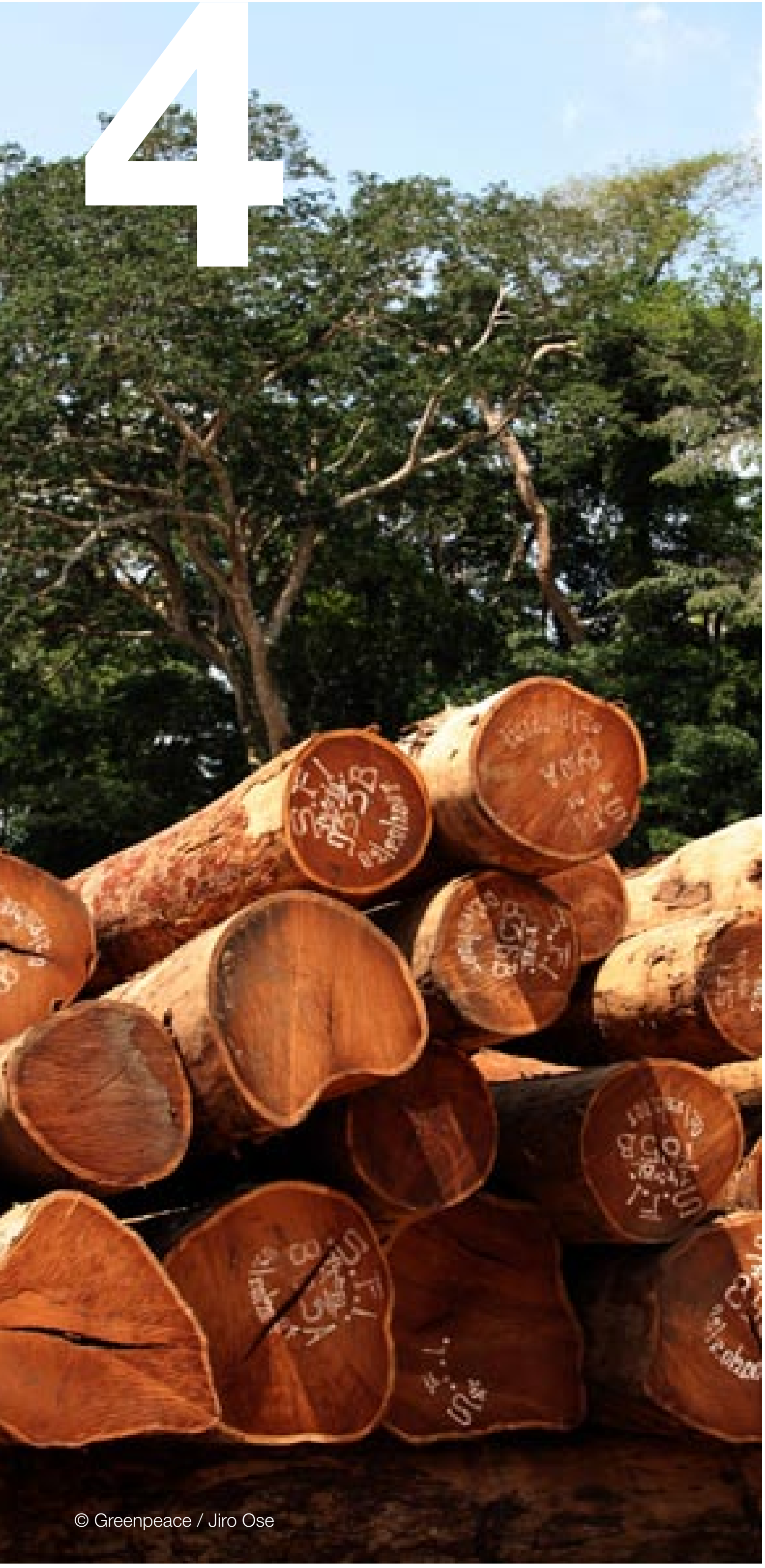

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Selective logging[vii] affects 28% of tropical forests worldwide[9]. Vast areas of primary forest have been allocated for future selective logging. In Papua New Guinea (PNG), between 2.9[10] and 4.1[11] million hectares of primary forest had already been selectively logged by 2002, and around half of PNG's forest (16.3 million hectares) is in concessions and under threat of becoming degraded as a result of logging. In Indonesia, 42 million hectares of forest are in concessions[12]. Across Central Africa, nearly 40 million hectares of primary forest are allocated to industrial logging concessions[13].

> **"Typical stand damages in conventional logging in many developing countries range from 10% to 70% of the residual trees depending on logging intensity" (FAO 2004)**

Typical stand damages in conventional logging in many developing countries range from 10% to 70% of the residual trees, depending on logging intensity[14] along with logging technique. Site damage, such as soil disturbance and compaction, or erosion will also release greenhouse gases from other carbon pools. Table 1 shows the many ways in which forest carbon stocks are reduced as a result of logging, along with the studies that have considered them. Several studies (see Table 1: point 3 below) in Southeast Asia[viii] looking at harvested timber, unutilised tree parts (roots, branches, etc) and trees, lianas and other vegetation damaged or destroyed, found that the direct impact of selective logging results in an approximate 50% reduction in biomass carbon.

vii The partial removal of trees for wood or forest management, as compared to clear-fell or clear-cut logging.

viii A 50% biomass (and hence carbon) has been found in several SE Asian studies on selective logging, e.g. Pinard & Putz (1996) found that, one year after logging, conventional (selective) logging contained biomass equivalent to 44% of pre logging levels in Sabah. This was for above and below ground biomass. Lasco et al. (2006) found that above ground carbon stocks declined by about 50% after selective logging. No measurements for below ground.

Table 1: Counting the carbon cost of selective logging

Source of carbon loss or emissions from selective logging and resulting degradation	Examples of studies that have considered this source
1. Logging infrastructure including roads, skid tracks and log ponds	UPNG (2008)[15], Greenpeace (2007)[16], Greenpeace (2008)[17]
2. Forest fragmentation impacts, including forest edge impacts from logging roads and biomass loss from forest fragmentation.	Laurance (1997)[18], Gaston et al. (1998)[19], Greenpeace (2007)[20]
3. Timber extraction impact on carbon stock, including volume of timber extracted and carbon from damaged and killed decomposing vegetation.	Abe et al. (1999)[21],Asner et al (2005)[22], PNGFA (2007)[23], Brown et al. (2005)[24], Lasco et al. (2006)[25], Pinard & Putz (1996)[26].

Taking into account road-building and infrastructure, as well as fragmentation and edge effects, carbon stock losses are even greater (see Table 1 above and see case study on page 9). Roads in particular are viewed as 'the seeds of tropical forest destruction'[27]. Furthermore, if the indirect impacts of logging are considered, such as edge effects increasing drought sensitivity and the likelihood of being burnt, or improved access increasing the risk of degradation or conversion[28], then the climate impacts of selective logging would be considerably greater. In the Amazon, remote sensing found that selective logging doubled the area of forest degraded by human activities[29].

"Furthermore, if the indirect impacts of logging are considered, such as edge effects increasing drought sensitivity and the likelihood of being burnt, or improved access increasing the risk of degradation or conversion, then the climate impacts of selective logging would be considerably greater."

Estimating forest carbon losses from selective logging of the Wawoi Guavi Concession in Papua New Guinea

For the 'Wawoi Guavi' concession held by the Malaysian company Rimbunan Hijau (RH) in PNG's Western Province, Greenpeace analysed the extent of infrastructure development including clearance for roads, log ponds and logging camps, using data provided by the University of PNG[30] and high resolution (accurate to 15 metres) satellite imagery. The analysis showed the length of the road network for that concession alone to be 3,920 kilometres. When multiplied by the width of the road – conservatively assumed to be 30 metres on average[ix] – the total area cleared for roads was 11,766 hectares, with an additional 360 hectares being cleared for log ponds and logging camps, etc, leading to a total of 12,126 hectares of clear cut forest in Wawoi Guavi. The area subject to edge effects was calculated to amount to 77,075 hectares.

An above-ground biomass of 300 tonnes per hectare (t/ha)[x] is assumed here as the concession area is entirely located within what was primary lowland tropical rainforest. This equates to 150 tonnes of carbon per hectare (tC/ha) using 50% biomass as carbon[xi].

Greenpeace estimates the emissions related to infrastructure development in this concession alone to be approximately 11 million tonnes of CO_2 (Mt CO_2) (see Table 2) by the time most of the total concession area had been logged over. This adds another 9% to the emissions of around 116 Mt CO_2[xii] due the logging activity itself giving a total of 127 Mt CO_2. No account is taken of impacts from logging on soil carbon pools. This means there is a huge carbon liability as result of the logging carbon emissions worth over 1 billion, and worth at least a magnitude greater than the public benefits received from the logging[31].

"In one major PNG logging concession there is a huge carbon liability as result of the logging carbon emissions."

Table 2; Estimated carbon emissions from infrastructure development and selective logging in Rimbunan Hijau's Wawoi Guavi Concession (PNG, Western Province)

Factor	Area affected (ha)	Resulting emissions ($MtCO_2$)
Clearance for roads and other infrastructure (ha)	12,126	6.7
Edge effect (ha)†	77,075	4.2
Total CO_2 emissions from infrastructure		10.8
Selective logging*	422,078	116
Total CO_2 emissions (infrastructure and logging)		127

†10% C reduction of above ground biomass on 100m either side of road; see Laurance et al. (1997);
*concession area extracted from PNG FA (2007)[32];

ix Road width estimated based on 15-metre resolution satellite imagery to range from 30 to 45 metres, with 30 metres being used for the purpose of this calculation.

x Based on IPCC 2006. IPCC Guidelines for National Greenhouse Gas Inventories. Prepared by the National Greenhouse Gas Inventories Programme. Eggleston, H.S., Buendia, L., Miwa, K., Ngara, T. & Tanabe, K. (Japan: Institute for Global Environmental Strategies).

xi ibid

xii Based on an above ground biomass of 150 MtC/ha (IPCC, 2006) and a reduction in biomass due to selective logging of 50% (Pinard & Putz, 1996; Lasco, 2006)

Impact of Reduced Impact Logging (RIL) or SFM on tropical forest carbon stocks

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Various comparative studies between improved tropical forest management[xiii] and conventional (selective) logging have found that forests logged using RIL retain and store more carbon and thus they have comparatively lower greenhouse gas emissions[33]. In Sabah, Malaysia, the carbon retained due to RIL in comparison to conventional logging was found to be between 30 and 36 t/ha[34] and 67% of original forest biomass after one year[35]. In the Amazon, with considerably lower logging intensities, the benefit of improved timber harvesting practices was estimated to be 7 tC/ha[36]. Furthermore, some studies have noted biodiversity benefits of RIL, including tree canopy species, soil fauna, and to some degree flying insects and mammals[37].

Through extrapolation of these studies to all tropical forests designated for logging it has been suggested that improved tropical forest management/RIL could retain at least 0.16 (GtC) a year[38] or equivalent to approximately 10% of tropical deforestation emissions globally. The ITTO estimates potential emission reductions from SFM of natural forests of 0.3 $GtCO_2$ per year until 2030[39]. However, this ITTO study found that the potential emission reductions from SFM were only 3% of the mitigation potential of REDD and forest restoration.

"ITTO study found that the potential emission reductions from SFM were only 3% of the mitigation potential of REDD and forest restoration."

xiii Usually Reduced Impact Logging – RIL, and sometimes referred to as Sustainable Forest Management – SFM

Moreover, these studies and extrapolations fail to consider the important constraint that most tropical forest logging is harvesting in intact primary forests - this first highly destructive cut actually reducing above-ground carbon stocks by a mid-range value of 50% - producing considerable GHG emissions that take decades or centuries to recover. Nor do they consider that 'improved forest management' (SFM or RIL) still reduces carbon stocks over time through the logging process and including forest regrowth, in comparison to restoration, conservation or protection. Also, as outlined above in 'Logging and forest carbon stocks', there are considerable indirect impacts of logging, such as increased risk of deforestation. In whatever way it is assessed, so called SFM or RIL is a major forest degradation activity. Simply comparing SFM or RIL with business-as-usual conventional (selective) logging does not give the full picture of management and emissions reduction options available to these high value forests in a climate change world with potential carbon finance flows for REDD.

"In whatever way it is assessed, so-called SFM or RIL is a major forest degradation activity."

Primary forests that have been logged (i.e. secondary forests) can become primary forests again over time. Above ground carbon stocks in secondary or degraded forests recovering from prior logging have been shown to be approximately 60% of their predicted maximum carbon storage potential[40]. The ITTO estimated a mitigation potential for forest restoration of 117 $GtCO_2$ until 2030, nearly 18 times their estimated potential of so-called SFM of natural forests[41]. Allowing secondary forests to recover from logging and disturbance can have a positive impact on climate change through increased carbon sequestration and secondary forests can also have a high biodiversity value. However, from both a biodiversity and carbon storage perspective, secondary forests are no substitute for primary forests.

A further argument used to give more credence to forestry in the climate change debate is the push to have the carbon in harvested wood products (HWP) recognised in the Kyoto II post-2012 climate agreement[42]. A recent study found that as little as 1% of the original tree volume will remain as solid wood products after 100 years[43]. The same study reviewed five similar studies whose estimates of carbon originally in the standing tree that is still in use in year 100 ranged from 0 – 4.6%, depending on underlying assumptions and formulas. If a full life-cycle analysis was completed that included all the carbon emissions from harvesting, road making, transport, processing, and waste, then it is almost certain that there would be no net carbon storage in HWP. Additionally incorporating HWP into carbon accounts and inventories is a methodological nightmare that would at this stage has no credibility.

"If a full life-cycle analysis was completed that included all the carbon emissions from harvesting, road making, transport, processing, and waste, then it is almost certain that there would be no net carbon storage in harvested wood products."

Implications of inclusion of SFM/RIL forestry in a REDD mechanism

6

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While the IPCC makes the point that the largest short-term gains are always achieved through mitigation activities aimed at emission avoidance, it's forestry contributors suggest that *"in the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fibre or energy from the forest, will generate the largest sustained mitigation benefit."*[44]

However, this type of conclusion is predicted against a comparison with a business-as-usual scenario of conventional logging and forestry rather than forest conservation and restoration options, nor does it take account of most logging occurring in primary forests. It also suggests that the IPCC forestry contributors and logging industry lobbyists are deliberately confusing the broader term of 'Sustainable Management of Forests' (SMF)[xiv] with the more narrow forest industry term of SFM. Given the importance of tropical forests, particularly IFLs, for mitigating climate change, conservation and protection options that retain and store the most carbon and protect the most biodiversity should be the priority objective. Management of forests for environmental services and non-timber forest products would fit well into this objective. The critical importance of primary forests for climate change mitigation is illustrated by the amount of carbon taken up by primary forests is estimated to approximately balance the carbon emitted by deforestation. Deforestation contributes approximately 20% of global greenhouse gas emissions – more than the entire transport sector[45]. Degradation of primary forest through logging, whether it be conventional or SFM, limits the ability of these forests to absorb anthropogenic CO_2, whilst increasing their vulnerability to climate change[46].

"If SFM practices are applied to previously intact primary forests, this could lead to increased carbon emissions and biodiversity loss, depending on the specific practices and the forest type"[47]

xiv e.g. in the Bali Action Plan

Any potential carbon storage benefit from so-called SFM or RIL would be limited to restoration of secondary forests or those already heavily degraded by logging, where low impact management interventions are used to restore the carbon stocks and biodiversity, and in support of indigenous peoples and local community rights. This could be certified under a credible third party system such as FSC, but without receiving carbon credits. It may be that through extending logging rotations in temperate secondary forests emission reductions can be made. For example in the US, for a marginal cost of $25, $50, and $200 US dollars per tC, it was found that 4.1, 8.4, and 57.2 MtC could be sequestered through aging of timberland by 15 years[48].

It is questionable whether it is efficient or effective to give considerable financial or carbon incentives to logging companies who are production and profit driven to attempt managing forest 'sustainably', and whether these companies can be trusted to deliver real emission reductions. Many of these companies are embroiled in scandals related to illegalities, corruption and destructive practices[49]. REDD-incentivised SFM may in fact end up being a subsidy for the expansion of logging into primary forests and IFLs.

"It is questionable whether it is efficient or effective to give considerable financial or carbon incentives to logging companies, and whether these companies can be trusted to deliver real emission reductions."

Furthermore, with the current poorly-developed methodologies and weak and inconsistent forest monitoring capacity in most tropical countries seeking to implement improved forest management/SFM techniques, it is unclear how emissions reductions will be credibly verified. *"Although sustainable forest management (SFM) is widely accepted as a framework for managing production forests, there is an acknowledged failure to implement sustainable forest management in many areas of the world due to insufficient financial resources, a lack of capacity and limited access to technologies."*[50]

In addition, net rather than gross accounting rules for deforestation rates that allow for SFM (emissions from logging less removals by regrowth) may increase incentives to expansion of logging into primary forests and IFLs. Given that under the current UN definition, a forest is only required to have a 10% canopy, many models of so-called SFM would likely allow considerable degradation of the forest without impacting on forest cover and deforestation rates.

Recommendations and Conclusions

7

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- So-called Sustainable Forest Management (SFM) involving industrial logging of forests will not reduce greenhouse gas emissions from forests nor make a positive contribution to slowing climate change. SFM is often a smokescreen for business-as-usual destructive forestry. The term 'SFM' is so poorly defined that it is meaningless, and further, there are no international standards or norms for SFM.

- No matter how it is assessed, 'improved forest management', SFM or reduced impact logging (RIL) is a forest degradation activity, in particular when carried out in primary forest or intact forest landscapes (IFLs) as it is in most cases. SFM and RIL 'improved' logging are even used as justification to open up previously inaccessible IFLs and thus drive their degradation and fragmentation. In consideration of the indirect impacts, and in comparison to forest conservation, restoration or protection, there are no emission reductions.

- No REDD funds should be used to support or subsidise industrial logging of forests, whether it is claimed to be so called SFM or not.

- Forest degradation should be included in any REDD frameworks. But there should be no carbon credits or offsets given for industrial logging including so called SFM.

- Greenpeace calls for zero deforestation by 2020. Climate change and deforestation are a vicious cocktail – only zero deforestation will sufficiently increase the resilience of forests to climate change. Zero deforestation requires an end to forest degradation and deforestation - meaning no industrial logging of primary and intact forest landscapes. It also means establishing comprehensive networks of protected areas at all scales consisting of strict protected areas and core zones as well as community protected areas and buffer zones allowing small-scale and low-impact forest use. Outside of protected area networks, the forest management standards of the Forest Stewardship Council (FSC) should be applied to any forestry in secondary or regrowth natural forests as a minimum to ensure an adequate level of conservation.

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