
REDD ALERT!
PROTECTION MONEY
How industry expansion plans would use climate funds to bankroll deforestation and undermine President Susilo Bambang Yudhoyono's commitment to low-carbon development
GREENPEACE

GREENPEACE

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

Greenpeace is committed to stopping climate change.

We campaign to protect the world's remaining ancient forests and the plants, animals and peoples that depend on them.

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.

November 2010

Published by Greenpeace International
Ottho Heldringstraat 5
1066 AZ Amsterdam
The Netherlands

enquiries@int.greenpeace.org

www.greenpeace.org/forests

JN 360

Printed on 100% recycled paper
with vegetable-based inks

Riau, 2010: Greenpeace, Jikalahari and Community Forum to Protect Kampar Peninsula (FMPKS) build a nursery of indigenous plants and trees to help protect and restore the carbon-rich peatland forest of Kampar Peninsular.

EXECUTIVE SUMMARY:

INDONESIA IS AT A CROSSROADS

I am confident that we can reach this goal [of GHG emissions reduction targets], while also ensuring sustainable and equitable economic growth for our people.
President Susilo Bambang Yudhoyono,
26 April 2010

For human development to become truly sustainable, the close link between economic growth and greenhouse gas emissions needs to be severed.
UNDP, 'Human Development Report 2010'
November 2010

So it [is] feasible for the government to set [a target to double production to] 40 million tons of palm oil without expanding plantations.
Deputy Agriculture Minister Bayu Krisnamurthi,
28 September 2010

I think it is really good to have a break. From [1980] until 2010, we have been under enormous criticism from all over the world. So let us just stop everything, tell us where did we do wrong and let us analyse it, see where we can improve according to national regulations and then come up with a new set of regulations or system.
Aida Greenbury, Sinar Mas pulp division,
22 October 2010

INDONESIA'S LOW-CARBON DEVELOPMENT GOALS NEED NOT DEPEND ON DEFORESTATION

Policy documents from Indonesia's Ministries of Forestry, Agriculture and Energy reveal planned expansion in pulp, palm, agriculture, biofuel and coal sectors that could bring an additional ~63 million ha of land into production by 2030. This would equate to all available land outside Protection and Conservation zones that is not already under identified economic use.

Ministry of Forestry data show that the area earmarked for expansion by these sectors includes 40% of Indonesia's forest area, some 37 million ha – an area the size of Norway and Denmark combined; 80% of Indonesia's peatland, some 16 million ha; and 50% of forested orang-utan habitat. Government figures suggest the forest and peatland carbon at risk amounts to 38GtC – four years' worth of global greenhouse gas (GHG) emissions.

Indonesia's GHG abatement plan identifies the pulp, palm and agriculture sectors as the lead drivers of future deforestation – potentially responsible for the loss of 28 million ha of forest (75% of forest within areas zoned for sector expansion) by 2030.

However, industry statements and government policy documents indicate that – with improved productivity as a primary objective – no additional land is needed to achieve government targets for expansion in these sectors.

Figures used consistently within Ministry of Forestry and other government documents show that existing industry-held landbanks could accommodate a fourfold increase in pulpwood plantation productivity, as is a doubling in palm oil productivity. A draft version of Indonesia's REDD strategy indicates that in the mid-term, no further land area is needed for agriculture.

This demonstrates that, appropriately supported through government policy and regulation, an economically prosperous low-carbon development path for Indonesia does not need to come at the expense of its natural forests and peatlands. International finance for forest protection therefore advances President SBY's low-carbon development agenda, and will incentivise industry best-practice, improved governance, and improvements in community agricultural practice and yields.

Indonesia's own data from the National Council on Climate Change (DNPI) position it as the world's third largest GHG polluter; it attributes some 85% of these emissions to land use – almost entirely from deforestation and peatland degradation.The Norwegian government has pledged $1 billion to a scheme designed to reduce deforestation and GHG emissions in Indonesia. Part of this deal includes a two-year moratorium on allocation of further peatlands and natural forests for sector expansion.

The Sinar Mas group is Indonesia's largest pulp and palm oil producer. The pulp division has stated that a moratorium provides an opportunity for industry and government to take stock, improve practice and come up with new regulations. The head of the palm oil division has stated that the sector needs virtually no more land to meet production targets.

However, despite the support for a low-carbon development model founded on a moratorium, better regulation and improved productivity, there is a huge risk that an alternative, high-carbon expansion model pushed by some within government and industry will be adopted. Such a model does not challenge the excesses of current industry practice or the admitted corruption within the forestry sector. For instance, the Ministry of Forestry has explicitly sought international climate funding to support pulp and palm oil expansion, and 'enhancing forest carbon stocks through [timber plantations] and forest restoration'. Some Officials within the Ministry of Forestry have stated that a moratorium on forest clearance would damage the economy, and have demanded a renegotiation of the Norway deal.

Proponents of this high-carbon model seek to rebrand the industrial activities driving deforestation as 'rehabilitation of degraded' lands. In practice, given weak definitions of 'forests' and 'degraded lands' or other key terms, this amounts to continued clearance of natural forests and peatlands. Consequently, international money designed to support protection of Indonesia's

forests and peatlands could end up being used to support their destruction. However the act is termed, it amounts to the same thing: natural forest loss, high emissions and poor industry practice.

That is not a model of development anyone should champion.

The cost of inaction – or worse, false accounting – to stop deforestation and peatland degradation will be climate change, biodiversity loss, and the derailing of genuine low-carbon development for the people of Indonesia.

The following elements are key to setting Indonesia on a truly low-carbon development pathway: (a) a clear vision on what development is necessary and desired; (b) a policy to make this a cross-cutting priority, integrating climate change, biodiversity protection and the economy; (c) strong governance to ensure implementation; (d) industry leadership and initiative to achieve world-class production standards; and (e) international financial support for forest protection and clean development.

PRESIDENT SUSILO BAMBANG YUDHOYONO AS A GLOBAL LEADER ON CLIMATE ACTION AND LOW-CARBON DEVELOPMENT

President Susilo Bambang Yudhoyono has recognised the risks climate change poses, and the need for action: 'Indonesia understands the necessity of doing its part to face the urgent global challenge of combating climate change. As a developing country, and an archipelago of 17,000 islands, our people face the brunt of impact of climate change.'

Commendably, President SBY seeks to lead global efforts to reduce GHG emissions and shift to a low-carbon development model. With international support, he has pledged dramatic cuts to national GHG emissions over the next decade.

The Norwegian government's pledge of $1 billion aids President SBY's progressive agenda and ambition to end deforestation.The deal includes a two-year moratorium on allocation of further peatlands and natural forests for sector expansion, as well as a review of the land held by companies in existing concessions.

The funds are meant to support natural forest protection, thereby benefiting ecosystem services, wildlife and the long-term economic and cultural interests of Indonesia's forest communities.

A strong moratorium is a critical step toward implementing a meaningful low-carbon development plan. Greenpeace is calling for immediate protection of all peatlands and a temporary halt on all further natural forest clearance not only in new areas, as currently planned, but also existing concession areas.

While current proposals from certain officials in Indonesian ministries support the status quo, such a moratorium would create an incentive for industry to dramatically increase productivity within existing plantation areas.

Critically, such a moratorium would also provide the Indonesian government with the necessary opening to overhaul the land allocation process to ensure protection of ecological, biodiversity, social, legal and economic values. It would indeed be 'a new development pathway'.

REAL LOW-CARBON DEVELOPMENT

Critical to determining the long-term development pathway Indonesia will follow are meaningful definitions and transparent maps of the land available for low-carbon development. The joint Indonesia National Development Planning Agency (BAPPENAS)–UN-REDD October 2010 draft National REDD+ Strategy does establish a technical carbon threshold for land suitable for low-carbon development, as well as land meriting conservation purely for its carbon storage potential. These carbon criteria should translate into policies for low-carbon development based on full peatland and forest protection.

Ministry of Forestry and other data sets used by the Indonesian government in developing its abatement plans suggest that the potential available area of low-carbon land represents at most 14 million ha.

In order for Indonesia to meet its express ambitions not to be 'locked into a growth model that is unsustainable for our, and the world's, environment' it is clear that sectors such as pulp and palm oil must 'shift to a less carbon-intensive development model'.

Surprisingly, for a national GHG abatement plan that seeks to set Indonesia on a 'low-carbon development pathway', the cost of low-carbon development in line with clear social, economic and environmental objectives is not estimated. Yet, industry statements and the government's own figures used within its abatement plans show that – given industry leadership on productivity and strong government regulation – the pulp and palm oil sectors need no further land in order to meet their production objectives.

- **Palm oil yield assumption:** doubling of yield on new plantations and the ones undergoing replanting; additional area needs: none.

- **Pulp plantation yield assumption:** fourfold increase in yield; additional area needs: none.

Equally, the 2010 draft of Indonesia's REDD strategy concedes that additional land for agriculture is also unnecessary in the mid-term. Thus, in addition to directing REDD financing to the peoples responsible for protecting natural forests, what is needed to fully protect Indonesia's natural forests and peatlands is for the leading drivers of deforestation to commit themselves to the moratorium, planting

Climate change and the economy are perceived as unrelated concepts in Indonesia, especially by the capital market and the banking community. This inhibits the pursuance of low-carbon development and the implementation of financial instruments to support such development.

UNFCCC (2010) 'National economic, environment and development study for climate change: initial summary report'

only the non-peatland areas they have already cleared, and improving productivity in line with government and their own figures.

INDUSTRY EXPANSION PLANS ARE HOLDING INDONESIA'S FORESTS TO RANSOM

Various ministries' economic development plans for big industry are set to bring an additional ~63 million ha into production by 2030:

- **Timber plantations including pulpwood:** 28 million ha
- **Estate crops including oil palm:** 9 million ha (total land-use demand not forecast)
- **Agriculture:** 13 million ha of forested land (total land-use demand not forecast)
- **Biofuel plantations including palm oil:** 9 million ha
- **Mining:** 4 million ha within the Forest Estate (total land-use demand not forecast)

This is roughly equivalent to all the currently undeveloped land in Indonesia, including extensive forest areas outside zoned protection and conservation forest areas. This area would equate to at least four times the area of low-carbon land (which Ministry of Forestry data suggest encompass, at most, 14 million ha). If this expansion goes ahead, it will lead to:

- The loss of 40% of Indonesia's remaining natural forest, some 37 million ha – an area the size of Norway and Denmark combined. Government figures suggest the forests in this area contain ~10Gt of carbon.
- The loss of half of all remaining forested orang-utan habitat.
- The degradation of nearly 80% of Indonesia's carbon-rich peatlands. Government figures suggest the peatlands in the areas at risk contain ~28Gt of carbon.
- A total carbon liability from expansion of 38GtC, equivalent to more than four times 2005 global GHG emissions.

More than half the planned forest loss would be through expansion of the pulp and palm oil sectors. The government plans for a trebling of pulp and paper production by 2025 and a doubling of palm oil production by 2020, with additional expansion targets for biofuel production.

Indonesia's pulp mills cannot meet current fibre needs through existing plantations and continue to rely on deforestation. Plantation expansion in Indonesia's pulp and oil palm sectors accounts for more than half of future projected deforestation. Current operations in these sectors are typified by poor governance – with apparent widespread disregard for regulations on permits, environmental impact assessments and protection of deep peatland – poor land management, and poor productivity.

However, Indonesia's GHG abatement plans seek international funding to support the expansion of the pulp and palm oil sectors in the name of tackling climate change. For instance, as part of a 'green growth' strategy, abatement plans suggest the International Finance Corporation (IFC – part of the World Bank) fund two pulp mills, massively increasing current capacity. The Industry Minister has called for a rapid doubling of production and export from the pulp sector, and the Ministry of Forestry is reportedly considering mill applications that would make this ambition a reality. The World Bank, through the Clean Technology Fund, has already leveraged more than $3 billion for Indonesia, with the expanding pulp sector identified as an important candidate for this support.

In terms of REDD+ funding and climate mitigation, these expansion ambitions could have a significant negative impact on Indonesia's forests and peatlands. Indonesia's GHG abatement plans improperly suggest that plantations have a role to play in 'rehabilitation' of 'degraded', 'critical', 'idle' or 'unproductive' land, and that supporting 'afforestation/reforestation' (planting trees) is a cheaper option than 'avoiding deforestation' (cutting trees down). While it may be cheaper (or less challenging to industry status quo) to call the replacement of natural forests with plantations 'rehabilitation' rather than 'deforestation', it amounts to the same thing.

Consequently, international REDD funds earmarked for forest protection may actually be used to subsidise their destruction, with significant climate, wildlife and social costs.

The government's own figures show that timber and estate crop plantations (such as oil palm) hold a fraction of the carbon of even the most heavily degraded natural forests. Further, they do not adequately provide the essential ecosystem services given by natural forests, sustain freshwater cycles and other benefits for local communities, nor harbour the same degree of biodiversity. Thus, replacing forests with plantations can never be a part of genuine low-carbon development.

Coupled with an absence of political or institutional accountability, and poor definitions of land available for low-carbon development in support of REDD objectives, Indonesia's GHG abatement plans may create perverse incentives to clear forests and peatlands, create opportunities for corruption, lead to inequitable distribution of benefits, and actually drive an increase in GHG emissions. The losers would be Indonesia's forest communities and vulnerable people who depend on the ecosytem services and adaptation benefits provided by natural forests.

CORRUPTION IN THE FORESTY SECTOR: WILL 'PROTECTION MONEY' FUND INCREASING GHG EMISSIONS?

The Ministry of Forestry has a history of corruption and corrupt policies. For example, Ernst & Young found that, over a five-year period, more than $5 billion was lost from a fund specifically designed for reforestation and rehabilitation of 'degraded' forest lands. Perversely, the Reforestion Fund itself incentivised mismanagement of forests by allowing concessionaires to access funds to convert to plantations areas they had deforested and degraded. Further, over one third of the area for which funding was dispersed has never been planted.

The objectives and approach of the Reforestation Fund have resonant echoes with Indonesia's current GHG abatement plans for the following interrelated reasons:

- The Ministry of Forestry is a key architect of Indonesia's GHG abatement plans.
- By the Ministry's own admission, corruption within the forestry sector is severe.
- The Ministry sees advancing industry interests as its primary objective, with GHG emissions mitigation activity to be 'integrated' into existing forestry sector plans for plantation establishment.
- Thus, GHG abatement strategies seek to redefine or rebrand existing industry activities as GHG emissions-mitigation activities. For example:
  - The Ministry plans for 33 million ha of timber plantations to be established. It describes this as 'carbon sink enhancement'.

    This assumes (a) that plantations permanently sequester significant amounts of carbon (they do not); and (b) that there is 33 million ha of low-carbon land available for this activity (there is not).
  - Extensive areas of natural forest that hold considerable carbon and biodiversity value are categorised as 'degraded', 'unproductive', 'idle' or 'critical' and in need of 'rehabilitation'. Indonesia's GHG abatement plans seek international funds to finance the 'forest rehabilitation' of these 'degraded' forests, and see plantations as the quickest, cheapest means of achieving this rehabilitation.

The implication is that replacing forests with plantations achieves something positive for the climate, biodiversity, local communities, and indeed, low-carbon development goals. In reality, such plans would lead to substantial loss of natural forest and peatland carbon, as well as driving the destruction of wildlife habitat and forests with important economic and other social values to local communities.

THE WAY AHEAD

Ensuring national and international measures to end deforestation and peatland degradation and advance a low-carbon development vision are successfully implemented requires good will, good governance and sound financial management by participating governments, institutions and industries.

STOP FOREST DESTRUCTION

IMPOSE AN IMMEDIATE MORATORIUM:Halt all forest clearance, including within existing concessions, and ensure immediate protection of all peat lands.

ENACT A ZERO DEFORESTATION POLICY: Permanently protect natural forests and peatlands.

PROMOTE GOOD GOVERNANCE: Implement effective measures to tackle corruption, control industry, and protect forests and the national interest.

SUPPORT LOW-CARBON DEVELOPMENT

ESTABLISH A NEW NATIONAL LAND-USE PLAN: Plan a genuine low-carbon development pathway.

PROMOTE INDUSTRY LEADERSHIP: Incentivise industry to support clean, low-carbon development including yield improvement.

DEVELOP A CREDIBLE CARBON ABATEMENT STRATEGY:Utilise and surpass the Brazilian model for monitoring and making available data on deforestation rates relative to a clear baseline.

FUND FOREST PROTECTION

ENSURE REDD FUNDS BENEFIT FOREST COMMUNITIES AND BIODIVERSITY:

Support forest protection, not industrial plantations or forestry sector corruption.

Climate change may be the single factor that makes the future very different, impeding the continuing progress in human development that history would lead us to expect. While international agreements have been difficult to achieve and policy responses have been generally slow, the broad consensus is clear: climate change is happening, and it can derail human development.

UNDP, 'Human Development Report 2010' November 2010

Riau, 2008: Pristine forest around Lake Palau Besar.

South Kalimantan, 2009: Oil palm expansion.

CONTENTS

i EXECUTIVE SUMMARY: INDONESIA IS AT A CROSSROADS

i Indonesia's low-carbon development goals need not depend on deforestation

ii President Susilo Bambang Yudhoyono as a global leader on climate action and low-carbon development

ii Real low-carbon development

iii Industry expansion plans are holding Indonesia's forests to ransom

iv Corruption in the forestry sector: will 'protection money' fund increasing GHG emissions?

iv The way ahead

1 PREFACE: A 'NEW DEVELOPMENT PATHWAY' FOR INDONESIA

5 BRAZIL AND INDONESIA: BIG EMITTERS, BIG CUTS, BIG PLANS?

6 Brazil: building on progressive industry initiatives

7 Indonesia: institutional and industry reticence leave the GHG emissions trajectory unclear

8 Which development pathway will Indonesia follow?

11 ZONING OUT: AREA AVAILABLE FOR DEVELOPMENT AND 2030 LAND-USE PLANS

11 Zones available for development

12 Map 1: development zones

12 Box 1: areas of development zones

13 Industry and land-use development plans to 2030

13 Figure 1: extent of undeveloped land within development zones and planned additional land use

15 PLANNING DESTRUCTION: INDONESIA'S INDUSTRIES HAVE HIGH-CARBON AMBITIONS

17 Sector development plans: 'treble pulp and paper production by 2025'

17 Figure 2: fibre demand (current, projected) and plantation fibre availability based on BAU plantation rates and yields

18 Figure 3: area (million ha) extent and status of HTI concessions, 2008

18 Sector development plans: 'revitalise the forestry sector'

19 Land-use planning for the forestry sector: 33 million ha of forest plantations by 2030

20 Sector development plans: double palm oil production

21 Sector development plans: 'competitive industrialised agriculture'

22 Sector development plans: eightfold increase in national energy demand

23 Biofuel production creates additional land pressure

23 Coal fuels high-carbon expansion

24 MAPPING DESTRUCTION: VALUES AT RISK WITHIN DEVELOPMENT ZONES

24 Map 2: values within available development zones

24 Figure 4: details of carbon, forest, peat and wildlife habitat in development zones in Riau zones

25 Figures 5, 6, 7: area (million ha), extent of forest wildlife habitats and development zones

26 Table 1: summary of forest, peatland and wildlife values within development and other zones

27 Government data indicate the extent and quality of forest values

27 Findings: values at risk from industry development goals

27 Conclusion: development ambitions must concentrate on increasing productivity

28 Impacts of planned expansion on peatland and GHG emissions

28 Figure 8: area (million ha), extent of peatland and development zones

28 Figure 9: forest and peatland carbon (tC/ha) and years of degradation following conversion by depth

30 Figure 10: the process of peatland degradation

31 IMPACTS OF PLANNED EXPANSION ON FORESTS, GHG EMISSIONS AND INDONESIA'S REDD+ PITCH

31 Figure 11: area (million ha), extent of forest and development zones

33 Figure 12: plantations mask the true extent of deforestation

34 Identifying land available for low-carbon development

34 What defines degraded land?

34 What defines critical land?

34 What defines unproductive or idle land and land zoned for development?

37 Setting a baseline for genuine low-carbon development

37 Figure 13: area (million ha), extent of land-use in development zones

39 Are plantations a climate solution?

39 Box 2: Indonesia's carbon assumptions

39 Figure 14: MoFor model of plantation carbon sequestration

39 Figure 15: UNFCCC model of plantation carbon sequestration (time-averaged C store)

39 Assumption 1: plantations sequester significant volumes of carbon

40 Assumption 2: plantations on 'degraded' land would increase Indonesia's forest carbon stock

41 Figure 16: relative carbon stores of different forest and plantation types

41 Assumption 3: plantations reduce deforestation pressure

42 Can the pulp and palm oil sectors support low-carbon development?

42 Figure 17: fibre demand (current, projected) and plantation fibre availability based on BAU plantation rates and yields and Scenario 1 improved rates and yields

42 Pulp sector: potential to quadruple productivity, no additional area needs

43 Figure 18: BAU vs best practice: area needs to meet pulp sector development targets

43 Palm oil sector: potential to double productivity, no additional area needs

43 Figure 19: BAU vs best practice: area needs to meet palm oil sector development targets

45 THE MORATORIUM IS AN OPPORTUNITY TO SHIFT TO A LOW-CARBON DEVELOPMENT PATHWAY

45 Progressive industry and government want a strong moratorium

46 Graft and poor governance in the forestry sector threaten development

47 Figure 20: area of HTI concession allocations per year and dates of national elections

47 Indonesia's experience of 'reforestation' funding in the absence of governance

49 CONCLUSION: BIG DEAL

51 TAKE ACTION FOR DEVELOPMENT

Stop forest destruction

Support low-carbon development

Fund forest protection

53 **ENDMATTER**

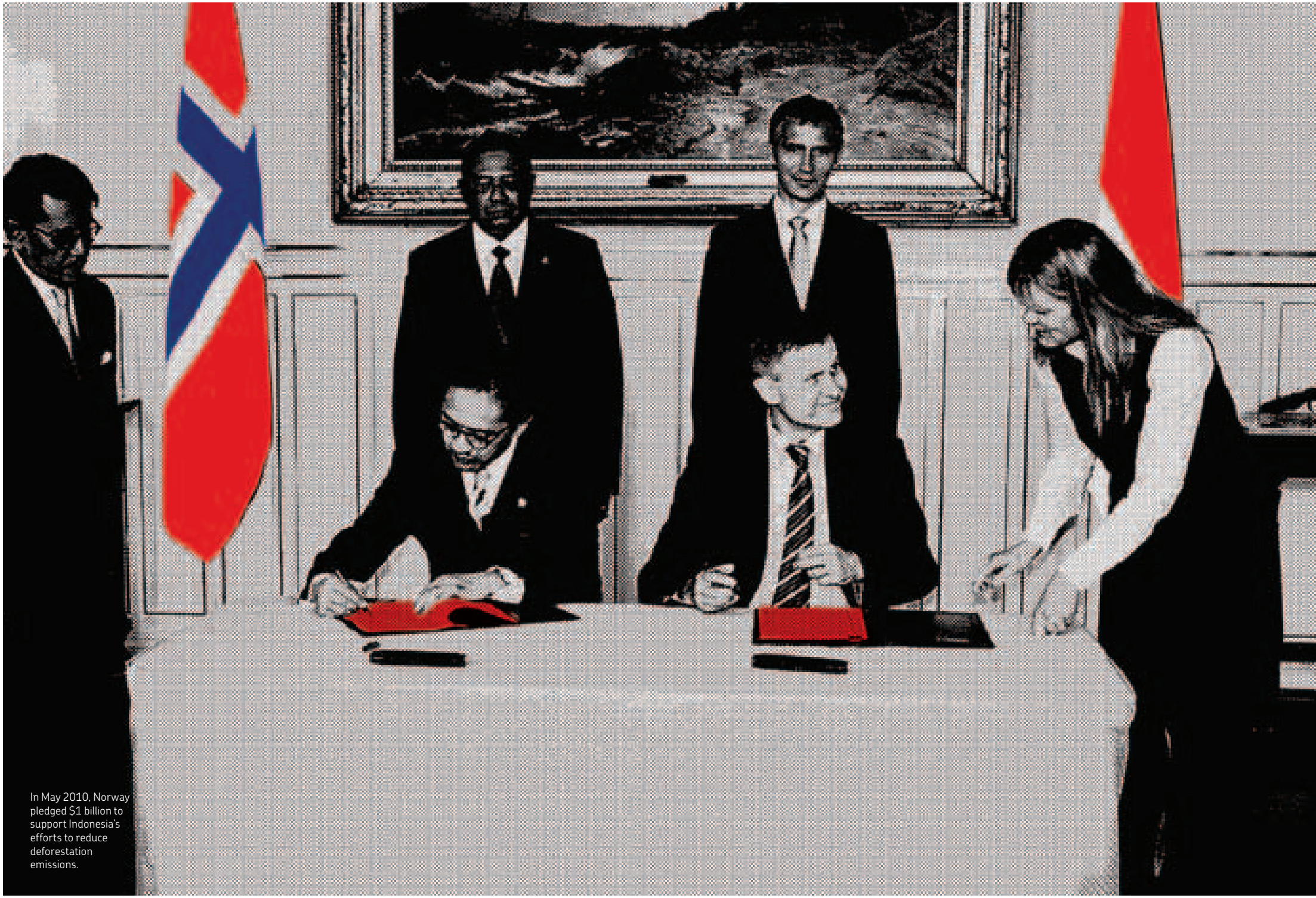
54 Data and methodology

55 Acronyms, technical terms and units

56 Endnotes

61 Picture credits

62 References



In May 2010, Norway pledged $1 billion to support Indonesia's efforts to reduce deforestation emissions.

PREFACE:

A 'NEW DEVELOPMENT PATHWAY' FOR INDONESIA

With the support of the global community, Indonesia has a window of opportunity to shift to a less carbon-intensive development model. Without early action, Indonesia may become locked into a growth model [...] that is unsustainable for our, and the world's, environment.

DNPI, August 2010

Current international climate commitments are inadequate, potentially leaving the world on course for a 4°C rise in average temperature by the end of the century.[1] According to the International Panel on Climate Change (IPCC), such a rise carries with it significant ecosystem, biodiversity and social threats.[2]

Greenhouse gas (GHG) emissions would need to have peaked no later than 2015 in order for the world to have the best chance of limiting global warming to less than 2°C.[3]

Deforestation, including emissions from deforested peatlands, is responsible for about one-fifth of GHG emissions,[4] so ending deforestation is critical to ensuring a rapid cut in GHG emissions, in order to provide time for the world to shift to a low-carbon development pathway.

Ending deforestation and peatland degradation in Indonesia is critical to achieving rapid, significant global GHG emissions cuts. By their own estimates, China and the USA are the world's top two GHG emitters, largely from fossil fuel-related industries; figures presented by Indonesia's National Climate Change Council (DNPI) position Indonesia as the world's third largest GHG emitter, largely as a result of deforestation-related emissions.[5]

According to the DNPI, some 85% of Indonesia's GHG emissions relate to land use – almost entirely from deforestation and degradation (1,006MtCO_2 gross, 760MtCO_2 net) and peatland degradation and fire (850MtCO_2).[6] The DNPI attributes over half of probable future deforestation to expansion from the pulp and palm oil sectors. As DNPI reports concede, plantation operations are typified by extensive deforestation, poor plantation establishment rates and poor productivity relative to global competitors and industry-claimed potential.[7]

Within Indonesia, President Susilo Bambang Yudhoyono and progressive elements within government are striving to move away from the low-productivity, deforestation-led model of industrial expansion toward a higher-value, low-carbon development model.

The DNPI presentation of Indonesia's 2010 GHG abatement plan describes this as 'a green growth plan' for the nation.[8] The goal is to 'ensure reductions in carbon emissions support rather than undermine our national development goals and our long-term efforts to improve the standard of living for all Indonesians'.[9] In partnership with the DNPI, three provinces – Central Kalimantan, East Kalimantan and Jambi – have developed 'green growth strategies', identifying how to 'move to higher value-added activities and new low-carbon sectors so that future growth leaves a smaller carbon footprint'.[10]

Indonesia's motivation is both global and based on self-interest, given the threat that climate change poses to the country: 'Even if all developed countries reduced their emissions to 1990 levels (as targeted under the Kyoto Protocol), this would not be enough to avert serious climate change [...]. Indonesia understands this impasse. It has decided to take action.'[11]

There is considerable international support for action to tackle the drivers of deforestation and peatland degradation, while supporting low-carbon development models. Although the international community failed to reach a multilateral agreement to tackle climate change in Copenhagen in 2009, there is significant donor and agency money available for Reducing Emissions from Deforestation and Forest Degradation (REDD+) and Clean Development Mechanism (CDM) pilot projects, as well as initiatives to help develop and implement the national GHG emissions reduction strategy. In May 2010, Norway pledged $1 billion to support Indonesia's efforts to reduce deforestation emissions and shift destructive forest activities to 'degraded' lands. The terms of this deal include a two-year moratorium on the issuance of new concessions on peatland and forests.[12]

Within these national and international initiatives, the low-carbon development imperative is discernible: strategies to mitigate GHG emissions associated with the pulp and palm oil sectors must incentivise the protection of Indonesia's remaining natural forests and peatlands. As a result, the pulp and palm oil sectors must support a strong moratorium and increase productivity within their existing plantation areas. Additional expansion must be confined to lands with little carbon or other conservation or social values.

The ambition is honourable, and the rhetoric of large-scale GHG emissions reductions impressive. The reality behind the headline numbers needs scrutiny, however, in order to understand the risks for Indonesia's natural forests and low-carbon development ambitions caused by an institutional reticence within industry and elements of the Indonesian government to genuinely tackle the business-as-usual (BAU) expansion plans of the pulp and palm oil sectors.

Greenpeace has undertaken an assessment of official government submissions to the UNFCCC, internal Ministry of Forestry documents and other relevent government and industry reports[13] to address the following questions:

- Does Indonesia have a low-carbon development plan with clear social and environmental objectives?
- Does Indonesia's GHG emissions reduction plan incentivise low-carbon development or reward high-carbon options?
- Does Indonesia's GHG emissions reduction plan tackle BAU operations of the key drivers of deforestation – the pulp and palm sectors – and incentivise improved productivity?
- Does Indonesia's GHG emissions reduction plan prioritise natural forest protection over plantation establishment?
- Does Indonesia's GHG emissions reduction plan prioritise protecting peatlands over mitigating the rate of emissions?
- Does Indonesia's GHG emissions reduction plan use a credible and proven methodology for monitoring deforestation rates and calculating emissions?
- What is the definition of 'degraded' land proposed for REDD+ initiatives, and does it include carbon, ecological, biodiversity, governance and social metrics?

THE FINDINGS:

Without a shift to a 'new development pathway',[14] Indonesia's priority development plans for key sectors are set to increase its deforestation rate, leaving all areas outside Protected/ Conservation forest zones logged out within 20 years.

- Government development priorities for pulp and other wood-processing, palm oil, agriculture and bioenergy sectors suggest that a total of about 63 million ha of new development is planned within these sectors by 2030. This roughly corresponds to the area of land outside Protected/Conservation forest zones without current identified economic activity.
- These plans would lead to the loss of 40% of Indonesia's remaining natural forest, some 37 million ha – an area the combined size of Norway and Denmark.[15] Government figures suggest the forests in this area contain around 10Gt of carbon.[16]
- These plans would lead to the loss of half of all remaining forested orang-utan habitat.[17]
- These plans would lead to the degradation of nearly 80% of Indonesia's carbon-rich peatlands. Government figures suggest the peatlands in the areas at risk contain around 28Gt of carbon.[18]
- The total carbon at risk from development is 38GtC, equivalent to more than four times 2005 global GHG emissions.[19]

The chief beneficiaries of Indonesia's GHG emissions abatement plan, and international funds to support its implementation, would be the pulp and palm oil sectors, the primary industrial drivers of natural forest loss. Historically, funds destined to 'reforest' 'degraded' land have perversely incentivised deforestation and provided opportunity for corruption. Auditors Ernst and Young found that, under Ministry of Forestry administration, the Reforestation Fund lost more than $5 billion over a five-year period.[20]

Various plans within Indonesian ministries and industry sectors propose inconsistent and specious methodologies to quantify the role of plantations in reducing deforestation and GHG emissions.

If the proposed moratorium fails to halt considerable forest and peatland loss within current concession areas, the proposed weak definitions of 'degraded' land mean that many millions of hectares of carbon-rich peatland and forest may also be unprotected by this two-year suspension.

The analysis exposes the strong risk that, at best, Norway's $1 billion may fail to support low-carbon development or stop defor estation; at worst, it may support a huge accounting fraud, paying for increased GHG emissions in Indonesia.

The following measures are critical to ensuring that the international donor community supports forest protection and Indonesia's shift to a low-carbon development pathway:

1. **A comprehensive moratorium on deforestation and peatland development covering existing as well as new concession areas.**
   - This would push industry to improve productivity within existing plantation areas, and plant areas within existing concessions that have already been cleared.
   - This would buy time for the Indonesian government to overhaul land-use planning and concession allocations.
2. **A credible definition for genuinely degraded lands for low-carbon development with negligible social or environmental conservation value.**
   - Indonesia's October 2010 draft National REDD+ Strategy provides the beginning of a technical baseline definition for land available for low-carbon development and forest land for carbon conservation. Logically interpreted into government policy, this baseline should translate to zero deforestation and full peatland protection.
3. **Strong incentives for increases in pulp and oil palm productivity within plantations, and stronger governance measures.**
   - Government and industry's own figures suggest potential to increase productivity fourfold within the pulp sector and nearly twofold within the palm sector. This indicates that little or no additional land is needed for expansion within these sectors.

Papua, 2008: Rainforest near the Kebar mountains.

Riau, 2008: APRIL pulp & paper mill.

BRAZIL AND INDONESIA:

BIG EMITTERS, BIG CUTS, BIG PLANS?

As a result of their deforestation-related emissions, government data position Indonesia and Brazil as the world's third and fourth largest GHG emitting countries, surpassed only by China and the United States. [21]

According to recent estimates published by the Brazilian and Indonesian governments, these countries were each responsible for around 5% of global GHG emissions in 2005.[22] While Brazil estimates that 60% of its emissions (1.2GtCO_2) come from deforestation,[23] Indonesia estimates that 85% of its declared net emissions come from land use, the vast majority from deforestation and peatland destruction (which represent 1.87GtCO_2 of gross GHG emissions).[24]

In international meetings on tackling climate change, both the Brazilian and Indonesian presidents have presented themselves as global leaders on action to cut GHG emissions from deforestation. [25]

[The Government of Indonesia] will reduce our emissions by 26% by 2020 from BAU (Business As Usual). With international support, we are confident that we can reduce emissions by as much as 41%. This target is entirely achievable because most of our emissions come from forest related issues, such as forest fires and deforestation.

Indonesian President Susilo Bambang Yudhoyono, 2009

2010: Presidents Lula da Silva and Susilo Bambang Yudhoyono.

The goals set out in this [National Climate Change Plan] are audacious, if compared with other countries. The potential of this Plan to [drive]the reduction of emissions of greenhouse gases is one of the largest – if not the largest – among all nations. Brazilian President Lula da Silva, 2008

BRAZIL:

BUILDING ON POSITIVE INDUSTRY INITIATIVES

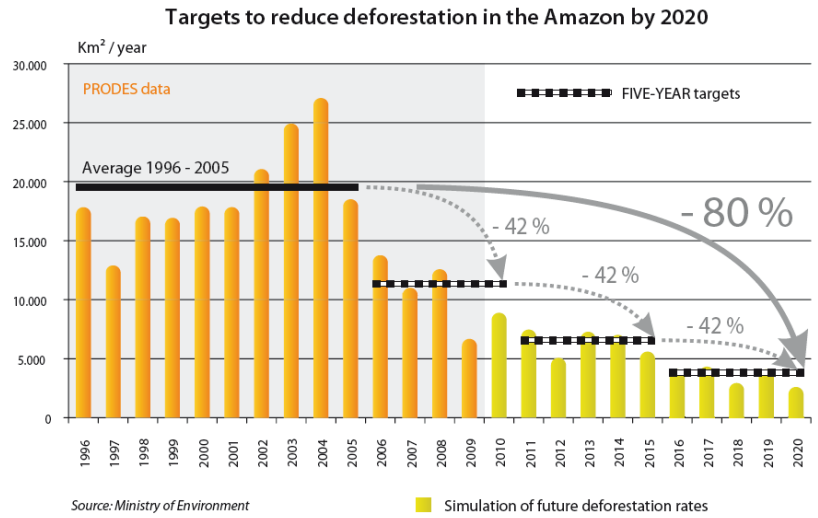
The largest single source of GHG emissions in Brazil is Amazon deforestation,[26] and the key drivers have been cattle ranching[27] and soya production.[28] Within the last four years, Greenpeace has initiated industry agreements to end the role of these sectors in driving forest loss in the Amazon.[29] With the support of civil society, it is to be hoped that government action will consolidate these gains, backing them with regulation and improved monitoring, in order to ensure that other drivers do not step into the breach. Critical to such progress is the provision of maps of rural properties by the private sector – already a legal requirement. Providing precise geographical coordinates and property boundaries, and indicating areas of use and non-use, these maps will be crucial to improving government's monitoring capacity.

At the 2008 international climate summit in Poznàn, pressured by civil society, President Lula da Silva presented the Brazilian National Climate Change Plan,[30] which has been updated and strengthened in 2010.[31] This plan could be more ambitious, but Brazil claims will prevent the emission of nearly 5GtCO_2,[32] will be achieved primarily through a drastic reduction in the gross rate of Amazon deforestation:[33] the reduction target is from 1.9 million ha/yr in the 1999–2005 period to 0.4 million ha/yr by 2020,[34] a reduction of 80%. A key component of this initiative was the creation of the Amazon Fund,[35] which has a multi-stakeholder steering committee and provides for transparent and free publication of data and independent external auditing of results.

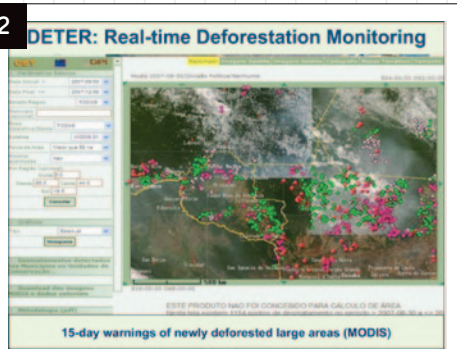
The proposal looks credible. For more than two decades, the Brazilian Ministry of Science and Technology has been using satellite imagery to monitor annual rates of natural forest loss in the Amazon. The average historical deforestation rate has been used to establish a baseline, rather than projections of future pressures on the forest. The Brazilian government has set intermediate targets to measure actual reductions in the annual rates of deforestation. Technology continues to advance, and Brazil now also monitors changes in Amazon forest cover in 'near real' time. The data are publicly available for independent scrutiny; non-governmental organisations (NGOs) and scientific institutions have access to satellite images and support the government by providing analysis of both the data and the drivers of deforestation.

Thus, Brazil is showing that it has recognised the environmental and social imperatives to protect its remaining natural forests, and it has adopted a simple and transparent means of measuring its success or failure in achieving that goal. It has an absolute target of reducing natural forest loss and monitors its current gross deforestation rates against historical data as an easy proxy for carbon emissions.

1



2



3

Although such a reduction of deforestation in the Amazon represents an ambitious target, in recent years the country has demonstrated its ability to reach it. With successive decreases in yearly deforestation rates of the Amazon forest achieved by REDD policies between 2005 and 2009, Brazil is close to meeting the target established for the first five years (2006–2010).
Brazilian Ministry of the Environment, 2010

Brazilian government strategy for reducing deforestation has sound foundations:
1. Clear targets to reduce deforestation by 2020 against an established baseline.
2. Near real-time monitoring of natural forest loss and publicly available data.
3. Market support for strategy.

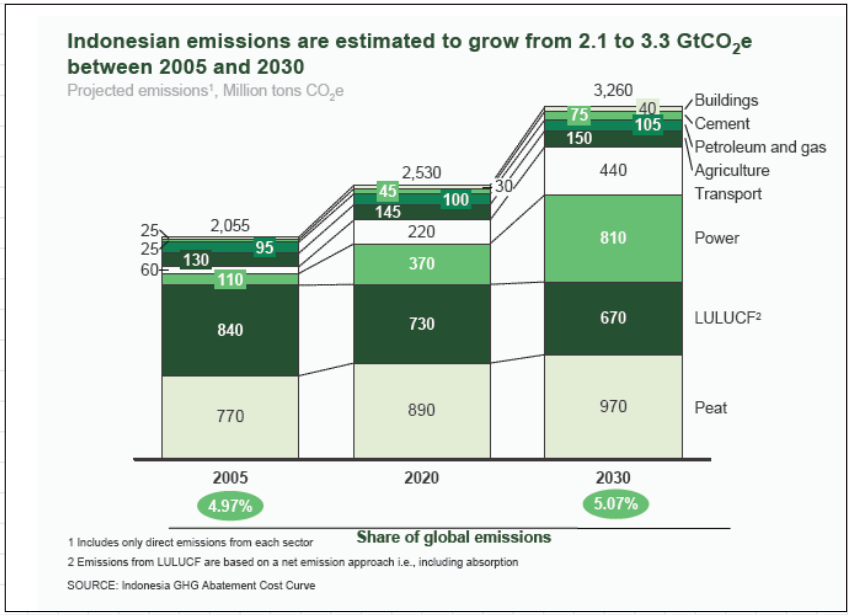
Sources: Brazilian Ministry of the Environment (2010) 28; INPE (2010) 13, 31.

INDONESIA:

INSTITUTIONAL AND INDUSTRY RETICENCE LEAVE THE GHG EMISSIONS TRAJECTORY UNCLEAR

Indonesia's BAU projected GHG emissions trajectory to 2030, developed with the aid of the McKinsey Cost Curve.

Source: DNPI (2010a) 11 Exhibit 2.



In September 2009, Indonesian President Susilo Bambang Yudhoyono announced Indonesia's GHG emissions reduction targets to G20 leaders.[36] He pledged that Indonesia would reduce GHG emissions by 26% by 2020 from BAU. 'With international support, we are confident that we can reduce emissions by as much as 41%.'[37] DNPI gives 2020 BAU GHG emissions as 2,530MtCO_2e,[38] so pledged reductions of 2020 BAU levels amount to 658MtCO_2e (26%) or 1,037MtCO_2e (41%), giving remaining GHG emissions of 1,493–1,872MtCO_2e in 2020. This represents a reduction of between 9% and 27% on 2005 net emissions levels of 2,055MtCO_2e.[39]

Indonesia's national and regional abatement plans – developed with the aid of the McKinsey cost curve, like many national abatement scenarios – assume that GHG emissions reductions align with government targets for expansion of key industry sectors: 'reductions in carbon emissions support rather than undermine our national development goals'.[40]

One goal that government foresees is a trebling in pulp and paper production by 2025: 'The Technology Needs Assessment report [...] projects that the production of pulp and paper will increase 3.24 times in 2025' to 55 million tonnes.[41] At the same time, Indonesia's abatement plans are largely focused on the forestry sector, which represents the vast majority of identified GHG emissions mitigation potential.[42]

Based on these plans, largely developed by the Ministry of Forestry, President Susilo Bambang Yudhoyono announced: 'We will change the status of our forest from that of a net emitter sector to a net sink sector by 2030.'[43] He declared that the forestry sector would ultimately be delivering GHG emissions savings of 1GtCO_2.[44]

The Ministry of Forestry wants international climate funding to fund 'enhancing forest carbon stocks through [timber plantations] and forest restoration'; and the Chairman of the Working Group on Climate at the Ministry of Forestry has stated: 'We will renegotiate the agreement with Norway. Indonesia needs money for tree planting.'[45] At the same time, the Ministry of Forestry is seeking international climate funding to support pulp and palm oil expansion.[46] Additionally, the DNPI-East Kalimantan 'green growth' plan suggests that the International Finance Corporation (IFC) fund the construction of two mills as part of its development strategy. Further, the World Bank Clean Technology Fund (CTF) proposes co-financing of $400 million (US) to support initiatives in Indonesia, including 'improving energy efficiency by 30% from business-as-usual by 2025'.[47] These investments in turn 'mobilise financing [...] from multilateral financiers, state-owned enterprises (SOEs), and the private sector'[48] amounting to a total of $3.1 billion as of March 2010, according to the World Bank.[49] The fund identifies the expanding pulp sector as an important candidate for such funding.[50]

National abatement plans for the forestry sector champion '(re-)establishing forests on more than 10 million ha of degraded non-forested and forested land'.[51] Ministry of Forestry plans to revitalise the forestry sector include – under the title 'integration of climate change issues into forestry sector planning' – the establishment of a total of 33 million ha of timber plantations by 2030/2050,[52] with the majority established by 2025. A 2010 Ministry document, 'Forestry policy for addressing climate change in Indonesia', describes these plantations as a 'carbon sequestration programme' that forms a core part of the 'Climate Change Action Plan in Forestry sector (RENSTRA)'.[53] Indonesia's Second National Communication (SNC) to the UNFCCC describes the plantation programme as 'sink enhancement'.[54]

In theory, the proposal to plant trees to sequester carbon sounds like a win-win for climate protection and industrial

WHICH DEVELOPMENT PATHWAY WILL INDONESIA FOLLOW?

Ultimately, REDD+ policies are only as reliable and effective as their underlying methodology for accounting for forest protection and GHG emissions reductions, and the political will to implement a low-carbon development pathway.

Before Indonesia's abatement plans leave the drawing board, there are a number of institutional, methodological and technical weaknesses that must be addressed, as they undermine the ability of the government to deliver on the President's climate goals or low-carbon development agenda.

Firstly, Indonesia's DNPI identifies the pulp and palm oil sectors as key industrial drivers of natural forest loss and peatland degradation.[55]

These two sectors, as well as Indonesian ministries including Ministry of Industry and Ministry of Forestry, regularly claim they play a critical role in national economic development and poverty alleviation.[56] The government appears divided on how – or whether – to address the rapid expansion of the pulp and palm oil sectors into carbon-rich forests and peatlands and critical wildlife habitats.

Current operations for the pulp and palm sectors are typified by poor governance[57] – with apparent widespread disregard for regulations on permits, environmental impact assessments and protection of deep peatland – poor land management and poor productivity when compared with global competitors such as Malaysia or Brazil. For instance, as the DNPI–East Kalimantan 'green growth' plan observes, both sectors have been given extensive concession areas. Much of this land has been cleared of natural forest, and what little area has been planted yields comparatively poor fibre or palm oil harvests.[58]

Independent third party verification of any claimed reductions in deforestation in Indonesia is challenging. Official data is often not readily and freely available to the public. What information the Ministry of Forestry does release is often several years out of date, and the methodology is unclear or contradictory. Industry has opposed the use of satellite monitoring of its operations,[59] although Sinar Mas – Indonesia's largest pulp and palm oil producer – itself uses state-of-the-art radar mapping 'to manage its pulpwood resource more efficiently'. This mapping technology delivers results 'equivalent to conducting a 100% ground inventory of the forest'.[60]

Indonesia's abatement methodology – what assumptions are made about the sequestration potential of plantations, for instance, and the ultimate fate of the carbon within harvested plantations – is in flux, with evident contradictions within and between official reports.

In line with industry claims and the seemingly-preferred Ministry of Forestry methodology, Indonesia's November 2009 Second National Communication to the UNFCCC credits timber plantations with huge, cumulative sequestration potential – ie it presumes that carbon in harvested plantation crops is stored in perpetuity.[61] However, UNFCCC standards assume that harvested wood is destined for products with a short lifespan, and therefore any carbon absorbed within the timber should be counted as emitted in the year the timber is harvested.[62]

The DNPI 2010 national GHG abatement plan downplays plantation sequestration potential, but suggests that, nevertheless, plantations have a role to play in terms of forest rehabilitation.[63] The DNPI's regional reports also acknowledge that carbon stored in plantation crops is emitted at harvest;[64] however, they appear to base at least some of their projections on the same discredited methodology used in Indonesia's SNC report,[65] and describe their reforestation plans as 'increas[ing] the natural carbon sink by enlarging the dry land forest cover on mineral soil with suitable and economically viable tree species, such as native species that can yield timber and non-timber products as well as species such as acacias'.[66] Acacia is grown as a short rotation plantation crop used for pulp production.

In terms of Indonesia's national development assumptions, calculations on projected 2025–2030 land-use demands by sectors prioritised by Indonesian Forestry, Energy, Agriculture and Trade ministries amount to about 63 million ha, which equates to all remaining land in areas zoned for development.

Additionally, the Ministry of Forestry has not yet made publicly available its definition of or maps locating so-called 'degraded' lands where low-carbon development in line with national objectives may take place. Such a definition is critical to ensuring that international REDD funding genuinely supports forest and peatland protection in the national and global interest. A variety of terms are used in government and industry documents to describe such land – degraded, critical, idle, unproductive – to suggest that extensive land exists that would benefit from REDD-funded plantation development. Greenpeace preliminary analysis, based on publicly available Ministry of Forestry data, suggests that the area of land potentially available for low-carbon development is less than one-quarter of planned expansion.

At the same time, Indonesia's 2010 national abatement plan fails to set out any productivity targets to incentivise improved yields and land management by the key drivers of deforestation. This is despite the DNPI 'green growth' plans, which reveal huge scope for improvement (up to fourfold improvement in pulp yields, and near twofold improvement in palm oil yields); the figures suggest that, were productivity improved, further concession areas would be largely unnecessary in order to achieve long-term sectoral development goals.

Jambi, 1997: During 1997, uncontrollable fires in forests and peatlands in Indonesia released up to 2.67GtC, equivalent to up to 40% of the mean annual global carbon emissions from fossil fuels during the period.

Source: Page et al (2002).

In the absence of strategic direction and clear social and environmental development goals, the cost of putting Indonesia on a genuinely low-carbon development pathway has not been assessed.

Productivity incentives to change expansion models are also required. International funding to support plantation establishment on as yet undefined and unmapped 'degraded lands' will not in and of itself prevent the planned destruction of millions of hectares of carbon-rich forests and peatlands. Inevitably, competing land uses will push some development into forests and peatlands.

President Susilo Bambang Yudhoyono appears to recognise that this would be a tragedy both for the people of Indonesia and the global climate: 'Indonesia understands the necessity of doing its part to face the urgent global challenge of combating climate change. As a developing country, and an archipelago of 17,000 islands, our people face the brunt of impact of climate change.'[67]

Indonesia's people, business environment and ecosystems have all been identified as being at 'high risk' due to the effects of climate change.[68] The protection of tropical forests is a well-recognised strategy to enhance societies' adaptive capacity and reduce the vulnerability of ecosystems to extreme events such as floods or droughts:[69]

- Forests are important for adaptation to climate change as they help protect from extreme weather events such as high winds and coastal floods.[70]

- Protecting natural forest ecosystems is often more effective and efficient at providing adaptation benefits than development of new infrastructures.[71]

- Loss or destruction of natural forests increases ecosystem, biodiversity and social vulnerability.[72]

- By contrast, timber or estate crop plantations such as oil palm hold a fraction of the carbon of natural forests. Equally, they do not adequately provide the essential ecosystem services given by natural forests, sustain freshwater cycles and other benefits for local communities, nor harbour the same degree of biodiversity.[73]

Critical to this, and to the long-term development pathway Indonesia follows, is a meaningful definition and mapping of the land available for low-carbon development. The joint Indonesia National Development Planning Agency (BAPPENAS)–UN-REDD October 2010 draft National REDD+ Strategy does establish a technical carbon threshold for land suitable for low-carbon development, as well as land meriting conservation purely for its carbon storage potential. [74] Logically applied, these carbon criteria translate into policies for low-carbon development based on full peatland and forest protection.[75]

Riau, 2006: Burnt and drained peatland in preparation for oil palm plantation.

ZONING OUT:

AREA FOR DEVELOPMENT AND 2030 LAND-USE PLANS

ZONES AVAILABLE FOR DEVELOPMENT

Since the 1960s Indonesia has been divided into two administrative land categories: Non-Forest Land and Forest Estate.[76] The consequence is that Indonesia has Forest Estate with trees, Forest Estate without trees, Non-Forest Land with trees and Non-Forest Land without trees.

Non-Forest Land (APL) is controlled by various ministries and regional governments, according to land use. The Ministry of Forestry has administrative responsibility for the Forest Estate.

Much APL is already occupied by agricultural land, industry and other identified economic activity or development, such as cities or transport infrastructure. However, APL contains significant areas of forest, peatland and other land areas deemed available for economic development. These areas are often outside central government control, and their industrial development can represent an important source of income for regional governments.

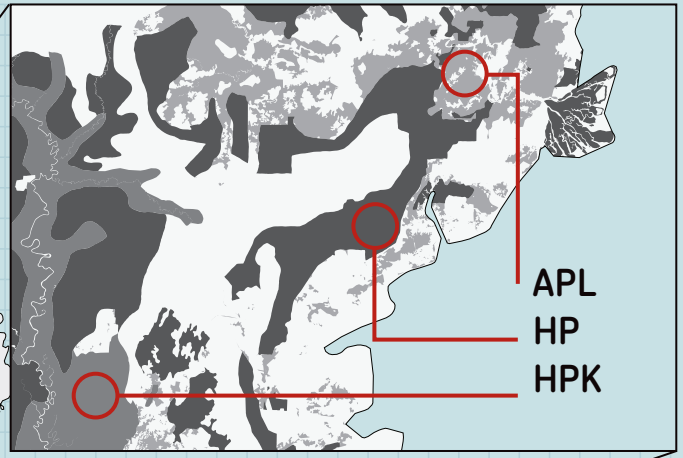
The Forest Estate is divided up according to functional categories: broadly speaking, conservation or industrial development. The category available for industrial exploitation is categorised as Production Forest and covers some 82 million ha – nearly two-thirds of the Forest Estate.[77]

Within Production Forest, there are three zones:

- **Limited Production Forest (HPT):** exclusively reserved for selective logging concessions (HPH) because its terrain or other environmental factors make it unsuitable for other uses, such as industrial plantations.
- **Permanent Production Forest (HP):** available for both HPH and timber or pulp plantation establishment (HTI).
- **Conversion/Convertible Production Forest (HPK):** slated to be excised from the Forest Estate and converted to non-forest use, notably oil palm plantations.[78]

The two latter zones are available for planned natural forest clearance, and the first is available for planned natural forest degradation.

DEVELOPMENT ZONES



BOX 1: Areas of development zones[79]

HP: Total area: 36 million ha
Not under identified economic activity: 27 million ha

HPK: Total area: 18 million ha
Not under identified economic activity: 15 million ha

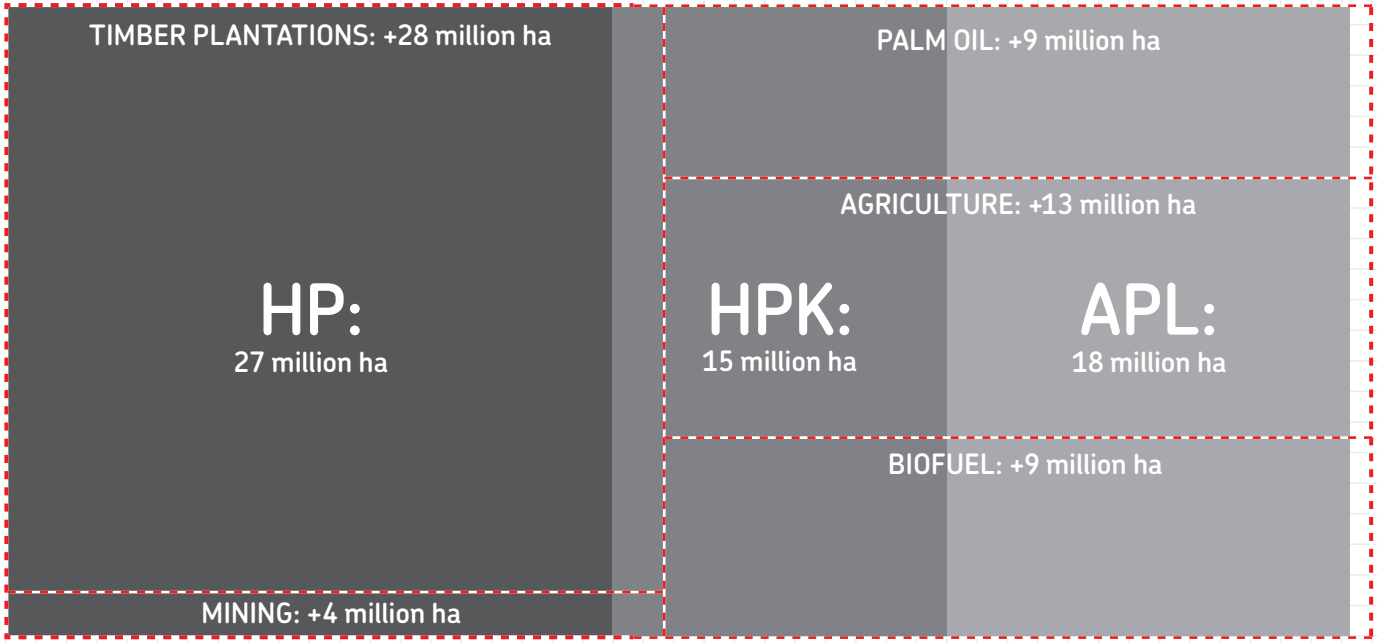
APL: Total area: 59 million ha
Not under identified economic activity: 18 million ha[80]

HP
HPK
APL

Map shows all of HP/HPK zones; the APL subset shown here is land not under identified economic activity. For the purposes of this exercise, this is land classified by the Ministry of Forestry as forest, swamp, scrubland, swamp scrubland, savannah and bare land. It includes selective logging concessions (HPH), as those are available for future conversion.

INDUSTRY AND LAND-USE DEVELOPMENT PLANS TO 2030

Figure 1: extent of undeveloped land within development zones and planned additional land use.



BALANCE

Area in development zones not under current identified land use:
27 (HP)
\+ 15 (HPK)
\+ 18 (APL)
= ~ 60 million ha.

2030 additional area demands for identified sectors:
28 (timber plantation)
\+ 9 (palm oil)
\+ 13 (agriculture)
\+ 9 (biofuel)
\+ 4 (mining)
= ~63 million ha.

REVITALISATION OF THE FORESTRY SECTOR AND FOREST PLANTATIONS

Ministry goals: Trebling pulp and paper production by 2025.[81] Revitalising the forestry sector.[82]

Forest plantations: 33 million ha total (28 million ha additional) area by 2030/2050. Development largely in HP zone.

PALM OIL SECTOR

Ministry goals: Doubling production by 2020.[83]

Plantations: 7 million ha additional forested land for oil palm by 2030 according to DNPI[84] and a total of 9 million ha additional forested land converted to estate crops by 2030.[85] Total land-use demand is not forecast; however, BAU oil palm expansion to meet 2020 production targets would require nearly 9 million ha of additional plantation by 2015.[86] Development in APL or released HPK zones.

AGRICULTURE SECTOR

Ministry goals: Prioritising agricultural development to boost exports and supply raw materials for agro-industries.[87]

13 million ha additional forested land area by 2030.[88] Total land-use demand is not forecast. Development in APL or released HPK zones.

ENERGY SECTOR

Ministry goals: Diversifying energy production. Assumed eightfold increase in power demand[89] largely met through coal.[90]

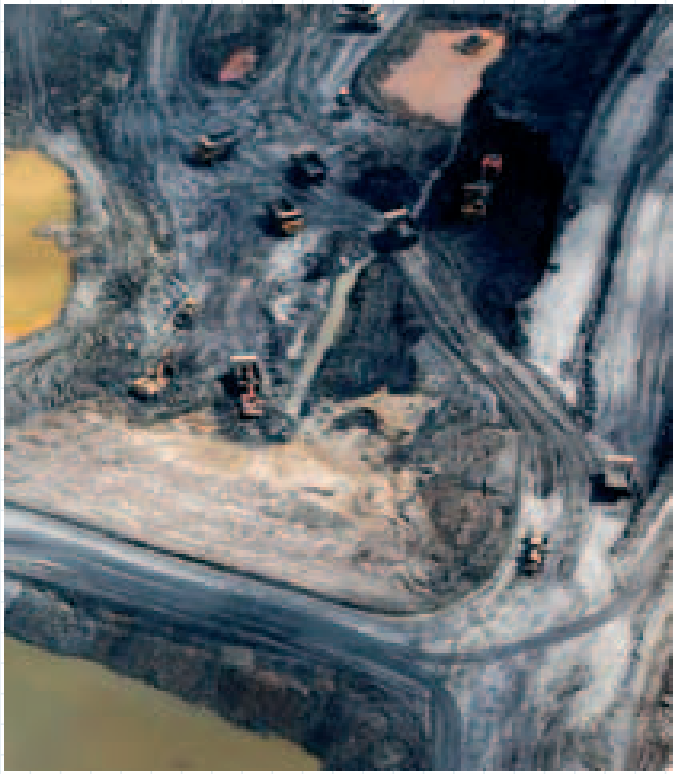
Biofuel plantations: 9.25 million ha by 2025, at least half of this in released HPK zones.[91]

Mining: 4 million ha by 2030 across Forest Estate (assuming BAU expansion rates). Total land-use demand is not forecast.

Generally, markets are very bad at ensuring the provision of public goods, such as security, stability, health and education. For example, firms that produce cheap labour-intensive goods or that exploit natural resources may not want a more educated workforce and may care little about their workers' health if there is an abundant pool of labour. Without complementary societal and state action, markets can be weak on environmental sustainability, creating the conditions for environmental degradation, even for such disasters as mud flows in Java.

UNDP, 'Human Development Report 2010' November 2010

South Sumatra, 2009: Sinar Mas pulp concession development on peatland.



South Kalimantan, 2009: Sinar Mas coal mining operation.

PLANNING DESTRUCTION:

INDONESIA'S INDUSTRIES HAVE HIGH-CARBON AMBITIONS

A first principle of Indonesia's GHG abatement plans is that they 'support rather than undermine our national development goals'.[92] The Indonesian Letter of Intent[93] with Norway signed by President Yudhoyono attempts to begin shifting Indonesia's economic development onto a low-carbon pathway. The levers are a moratorium on new permits to convert natural forests and peatlands, and a call for an immediate review of existing concession permits on such lands to see if they could be relocated elsewhere.

A strong moratorium would protect the remaining natural forests, focus low-carbon development on increasing productivity and confine expansion to genuinely degraded lands with low carbon, social or biodiversity values. This would have the effect of helping improve national economic health, by making Indonesia a secure and sustainable investment location for companies who do not want to be associated with forest destruction; improving people's quality of life through the creation of higher-value, clean industry without loss of natural resources; and respecting the rights of indigenous peoples and local communities.

However, Indonesia's pulp and paper industries – with support from inside certain ministries – are seeking to forestall these changes and either derail the agreement with Norway or render it ineffective. Notably, Indonesian ministries have projected considerable expansion for sectors including pulp, palm oil, biofuel and coal in the name of improving Indonesia's self-sufficiency, strengthening international trade and poverty alleviation. This raises the question of the likely impacts of current development plans on Indonesia's forests, peatlands, GHG emissions and communities.

As the DNPI 2010 GHG abatement plan admits, expansion plans in key industry sectors are expected to result in the conversion of millions of hectares of forest and peatland by 2030: 'Government plans for increasing pulp and palm oil production will require 11–15 million ha of currently forest covered areas to be converted. To feed and support the growing population, another 10–13 million ha are required for croplands. General increasing demand for wood products in construction and bioenergy might lead to even larger areas required.'[94]

'Much of that additional land is likely to be made available through deforestation of conversion forest (Hutan Produksi Konversi, HPK); the shift of production forests (Hutan Produksi, HP) to conversion forests because of high rates of degradation (due to poor logging practices); and from conversion of forests located outside the forest estate (kawasan hutan). [...] It is expected that deforestation will shift to other, still largely forested islands such as parts of Kalimantan and especially Papua.'[95]

This section looks at the projected land-use pressures from key sectors to 2030, identifies which zones will feel the pressure from particular sectors, and assesses the high-carbon forest and peatland values at risk within those zones.

The findings: if targets and assumptions for key land-use sectors are met, about 63 million ha or more[96] of additional land would need to be brought into production by 2030, almost exclusively within the HP, HPK and APL zones. Including forests, areas within these zones not already under identified economic land use amount to about 60 million ha.

This suggests that there will be significant competition for land within the HP, HPK and APL zones. Undeveloped forested land and peatland areas will be primary targets for expansion, being both less likely to conflict with existing social or economic interests and more lucrative, as forest assets (timber) can be liquidated to fund plantation or agricultural development (or just logged and the land left degraded, as the DNPI concedes).[97]

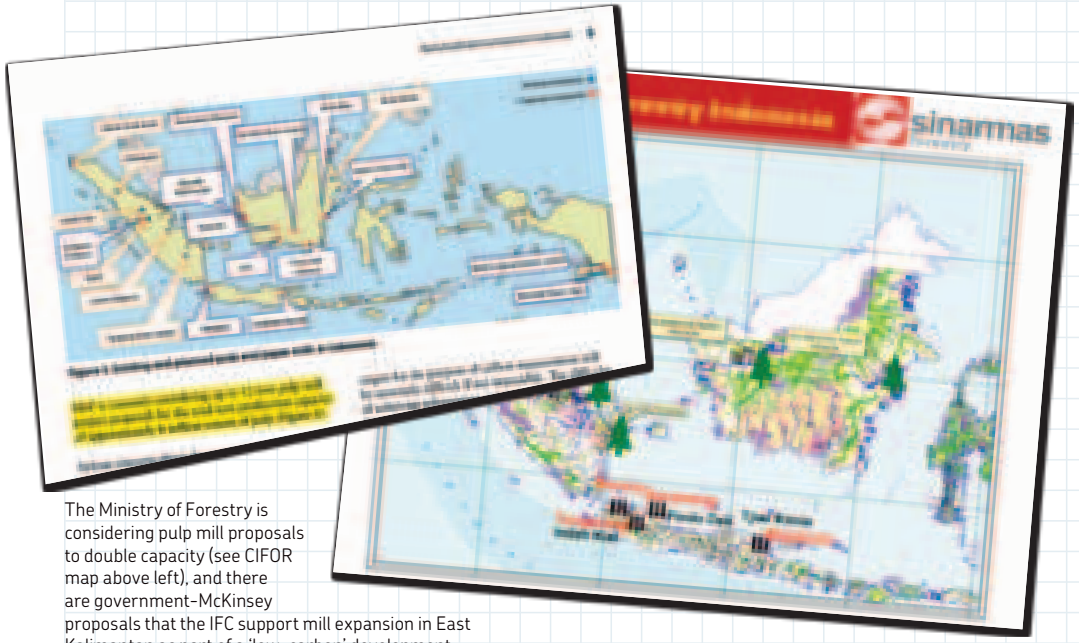
The findings seriously challenge the basic premise of the DNPI GHG abatement plan and other climate-related reports that – with international support – the pulp and paper sectors will help reduce GHG emissions from deforestation, and set Indonesia on a low-carbon development pathway. The findings highlight the critical need to define genuinely degraded land available for low-carbon development.

The stages from forest to plantation to disposable paper product:

1. Kerumutan, 2010: Peatland forest clearance on a Sinar Mas concession.
2. Kampar, 2009: Peatland drainage.
3. West Kalimantan, 2010: Sinar Mas plantation nursery.
4. South Sumatra, 2010: Workers' housing, Sinar Mas concession.
5. Riau, 2008: Eucalyptus plantation.
6. 2010: Harvested acacia.
7. Riau, 2008: Sinar Mas' Indah Kiat pulp mill.
8. Jambi, 2010: Sinar Mas' Lontar Papyrus pulp mill.
9. Sinar Mas' paper.

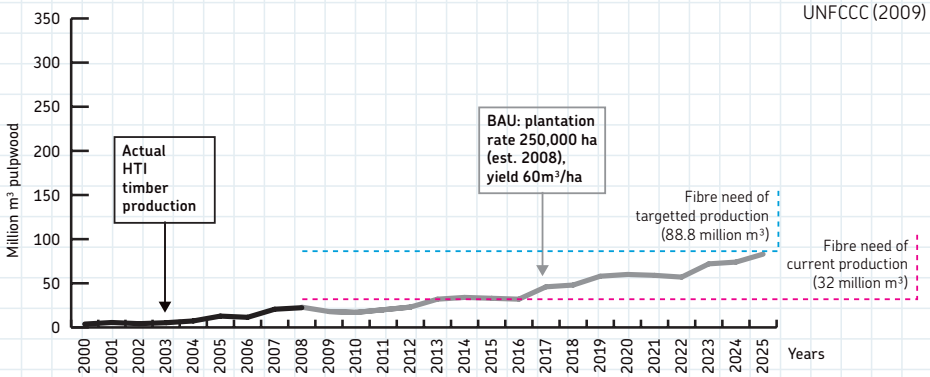
SECTOR DEVELOPMENT PLANS:

‘TREBLE PULP AND PAPER PRODUCTION BY 2025’



The Ministry of Forestry is considering pulp mill proposals to double capacity (see CIFOR map above left), and there are government-McKinsey proposals that the IFC support mill expansion in East Kalimantan as part of a ‘low-carbon’ development strategy. Sinar Mas internal documents show huge mill expansion ambitions, including in East Kalimantan. Sources: Cifor (2010), confidential Sinar Mas document.

Figure 2: fibre demand (current, projected) and plantation fibre availability based on BAU plantation rates and yields



Sources: MoFor (2007b), MoFor (2009a,c), DNPI/ UNFCCC (2009) 43.

Government climate planning documents project a trebling of pulp and paper production by 2025.[98] The DNPI’s GHG abatement plan states: ‘government plans for increasing pulp production’ will require 6–8 million ha of ‘currently forest covered areas to be converted’.[99] Total land-use projections for the sector are not quantified. The Ministry of Forestry is already considering pulp mill project proposals that would see a doubling of 2009 capacity levels to around 16 million tonnes,[100] with proposals from the DNPI-East Kalimantan government that involve IFC support for development of two mills with a total pulp capacity of 2.6 million tonnes.[101]

Data deficiencies make estimating long-term pulpwood yields, ongoing fibre deficits met from natural forest clearance and associated future industry land-use needs difficult.

Pulp production figures together with Ministry of Forestry statistics on pulpwood yields suggest that the pulp sector remains dependent on natural forest clearance to meet at least one-quarter of current production.[102]

Although up to 10 million ha of industrial timber concessions (HTI) – chiefly pulpwood[103] – had been licensed by 2009,[104] less than half (4.3 million ha) had been planted by 2008.[105] Much of the area that has been developed is poorly managed.[106] Credible plantation yield figures are difficult to obtain. At most, the Ministry of Forestry’s own production data as of 2008 allow a maximum average yield of HTI pulp plantations of 60m³/ha at harvest,[107] about half of the industry’s claimed yields.[108] Data within the DNPI–East Kalimantan regional government ‘green growth’ strategy suggest – at least within that province – actual yields of just 30m³/ha (or just a quarter of industry claims).[109]However, the maximum current yield derived from the official Ministry of Forestry production data suggest that to treble production over the next 15 years would require the gross concession area to nearly double to 19 million ha.[110]

If new pulp mills are built prior to plantations being fully established and able to meet raw material demands, the mills can only be supplied by clearing natural forest. It is clear that even in the short term, certain ministries are advocating substantial natural forest loss to overcome the ongoing pulp fibre deficit[111] and feed further increased pulp production. When, in July 2010, the Industry Minister called for a rapid doubling of production and export from the sector,[112] he also announced that the government planned to expand the pulp and paper industry to Papua, reportedly ‘because of its vast tracts of forest’,[113] in recognition of the insufficiency of plantation timber supply to meet even current pulp production levels.[114]

‘Rapidly’ doubling current production would require the clearance of 320,000–640,000 ha of natural forest per year, assuming that producers are able to obtain 50–100m³ of pulpable wood from each hectare they clear.[115]

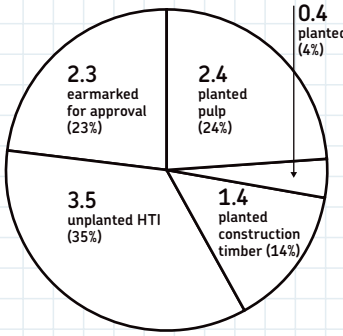
Existing plantations are not able to meet even current fibre demand from the pulp sector, given the current maximum average yield of 60m³/ha. Plantations take about seven years to mature. Plantation timber planted in 2012 to fuel increased production could only be assumed to start becoming available from 2019 in limited volumes, with amounts increasing as later plantings and repeat rotations kick in.

It can be assumed, therefore, that without radical changes in industry practice, the pulp sector’s supply deficit and consequently natural forest clearance will continue for many decades if pulp production increases to the target levels.

Supply cannot meet current levels of demand because plantation lands are not being planted at sufficient rates to produce logs in the right time frame. Also, lands that are planted are not, on average, yielding timber at industry-recognised levels of performance.

Ministry of Forestry/FAO 'Indonesia forestry outlook study' 2009

Figure 3: area (million ha), extent and status of HTI concessions, 2008



Total: 10 million ha

Source: MoFor (2007b) 2008 numbers have been estimated based on 2006 plantation data.

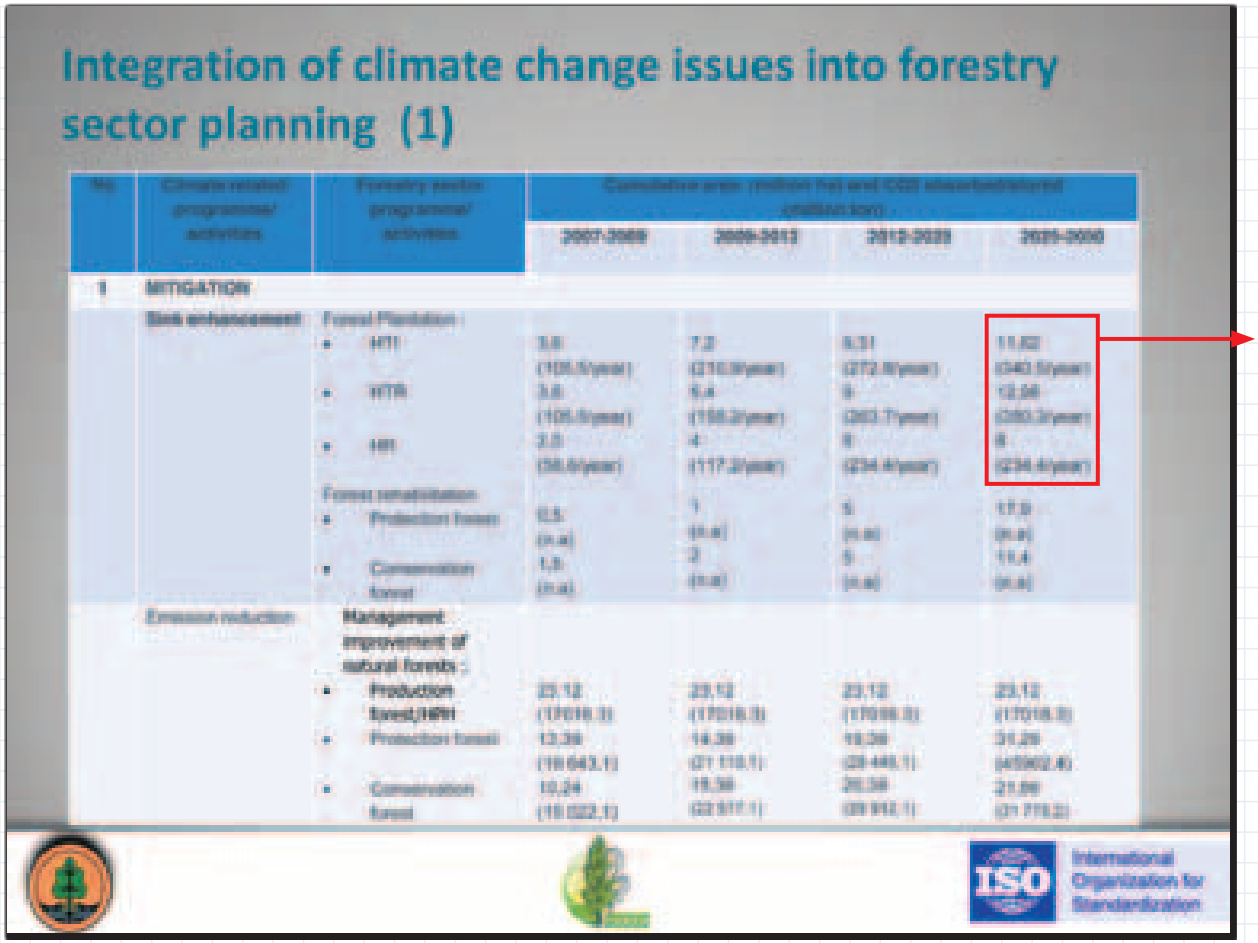
SECTOR DEVELOPMENT PLANS: 'REVITALISE THE FORESTRY SECTOR'

Excluding pulp, installed capacity for the wood-processing sector – lumber, plywood, veneer and woodchips – is estimated to require 44 million m^3/yr of timber.[116] Given that the 2004–2008 average official legal log supply was 25 million m^3/yr,[117] with only about half of that destined for the non-pulp segment of the wood-processing sector,[118] the overall structural deficit of this segment of the sector equates to about 31 million m^3/yr.

Although this deficit has forced a temporary decrease in processed wood production,[119] leading to the collapse and bankruptcy of some wood-based industries,[120] government figures suggest that in 2005 – even with reduced production levels – around 30% of overall sector production came from illegal timber supplies.[121]

Indonesia's 2010 GHG abatement plan states that, over the 2010–2030 period, Indonesia stands to lose '21–28 million ha of currently forested land [in part] because of high rates of degradation (due to poor logging practices)'[122] in logging concessions – the source of legal wood to the sector. The document concedes that the 'general increasing demand for wood products [...] might lead to even larger areas [of forest] required', but does not quantify the sector's needs.[123]

Data on BAU plantation establishment and productivity of non-pulp timber plantations is not readily available from official sources. It is a fair assumption that the sector will continue to rely on natural forest timber, some of it illegally harvested, for the foreseeable future, driving deforestation and degradation.



Ministry of Forestry plans to establish a total of 33 million ha of timber plantation in the name of 'sink enhancement', and apparently claim 1GtCO2 annual sequestration.

Source: MoFor/FORDA (2009).

LAND-USE PLANNING FOR THE FORESTRY SECTOR: 33 MILLION HA OF FOREST PLANTATIONS BY 2030

To service current industry needs and future forestry sector expansion, Indonesia's climate planning documents foresee that forest plantations, described as carbon 'sink enhancement', will cover a total of 33 million ha by 2030/2050.[124] Given that 4.3 million ha are currently established, that amounts to about 28 million ha of additional land area to be converted to forest plantation in the HP zone (the only zone available for this activity). There are 36 million ha in the HP zone; of this, only 27 million ha are not yet under identified economic activity.

There are three types of forest plantations:

HTI (industrial timber plantations): largely, but not exclusively to service the pulp sector.[125]

Goal: 12 million ha. Current area planted: 4.3 million ha. Current area allocated: 10 million ha.

HTR (joint community/industry ventures): with 10% going to pulp sector, these plantations are primarily to service the needs of the rest of the forestry sector (plywood, etc).[126]

Goal: 13 million ha. Current allocated concession area: 0.56 million ha.[127]

HR (community forests): exclusively to service the needs of non-pulp segments of the forestry sector.[128]

Goal: 8 million ha.

SECTOR DEVELOPMENT PLANS:

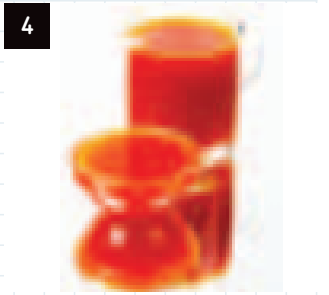
DOUBLE PALM OIL PRODUCTION

Indonesia aims to more than double its palm oil production to 40 million metric tonnes by 2020.[129] At current yields, this would require an increase of 8.6 million ha over 2008-planted area.[130] Additional targets are set for biofuel development.

The DNPI 2010 GHG abatement plan projects that by 2030 'government plans for increasing palm oil production' will require 5–7 million ha of 'currently forest covered areas to be converted'.[131] The document assumes a constant establishment rate of nearly 450,000ha/yr of estate crops in forest, ie an additional 9 million ha by 2030, with oil palm being the principal crop.[132] Total land-use projections for the oil palm and other estate crops are not quantified.

Estate crops such as oil palm plantations may be developed in either APL or released HPK zones.

1. Riau, 2007: Palm oil mill.
2. Riau, 2009: Oil palm fruit bunches.
3. Kalimantan, 2008: Processing palm oil.
4. Palm oil.
5. Leading food brands have moved to distance themselves from palm oil producers linked to deforestation.



SECTOR DEVELOPMENT PLANS:

‘COMPETITIVE INDUSTRIALISED AGRICULTURE’

Indonesia is a leading exporter of coffee.

‘To support and implement a development policy for sustained high economic growth,’ the Indonesian government has made ‘Revitalisation of Agricultural Competitiveness in the National & Global Economy’ a ‘policy priority’, with specific goals including the ‘realisation of a competitive industrialised agriculture’. Thus: ‘To increase competitiveness of the agri. [sic] sector, it must be transformed from self-sufficiency to exporting high-value agricultural products. In addition to meeting the country’s food security needs, it should also produce high-value crops, livestock, fisheries, forestry and other products for export and supply raw materials for agro-industries.’[133] Indonesia is already a global power in exports of commodities such as cocoa beans and coffee, in addition to palm oil.[134]

Indonesia is seeking to stimulate foreign and domestic investment in the agriculture sector through the creation of ‘food production zones’. In August 2010, the government granted permits to the first of these projects,[135] covering a total of 1.6 million ha of land in the heavily forested Merauke region of Papua.[136] One company – Singapore-based Wilmar International Ltd – secured a permit to develop 200,000 ha for sugar cane.[137]

The rapid expansion of agricultural crops for domestic use and export creates significant land-use pressure. United Nations Food and Agriculture Organisation (FAO) statistics reveal that since 2000, an average of 250,000 ha of new land has been brought into agricultural production annually, excluding permanent estate crops such as oil palm, cocoa and coffee plantations.[138] Extrapolating, this suggests an additional 5 million ha may be brought into production by 2030.

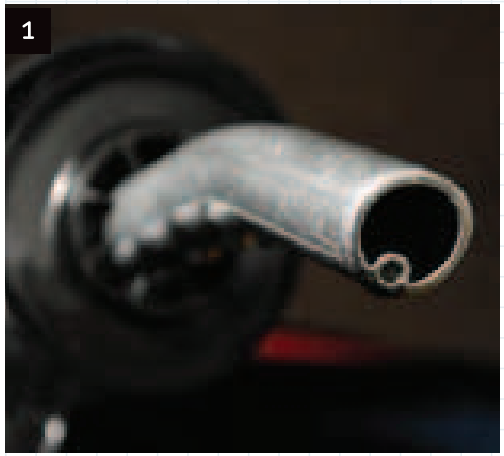
Administratively, this expansion takes place in the APL or released HPK zones.

The DNPI 2010 GHG abatement plan projects that by 2030 ‘another 10–13 million ha [of forest] are required for croplands’,[139] but it does not quantify total land-use demands for the agriculture sector. Given the policy priority to expand industrialised agricultural commodity production and trade, it is highly problematic for the DNPI to single out smallholder agriculture as a main driver of deforestation, with no mention of other agricultural drivers. Additionally, these land expansion projections contrast sharply with the 2010 draft REDD+ Strategy which states: ‘until 2020 the needs for crop lands […] can still be fulfilled from the existing agricultural lands without any needs for a [sic] new forest conversion (clearing)’.[140]

SECTOR DEVELOPMENT PLANS:

EIGHTFOLD INCREASE IN NATIONAL ENERGY DEMAND

South Kalimantan, 2009: Coal mine.



1. Indonesia has earmarked 9.25 million ha for biofuel production.
2. Jerapa, 2007: Coal power station.

Demand for power is expected to increase eightfold from 2005 to 2030.[141] The National Energy Blueprint sees coal dominating the energy mix,[142] with biomass – notably timber and fuel crops – the single largest identified abatement lever.[143] Indonesia is a signatory to the G20 pledge to phase out subsidies for fossil fuels.[144]

BIOFUEL PRODUCTION CREATES ADDITIONAL LAND PRESSURE

Indonesia's Ministry of Energy has large-scale ambitions for bioenergy production. It has promoted four priority commodities for bioenergy production: oil palm, jatropha, sugar cane and cassava.[145] In 2007, the Ministry presented plans to develop 5.25 million ha of 'idle land' for biofuel plantations by 2010,[146] virtually all within the Forest Estate[147] (hence, the HPK zone). Additionally, a further 2.5 million ha of oil palm and 1.5 million ha of jatropha plantations are stipulated for biofuel production to meet 2025 production targets.[148]

1

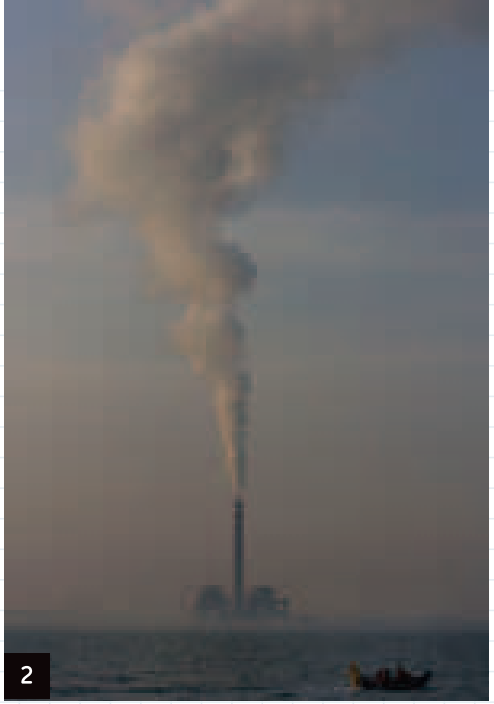
This brings the total area earmarked by the government for biofuel production to 9.25 million ha, at least half of it within the Forest Estate. The DNPI 2010 GHG abatement plan concedes that 'general increasing demand for [...] bioenergy' might lead to the conversion of significant areas of forest, but does not quantify the sector's needs.[149] Interestingly, the DNPI suggests 'Biodiesel made from palm oil would provide an additional 10MtCO_2e of abatement potential' at the cost of \$100/tCO_2e.[150] This would represent a contribution of \$1 billion/yr to the sector for the dedication of 4 million ha of oil palm to biofuel production.[151] Clearly, the plantations would have to be on virtually bare land if the biofuel is assumed to be carbon neutral, and would need to avoid displacing other development into forests.

COAL FUELS HIGH-CARBON EXPANSION

Coal is one of the dirtiest forms of energy in the world. Indonesia has seen a rapid expansion of coal mining during the last decade.[152] According to the DNPI-East Kalimantan document, coal is a leading driver of deforestation.[153]

Although Indonesia's 2010 GHG abatement plan specifically states that with international support, the country has the opportunity 'to shift to a less carbon-intensive development model',[154] the Ministry of Energy and external funding agencies assume coal will fuel most expansion in power generation.[155]

The rapid expansion of Indonesia's coal sector to meet growing domestic and global energy demand creates additional pressure on Indonesia's forests, as well as the global climate.


2

By 2009, working coal concessions covered over 500,000 ha of Forest Estate,[156] while a much larger area was covered by concessions at various stages of exploration.[157] The Ministry of Forestry is working on the basis that 200,000 ha of land within the Forest Estate will be given over to mining activities annually.[158] This suggests that by 2030 coal concessions within the Forest Estate will cover an additional 4 million ha. Total land-use demand is not quantified.

One of the key drivers of increased energy demand identified by the DNPI and the UNFCCC is the pulp and paper sector.[159] The DNPI–UNFCCC Needs Assessment on Climate Change Mitigation report notes that its assessment of the sector is based on data provided by Sinar Mas,[160] responsible for almost half of Indonesia's pulp production in 2009.[161]

Citing work by Environmental Resources Management (ERM),[162] Sinar Mas claims that the carbon footprint of its pulp and paper production is 'close to neutral'.[163] By contrast, the DNPI–UNFCCC Needs Assessment on Climate Change Mitigation report states that the GHG emissions intensity per tonne of product is currently about 5.6tCO_2.[164] The report projects that this will rise to about 6.3tCO_2[165] due to the increased use of coal.

Sinar Mas has joined the dash for coal and is rapidly expanding its coal mining operations. The Executive Director of the Indonesian Mining Association (IMA), Priyo Soemarno, stated in an interview with *Investor Daily* in May 2009: 'I am sure Sinar Mas could be one of the big 10 national coal producers in the next few years. [...] The main reason is to guarantee the supply of internal needs.'[166] Sinar Mas has stated publicly: 'Sinar Mas now needs more than 10 million tons of coal per year to meet electricity generation requirements in its paper and pulp factories. These business groups will continue to increase production capacity in the future.'[167] Based on Sinar Mas Mining's analysis of the carbon content of its coal and declared use, coal emissions alone resulting from Sinar Mas' pulp and paper production amount to 20–26.5MtCO_2 annually;[168] this is about half of Norway's total nationally reported GHG emissions.[169] Sinar Mas' largest Indonesian pulp mill uses peat as part of its fuel mix.[170]

The DNPI–UNFCCC statements on the energy intensity of pulp and paper production suggest the sector is currently responsible for over 50MtCO_2e[171] – equivalent to almost half of current GHG emissions from power generation, although it does not appear to figure in the national GHG emissions calculations. The assumptions further suggest that if expansion targets for the sector are met paper production will be responsible for 170–200MtCO_2e emissions annually, depending on whether or not efficiency measures are implemented.[172] This is almost twice Indonesia's current total declared GHG emissions from power generation of 110MtCO_2e.[173]

VALUES WITHIN AVAILABLE DEVELOPMENT ZONES

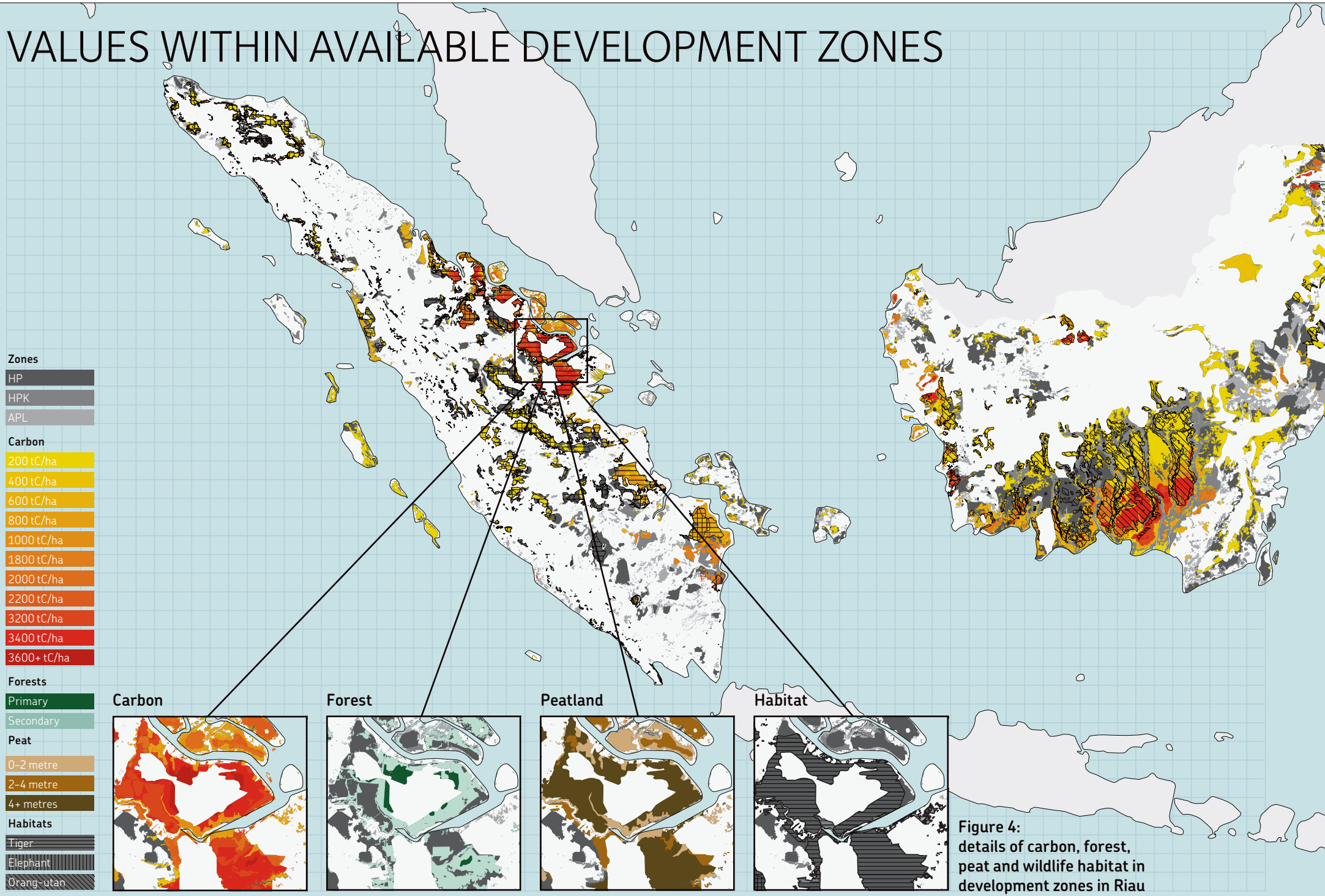
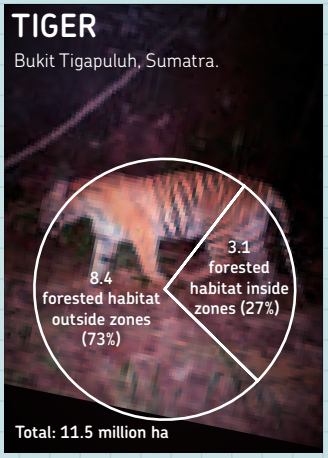
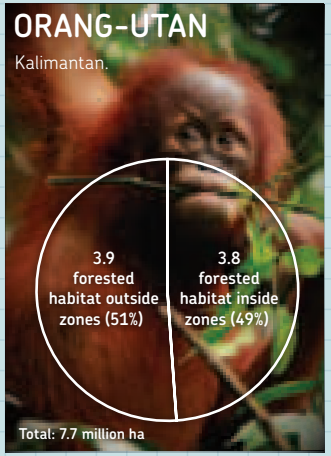
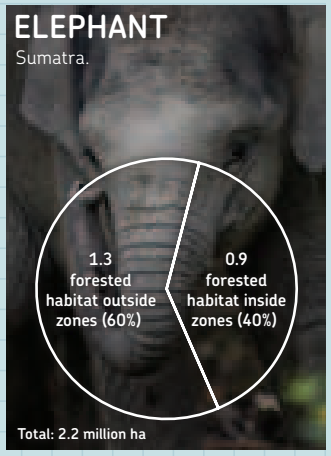


Figure 4:
details of carbon, forest, peat and wildlife habitat in development zones in Riau

Figures 5, 6, 7: area (million ha), extent of forest wildlife habitats and development zones







Map sources: Meijaard (2004), MoFor (2009e), MoFor (2010c), Wayhunto et al (2003, 2004, 2006), WWF/SaveSumatra.org.

SUMMARY TABLE OF FOREST, PEATLAND AND WILDLIFE VALUES WITHIN DEVELOPMENT AND OTHER ZONES

Landcover	Area (million ha)					
	HP	HPK	APL	Total development zones	Total (all zones)	% of total forest type in development zones
Primary Forest	7.5	5.0	1,1	13.6	44.7	30%
Secondary Forest	12.1	5.0	6.1	23.3	47.3	49%
Other land cover/no data	16.4	8.3	51.4	76.0	94.7	
Total	36.0	18.3	58.7	113.0	186.7	
Peatland in development zones						
Peatlands	HP	HPK	APL	Total development zones	Total (all zones)	% of total peatland type in development zones
Peatlands, all depths	8.2	3.8	4.3	16.3	20.9	78%
peat >4m depth	1.7	0.4	0.4	2.4	3.0	79%
peat <4m depth	6.6	3.4	3.9	13.9	17.8	78%
Habitat in development zones						
Kalimantan orang-utan	HP	HPK	APL	Total development zones	Total (all zones)	% of total habitat in development zones
forested habitat	2.6	0.9	0.2	3.8	7.7	40%
non-forested habitat	0.8	0.6	0.1	1.5	1.8	15%
total habitat in zone(s)	3.4	1.5	0.3	5.2	9.5	55%
Sumatran tiger						
forested habitat	2.0	0.2	0.9	3.1	11.5	15%
non-forested habitat	2.2	0.2	4.0	6.5	9.3	31%
total habitat in zone(s)	4.2	0.4	5.0	9.6	20.8	46%
Sumatran elephant						
forested habitat	0.7	0.04	0.1	0.9	2.2	22%
non-forested habitat	0.6	0.07	0.5	1.1	1.7	29%
total habitat in zone(s)	1.3	0.1	0.6	2.0	4.0	51%

MAPPING DESTRUCTION:

VALUES AT RISK WITHIN DEVELOPMENT ZONES

Far from being 'degraded forest or wasteland',[174] Indonesia's HP, HPK and APL zones hold considerable values including carbon and biodiversity that stand to be lost through planned land-use change.

GOVERNMENT DATA INDICATE THE EXTENT AND QUALITY OF FOREST VALUES

Greenpeace's mapping analysis uses many of the same methodologies and data sets used by the DNPI, industry and scientific research bodies.

The 2008 Ministry of Forestry statistics on Indonesia's forests include the most up-to-date official government analysis of the extent of those forests, based on interpretation of Citra Landsat 7 ETM+ satellite data for 2005/2006 in relation to land-use zoning.[175] This quantifies the extent of forest cover in different administrative zones.

Supplementary analysis by Greenpeace based on best-available data sets reveals the quality of the forest cover, and the extent of habitat and peatland within the areas zoned for development.

In 2009, the Ministry of Forestry made available its 2006 landcover data,[176] which identifies primary, secondary and plantation forest cover, agricultural lands, land for other identified economic uses, scrubland and 'bare land'.

Greenpeace mapping and analysis of ecological values and their overlap with administrative zones and existing concession areas include several data sets: government landuse maps,[177] pulpwood concession maps recently made available by the Indonesian Ministry of Forestry;[178] peatland distribution is based on maps published by Wetlands International;[179] Sumatran tiger habitat distribution is based on maps compiled by WWF;[180] orang-utan habitat is based on maps published by United Nations Environment Program (UNEP).[181]

FINDINGS: VALUES AT RISK FROM INDUSTRY AND MINISTRY DEVELOPMENT PLANS

Areas available for expansion within the HP, HPK and APL zones currently planned for development contain considerable carbon, ecological and biodiversity values. Collectively, these areas contain:

- Nearly 80% of Indonesia's peatland (over 16 million ha; of this, 2.4 million ha is very deep peat [>4 metres]).
- 40% of Indonesia's remaining natural forest (37 million ha in total; of this, more than one-third is primary) – an area the size of Norway and Denmark.[182]
- Half of forested orang-utan habitat in Kalimantan (nearly 4 million ha is forested); over a quarter of forested Sumatran tiger habitat (just over 3 million ha).

Indonesia's development ambitions and REDD mitigation proposals suggest there is adequate 'degraded land' available for development priorities, but offer inadequate or contradictory definitions of this land.

The joint Indonesia National Development Planning Agency (BAPPENAS)–UN-REDD October 2010 draft National REDD+ Strategy does establish a technical carbon threshold of <35tC/ha[183] for land suitable for low-carbon development. It also states that land with a potential to reach 100tC/ha merits conservation purely for its carbon storage potential.[184] Logically applied, these carbon criteria should translate into policies for low-carbon development based on full peatland and forest protection.[185]

Greenpeace's preliminary analysis sought to identify genuinely degraded land for potential low-carbon development. Collectively, the HP/HPK and APL zones contain 14 million ha of landcover identified by the Ministry of Forestry as bareland, scrubland or savannah that is not on wetlands, and hence is potentially below the threshold of 35tC/ha.[186] However, this assessment does not include other important development metrics, including wildlife (habitat) and social (identified economic or agricultural activity) values. Further, supplementary landcover analysis suggests significant tree cover within some of these categories.

CONCLUSION: DEVELOPMENT AMBITIONS MUST CONCENTRATE ON INCREASING PRODUCTIVITY

Ministry of Forestry and other data sets also used by the Indonesian government in its 2010 GHG abatement plan suggest that the potential area of low-carbon land available for planned expansion in key sectors represents less than one-quarter of predicted BAU sector land-use: about 14 million ha as opposed to about 63 million ha. Even within this subset, alternative land-uses to industrial plantation development may be more appropriate from carbon, conservation, ecological and social perspectives.

The 2010 GHG abatement plan identifies the pulp and palm oil sectors as drivers of half of predicted deforestation over the 2010–2030 period.[187]

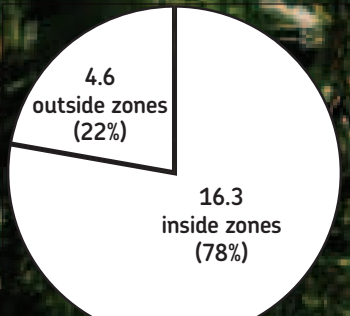
In order for Indonesia to meet its express ambitions not to be 'locked into a growth model that is unsustainable for our, and the world's, environment' it is clear that sectors such as pulp and palm oil must 'shift to a less carbon-intensive development model'.[188]

A top priority must be radically improving productivity within existing plantations, without further clearance.

DNPI and industry documents emphasise the potential to improve productivity for pulp fourfold and palm oil nearly twofold. Concentrating on productivity improvements would render further extensive land conversion for these sectors, even within existing concession areas, largely unnecessary. That is a win-win situation for both the economy and the environment.

However, key players in the pulp and palm oil sectors and within ministries in the Indonesian government appear institutionally hostile to revision of the BAU model, and seek to equate their unsustainable business model with rhetoric about poverty alleviation and economic development.[189] Such rhetoric is undermining President's Yudhoyono's ambitions to seize this opportunity to set Indonesia on a low-carbon, high-value development pathway with substantial financial support from the international community.

Figure 8:
area (million ha), extent of peatland and development zones



Total: 20.9 million ha

Sources: MoFor (2010c), Wayhunto et al (2003, 2004, 2006).

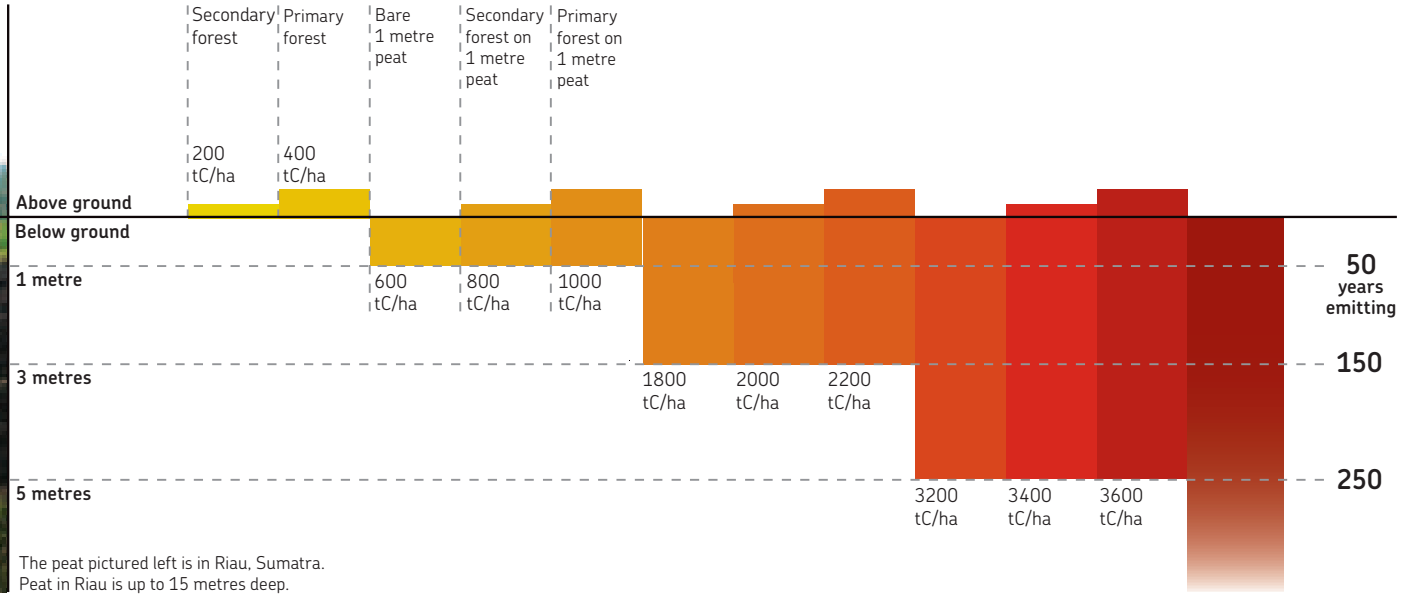
Riau, 2009: Intact peatland forest.

IMPACTS OF PLANNED EXPANSION ON PEATLAND AND GHG EMISSIONS

The quality of natural forest determines its carbon stock. Peatlands have varying depths of peat. The depth of peat on which a 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.

Sources: Ministry of Environment (2009), Hooijer et al (2006) and Germer an Sauerborn (2007).

Figure 9: forest and peatland carbon (tC/ha) and years of degradation following conversion by depth



The peat pictured left is in Riau, Sumatra. Peat in Riau is up to 15 metres deep.

According to the DNPI, Indonesia's peatland areas and their forests store 40GtC, 'a value comparable to the Amazon rainforest'.[190] However, whereas the Amazon extends over an area over three-quarters the total size of the USA,[191] Indonesia's total peatland area is smaller than the UK.[192] Less than half of that area is – as yet – degraded,[193] yet GHG emissions from Indonesia's peatland[194] are greater than the UK.[195]Nearly 80% of Indonesia's peatland – holding 28GtC – is in areas zoned for intensive development by 2030.[196] The DNPI's 2010 GHG abatement plan assumes 'that large areas [of peatland] will be converted'[197] without radical change in government policy and industry practice, and that peatland emissions will rise 'due to the fresh conversion and drainage of peatland for plantations (eg, pulpwood and oil palm plantations)'.[198]

DNPI plans identify three levers for mitigating BAU GHG emissions: fire prevention, water management and rehabilitation.[199] Avoiding planned development on peatland is not specifically identified as a potential lever.[200]

The DNPI's mitigation/abatement levers largely target the rate of peatland emission rather than the overall GHG emissions liability from the area. They also leave open the possibility that plantations will be classified as rehabilitation – an interpretation strongly advocated by industry.

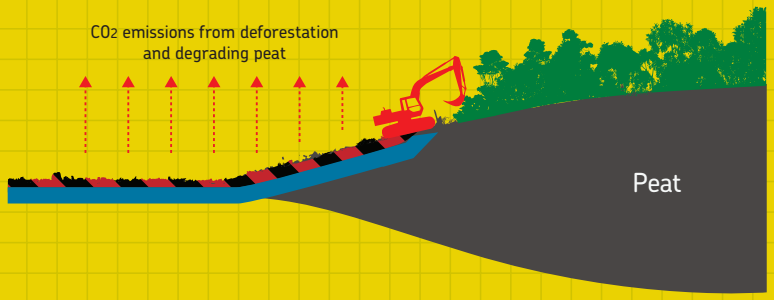
For instance, a presentation by Sinar Mas to a group including the DNPI and the Ministry of Forestry immediately prior to the Copenhagen Climate Summit in December 2009 suggested that its pulp plantations on peatland abate GHG emissions from fire, restore hydrological function of degraded peat and restore carbon sequestration of collapsed peat domes.[201]

The carbon reality is that further development on peatland will add substantially to the world's overall GHG emissions, bringing us closer to climate tipping points that could have catastrophic impacts for all nations, including Indonesia. Full protection of peatlands is the simplest, quickest and most direct way to meet a substantial share of President Yudhoyono's climate commitments.

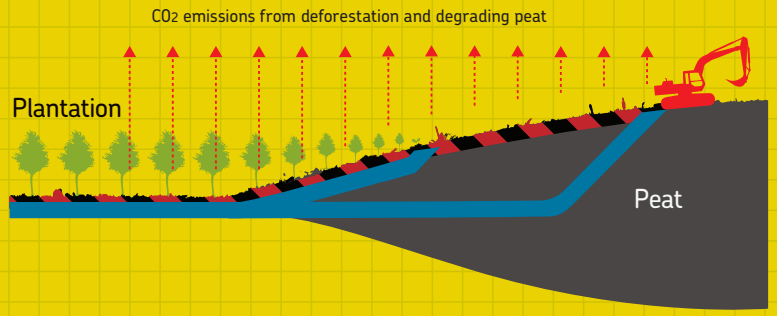
Figure 10: the process of peatland degradation

1 Natural forested peatland

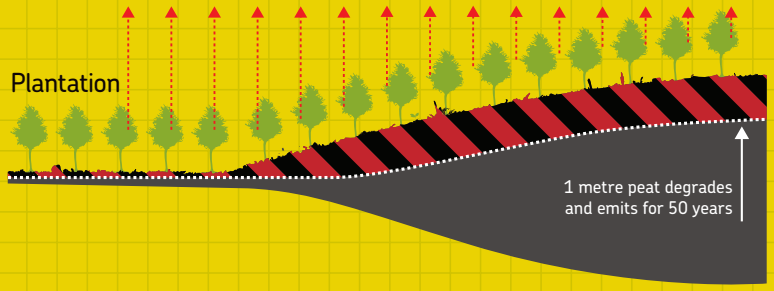
2 Deforestation



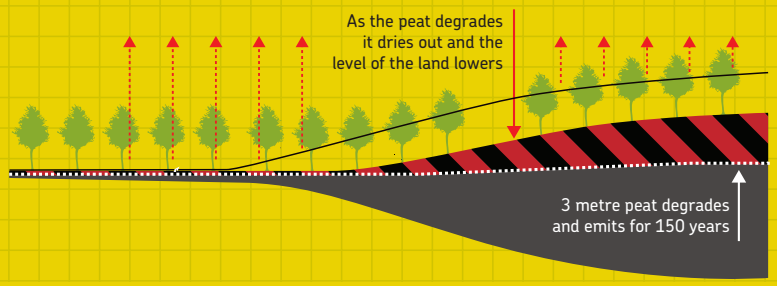
3 Clearing and planting



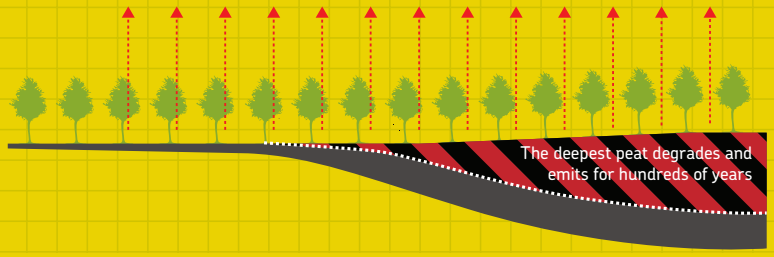
4 Emissions from 0–2 metre peat



5 Emissions from 2–4 metre peat

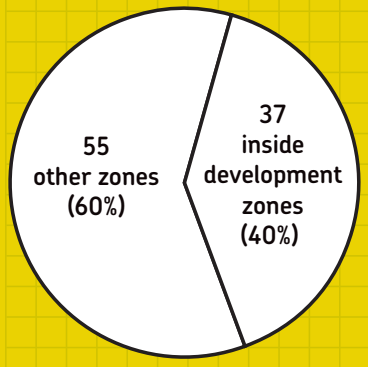


6 Emissions from 4+ metre peat



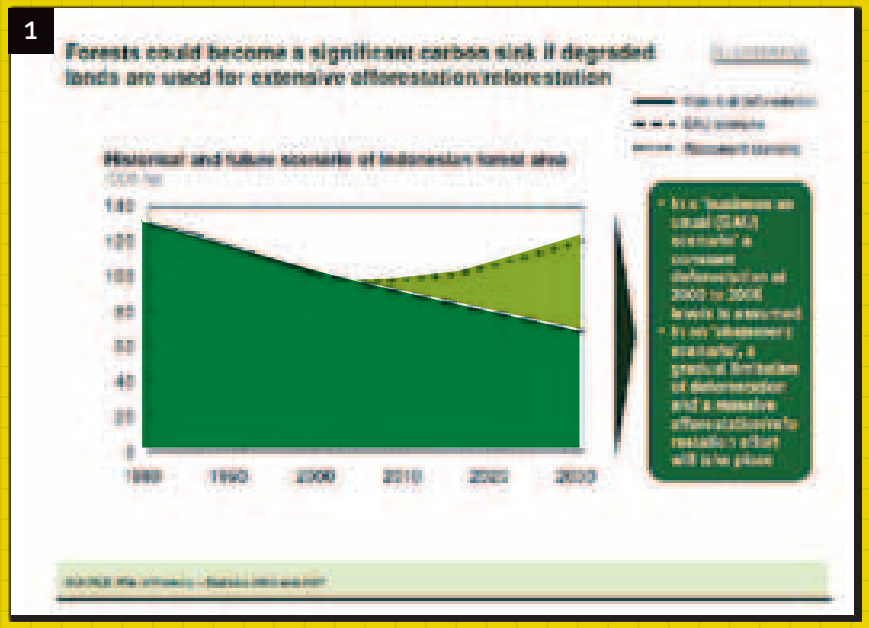
IMPACTS OF PLANNED EXPANSION ON FORESTS, GHG EMISSIONS AND INDONESIA'S REDD+ PITCH

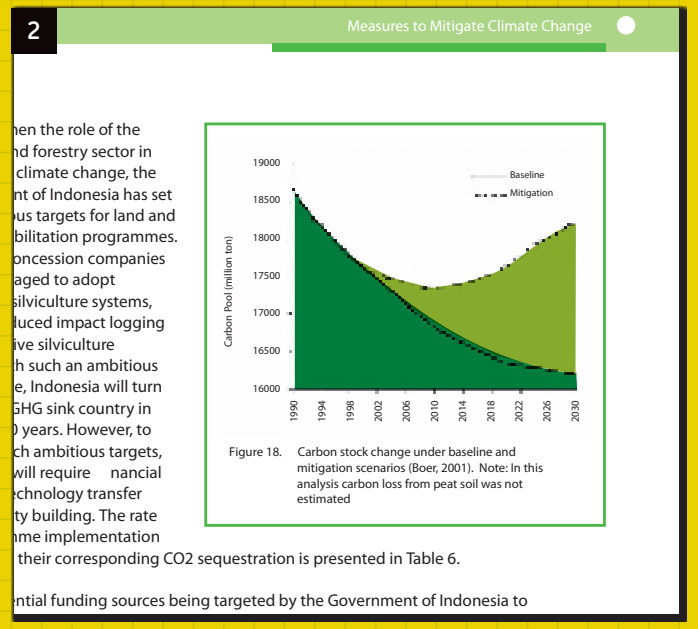
Figure 11: area (million ha), extent of forest and development zones



Total: 92 million ha

Sources: MoFor (2009e), MoFor (2010c).





Sources:
1.DNPI (2009) 11
2. Ministry of Environment (2009) 1:27.

According to Indonesia's 2009 Second National Communication to the UNFCCC, on average Indonesia's primary forests store 400tC/ha and other forests 200tC/ha.[202]

About 40% of Indonesia's forest is in areas zoned for development, including conversion to timber and oil palm plantations and production of agricultural commodities. Within these zones, primary forest covers more than 13.6 million ha and other forests cover nearly 23.3 million ha – 37 million ha in total, an area the size of Norway and Denmark.[203] Ministry of Forestry figures suggest these forests hold 10GtC.[204]

The DNPI's scenario assumes the loss of the majority – if not all – of this forest: 'Government plans for increasing pulp and palm oil production will require 11–15 million ha of currently forest covered areas to be converted. To feed and support the growing population, another 10–13 million ha are required for croplands. General increasing demand for wood products in construction and bioenergy might lead to even larger areas required.'[205]

The opportunity cost of preventing just over half of this zoned deforestation (the share attributed to pulp and palm development) is given at about $30/tCO$_2$e, which equates to an opportunity cost of about $20,000/ha.[206]

Use of these figures in terms of the cost of avoiding deforestation from the pulp and palm sectors is disingenuous. It assumes that economically and environmentally sustainable levels of fibre cannot be produced without extensive plantation establishment, and that plantations will not be established at all if not on forest land.

The DNPI's 2010 GHG abatement plan does go on to say: 'These costs can be significantly reduced if those plantations can be established on already degraded or deforested areas, as the costs then represent only forgone revenue from one-time timber extraction for the initial land clearing'.[207] However, the actual cost – per tonne CO$_2$e, or per hectare of forest of relocating plantations, or (most appropriately from an economic perspective) per tonne of desired production – is not given.

One possible effect of presenting the cost of avoiding deforestation by plantations in this way – ie presenting the most expensive possible scenario – is to make policy options involving prevention of plantation establishment on forested land appear prohibitively expensive (at least in terms of opportunity cost), thereby implicitly favouring cheaper policy options (such as fire prevention on peatlands – perhaps through plantation establishment). This has the perverse effect of allowing deforestation and peatland degradation for plantations to continue, possibly for years or decades.

It also fails to incentivise improvements in productivity, which would lessen overall land area demands.

Equally perversely, allowing areas to be deforested (with the lost timber quite probably used to meet the fibre needs of the pulp sector) and then allowing plantation establishment on 'degraded [...] forested land'[208] to count as 'reforestation' is identified as a markedly cheaper option to avoiding deforestation.

'Afforestation and reforestation represent a sequestration opportunity of 300MtCO_2e by 2030 at a cost of $5–6 per avoided t$CO_2$e. This implies (re-)establishing forests on more than 10 million ha of degraded non-forested and forested land [...]. Developing commercial timber and estate crop plantations as part of the reforestation program could help to reduce the pressure on remaining forest areas.'[209] A DNPI–Jambi regional government strategy document puts forward a theory to resolve this tension between reforestation as plantation establishment in 'degraded' forest or as GHG emissions abatement: 'Increasing the carbon sink by afforestation or reforestation can only be realised if these areas are set aside for conservation. However, one way to bring degraded areas back under forest cover could be to plant a temporary timber plantation, which could then be gradually transformed to conservation or protection forest.'[210]

Two preferred options in relation to plantations seem to emerge from the DNPI GHG cost curve report – either the international community should pay the full 'opportunity cost' of not establishing plantations, or it should accept plantation establishment as part of the solution. The industry stands to benefit either way, and unless very large sums of money are made available (over $10 billion/yr for the pulp and palm oil sectors by 2030)[211] deforestation for plantations is set to continue under the DNPI plan.

It would appear that some elements within the Indonesian government want the international community to pay quite a lot of money for pulp and palm oil industry expansion, without being able justify it from a climate perspective.

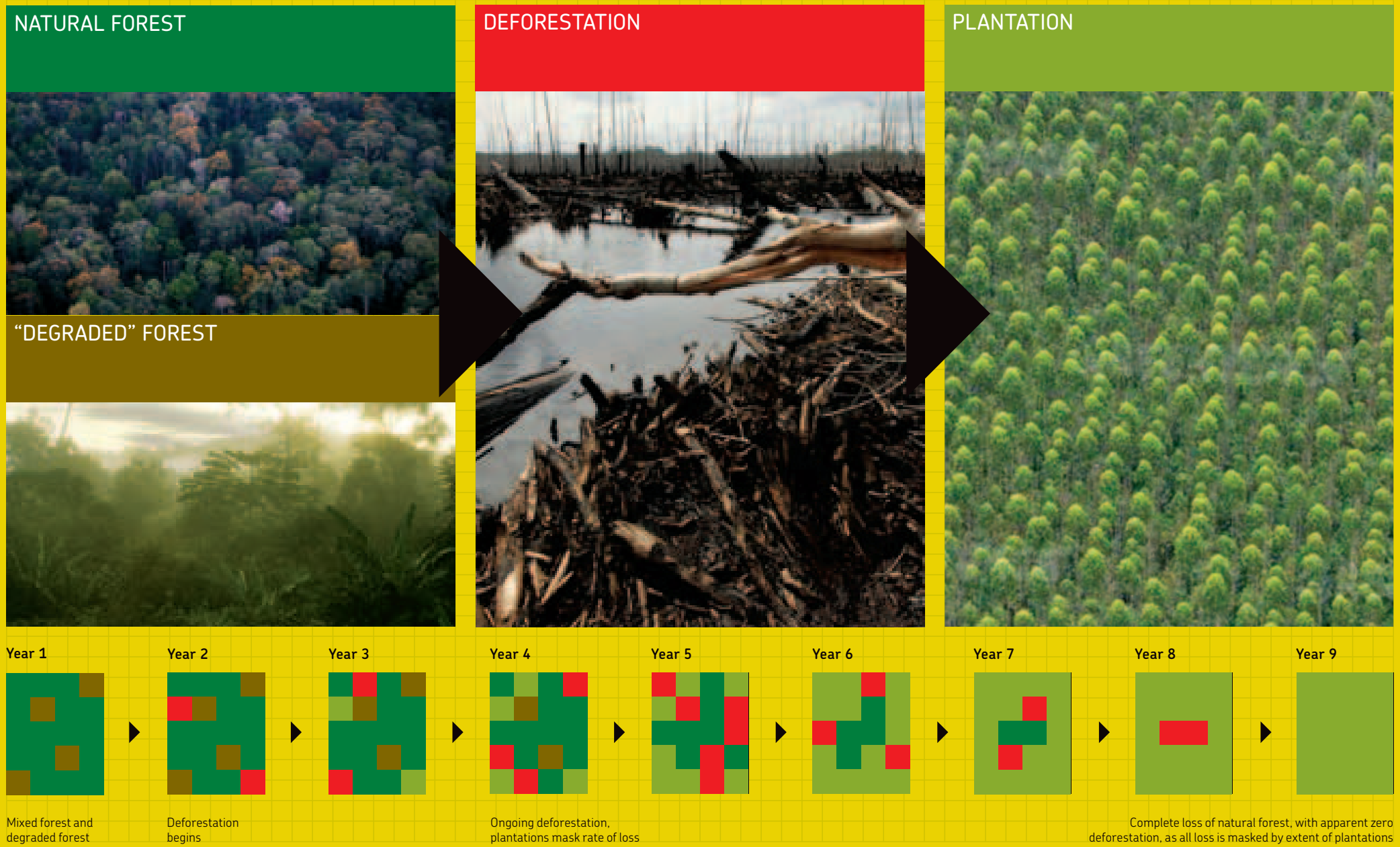
Interestingly, however, these same documents contain much evidence suggesting that the pulp and palm oil sectors have the potential to radically transform their business models and genuinely contribute to a low-carbon development trajectory for Indonesia that does not depend on forest and peatland destruction.

As recognised by various official documents,[212] Indonesia is a nation whose environment, people and economy are incredibly vulnerable to the impacts of climate change. As the world's leading source of deforestation-related emissions, Indonesia must take action to protect its remaining natural forests and peatlands. Their protection is vital not only to reducing global GHG emissions, but also to maintaining the health, safety and security of Indonesia's people.[213]

The reality of the GHG emissions reductions achieved through shifting oil palm and pulp plantation expansion and other development from forested lands to land appropriate for low-carbon development depends very much on how key terms such as 'forest' are defined.

Within the context of Indonesia's national GHG emissions abatement plan, REDD+ projects and the agreement with Norway, there is a lack of clarity about definition; the terms 'degraded', 'critical', 'unproductive', 'idle' and 'waste land' are used widely by both government and industry in Indonesia to describe land which could be developed to avoid deforestation-related emissions.

Figure 12: plantations mask the true extent of deforestation



IDENTIFYING LAND AVAILABLE FOR LOW-CARBON DEVELOPMENT

WHAT DEFINES DEGRADED LAND?

All concession areas owned or managed by SMART and its parent company, Golden Agri-Resources (GAR), are located on degraded land, based on government concessions.
Sinar Mas palm oil division, Press release, 28 July 2010

Official government reports and industry frequently refer to 'degraded' land, without clear definition, to suggest that Indonesia has significant areas of land that – with REDD funding – could be developed to avoid deforestation-related emissions. Within the context of international negotiations to reduce GHG emissions, there is no single internationally-approved definition of 'degraded land', nor is there one definitive Indonesian law or policy.

As the World Resources Institute has summarised:[214] 'Land degradation is generally understood as a human-caused process that results in long term loss of natural productivity; forest degradation generally refers to loss of services provided by forested ecosystems, including but not limited to carbon storage.' Ecologists refer to degraded forests to mean secondary or selectively logged forests; however, they emphasise that such forests contain important carbon, biodiversity and other values.[215]

In relation to GHG emissions abatement plans, the DNPI–Central Kalimantan regional government report 'Creating low-carbon prosperity in Central Kalimantan' states that 'degraded land' is 'defined by the Ministry of Forestry' as *'lahan kritis'* – critical land.[216]

WHAT DEFINES CRITICAL LAND?

'Lahan kritis' (literally 'critical' land) is land legally designated by the Ministry of Forestry as having reduced ecological functions.[217]

The Ministry of Forestry identifies 59 million ha of 'critical land' within the Forest Estate and a further 41 million ha outside the Forest Estate.[218] The March 2010 ICCSR report notes that this land is in need of 'rehabilitation' – a key component of Indonesia's abatement scenario.[219] Indonesia's October 2010 draft National REDD+ Strategy notes that 'efforts to rehabilitate forest areas and critical land [...] should be made a national priority'.[220]

The DNPI–East Kalimantan government report 'East Kalimantan Environmentally Sustainable Development Strategy' specifically singles out 'critical' and 'very critical' land as degraded land with abatement opportunities. It defines these areas as having forest cover of up to 40% and 20%, respectively, and cites the Ministry of Forestry as the source.[221]

Given the relatively high forest cover levels within the definition, it is clear that relocating plantation development to 'critical' land is not synonymous with stopping deforestation of carbon-rich forests and peatlands. Under FAO criteria, areas with more than 10% canopy cover are defined as forests.[222]

WHAT DEFINES UNPRODUCTIVE OR IDLE LAND AND LAND ZONED FOR DEVELOPMENT?

'Tanah terlantar' is unused/abandoned land on which a permit has been issued but has not yet been utilized by the permit-holder – estimated by the BPN and Forestry Minister at about 7 million ha.[223]

'Lahan tidur' (literally "sleeping" land) is idle land, considered unproductive according to national or provincial regulations – currently estimated at 12 million ha by the BPN.[224]

Indonesia's August 2009 draft National REDD+ strategy states that the strategic policy to reduce deforestation is to allocate 'unproductive land' for plantation development,[225] suggesting that the criteria reflect economic use to industry, rather than ecological values.

The October 2010 draft National REDD+ strategy suggests that Indonesia has just over 30 million ha of 'unused land (deemed as available)' – these are 'overgrown with weeds and bushes, both in dry and mangrove swamps'.[226]

However, there is currently no technical definition for unproductive forest.[227] The closest definition and criteria are forestry regulations revoked in 2003 by Ministerial Decree to accelerate plantation development by allowing clearing of natural forest.[228] These historic regulations stipulated that timber plantations should be established on areas holding <5m^3/ha of commercial timber.[229] That is equivalent to one large or about ten spindly trees per ha – ie virtually bare land and shrubland. New regulations leave decisions on the productivity of a given area to the Minister to determine on a case-by-case basis.[230]

Indonesia's November 2009 Second National Communication to the UNFCCC and internal Ministry of Forestry documents appear to assume that the entirety of the permanent production zone is unproductive land, given that forest plantations may only be established in that zone, and the extent of the proposed plantation programme (33 million ha total) is almost the same area as the zone itself.[231]

This administrative and zonal-level approach to defining land available for expansion is actively supported by the industries and by the parts of government ministries that stand to gain in the context of significant international climate funding for REDD projects, and the proposed moratorium on further forest conversion.

The Indonesian Pulp and Paper Association (APKI) has stated that areas designated for the development of plantation forestry (ie 'based on zonal land-use plans') are 'consistent with approved national, regional and local land-use plans, to capture the productive capacity of degraded forest lands and to ease pressure on natural forests'.[232]

APP only establishes plantations in areas that have been designated by the government as least valuable in line with policy for development.
APP, 2009

We currently have a huge area of degraded forests. The National Land Agency (BPN) still has some 12 million hectares of idle land that could be used for business purposes. There are another 40 million hectares of degraded forests that could also be turned into plantations.

Forestry Ministry Zulkifli Hasan, 6 July 2010

Riau, 2007: Peatland drainage.

Even the most degraded logged forests […] have very considerable biological value. And we can also conclude that such biological value incorporates a high number and abundance of IUCN Red-listed – or HCV-species. […] Degraded forests should be viewed as an important reservoir for biodiversity.

Dr. David P Edwards, Institute of Integrative & Comparative Biology, University of Leeds, personal communication, August 2010

1. Borneo, 2009: *Borneo langur.*
2. East Kalimantan, 2003: Women sieving rice for a local festival.
3. Aceh, 2006: Greenpeace helping villagers install solar panels.
4. East Kalimantan, 2003: Rubber tapping.

SETTING A BASELINE FOR GENUINE LOW-CARBON DEVELOPMENT

What is missing from Indonesia's national abatement plan is a clear definition and map of what lands it deems suitable for conversion and development – and equally, what lands would benefit from protection.

The ultimate interpretation of what land should be made available for large-scale development and what land should be off-limits to such activities will have serious implications for Indonesia's GHG emissions, biodiversity, forest communities and pulp and palm sector land-use development strategies. Central to achieving real emissions reductions is the international challenge to set strict criteria for the definition of land available for low-carbon development based on carbon, biodiversity and social metrics:

- From a carbon perspective, development will not result directly or indirectly in significant GHG emissions (gross).
- From an environmental perspective, development will not target land with high conservation values, such as wildlife habitat, fresh water supplies or other environmental services.
- From a legal perspective, development does not conflict with existing laws, concessions or other rights including traditional rights of indigenous communities.
- From a social perspective, development will not have negative impacts on local community livelihoods and will be negotiated based on a process to obtain free prior and informed consent.
- From an economic perspective, development is sustainable.

One of the commitments of the Norway/Indonesia deal is to 'establish a degraded lands database' 'to facilitate the establishment of economic activity on such lands rather than converted peatland or natural forest'.[233]

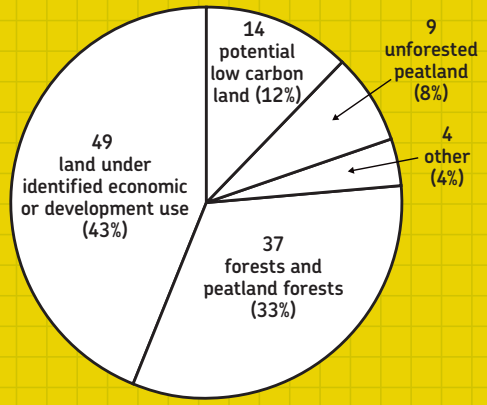
A technical definition of land for low-carbon development has been provided in Indonesia's October 2010 draft National REDD+ strategy – produced jointly with UN-REDD. This defines high-carbon land for conservation as having a 'potential of carbon storage' of >100tC/ha and low-carbon land as having carbon stock of <35tC/ha.[234]

The standard international baseline definition for forest as defined by the FAO is >10% tree canopy cover[235] – the percentage of land covered by foliage or branches at the top or crown of a forest's trees. Ministry of Forestry data suggest that even forest areas at this threshold have potential to store >100tC/ha; while 35tC/ha equates to significantly <10% canopy cover. Thus, these carbon criteria should translate into policies for low-carbon development based on full peatland and forest protection.[236]

Greenpeace preliminary analysis based on Ministry of Forestry data sought to identify the area of land potentially available for low-carbon development in line with this interpretation. Collectively, the HP/HPK and APL zones contain 14 million ha of landcover identified as bareland, scrubland or savannah that is not on wetlands.[237]

However, landcover classifications alone do not adequately assess actual ecological, biodiversity or social values. For instance, 2005 data suggest that a significant share of this land area has >30% canopy cover.[238] This suggests errors in classification and renders this area's carbon, biodiversity and social values to local communities potentially far greater through ecological restoration than through industrial development such as plantation establishment.

Figure 13: area (million ha), extent of land-use in development zones



Total: 113 million ha

Sources: MoFor (2009e), MoFor (2010c), Wayhunto et al (2003, 2004, 2006).

The lifecycle of plantation timber.

1. Riau, 2008: Plantation nursery.
2. Sumatra, 2009: Timber plantation.
3. Tesso Nilo, 2008: Timber harvest.
4. 2010: Timber being transported to Sinar Mas pulp mill, Indah Kiat.
5. Riau, 2008: Sinar Mas pulp mill, Indah Kiat.
6. Toilet rolls, a disposable paper product.

ARE PLANTATIONS A CLIMATE SOLUTION?

BOX 2: INDONESIA'S CARBON ASSUMPTIONS

Forest and peatland carbon stock

Peatland
600tC/ha per metre depth[239]

Primary/undisturbed forests
400tC/ha[240]

Secondary/Production/logged forests
200tC/ha[241]

Plantation carbon sequestration

Current maximum
2tC/ha/yr[242]

Government projected
8tC/ha/yr[243]

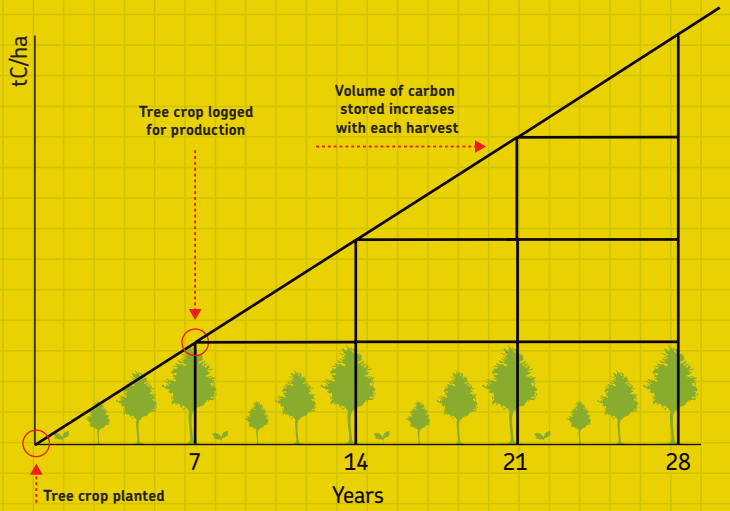
Sinar Mas current claims
33tC/ha/yr[244]

Baselines for low-carbon development and carbon protection[245]

Protection potential to reach
100tC/ha

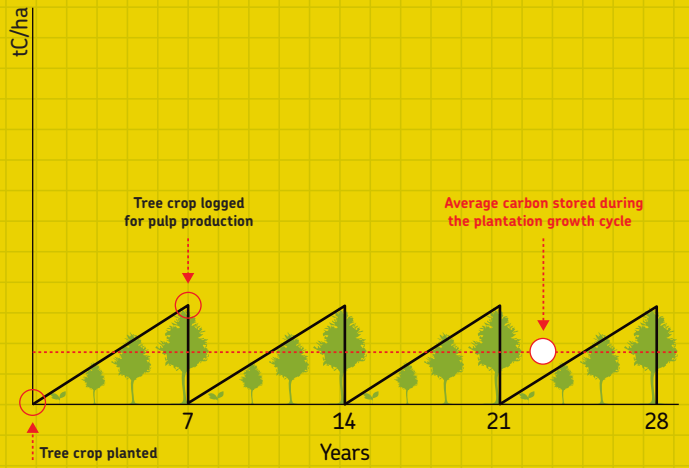
Low-carbon <35tC/ha

Figure 14: MoFor model of plantation carbon sequestration



Source: eg. MoFor/FORDA (2009), Ministry of Environment (2009) 28.

Figure 15: UNFCCC model of plantation carbon sequestration (time-averaged C store)



Source: DNPI (2010a) 41.

The plantation hypothesis:

a) plantations sequester considerable volumes of carbon

b) Indonesia has a lot of bare land that would see a net carbon gain through plantation establishment

c) establishing plantations reduces pressure on natural forest

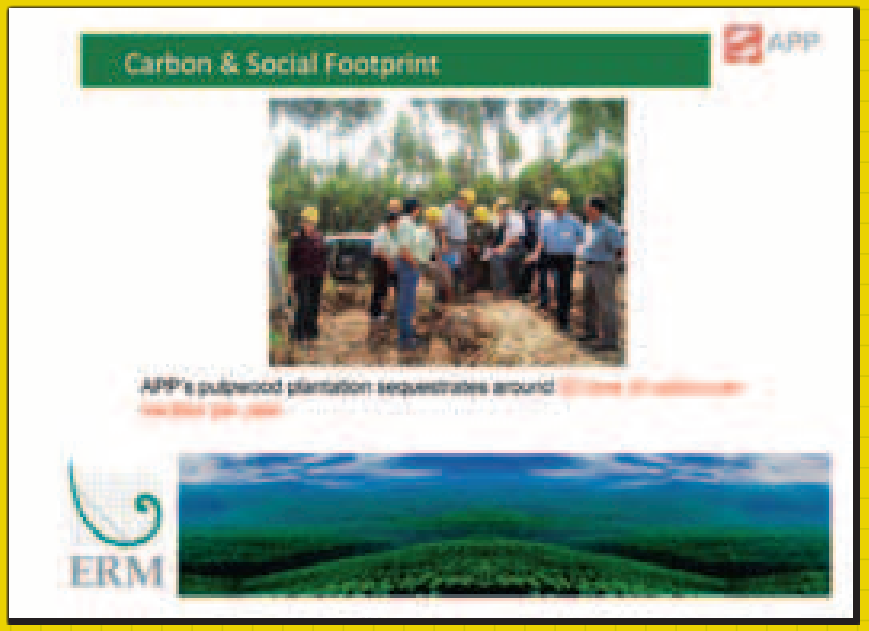
ASSUMPTION 1: PLANTATIONS SEQUESTER SIGNIFICANT VOLUMES OF CARBON

Indonesia's November 2009 official UNFCCC submission, the DNPI GHG abatement plan and other Indonesian government documents,[246] assume timber plantation crops will sequester carbon at the rate of 8tC/ha/yr (implying an improvement in productivity about four times the maximum current national average).

(Sinar Mas claims for annual carbon sequestration within pulp plantations – claims it credits to ERM – are fourfold greater: 'APP's pulpwood plantation sequestrates around 33 tons of carbon per hectare per year.'[247])

The total planned forest plantation area by 2030/2050 is 33 million ha[248] (gross concession area including infrastructure would be 30–40% larger).

Indonesia's 2009 Second National Communication to the UNFCCC assumes that forest plantations will be sequestering more than 800MtCO_2e by 2030;[249] implementation of the full plantation scheme would sequester about 1GtCO_2 annually[250] – in line with



Source: Greenbury (2010).

President Yudhoyono's public statements to the G20 and internal Ministry of Forestry documents.

Indonesia's 2010 GHG abatement plan makes the following assumption: 'Afforestation and reforestation represent a sequestration opportunity of 300MtCO_2e by 2030.'[251]

Sinar Mas – one of the world's largest pulp producers, accounting for almost half of Indonesia's pulp production in 2009,[252] and 'the world's second largest oil palm company'[253] – claims its pulp operations are 'in the process of afforesting over 1.3 million hectares of degraded land and wasteland worldwide and in doing so [have] contributed to the fight against global warming'.[254] This afforestation includes establishment of plantations on peatland, thereby – it claims – turning them 'from carbon source into carbon sink'.[255] Half of Sinar Mas' pulp concessions are on peatland.[256]

REALITY

Annual carbon uptake through the rapid growth of short-rotation timber plantations can only be counted against deforestation emissions if it is assumed that all carbon is permanently sequestered, with no GHG emissions following harvest.

The majority of Indonesia's plantation timber is destined for the pulp and paper sector.

UNFCCC standards assume that harvested wood is destined for products with a short lifespan, and therefore any carbon absorbed within the timber should be counted as emitted in the year the timber is harvested.[257] The DNPI's 2010 GHG abatement plan recognises that plantations have a very limited abatement potential: 'Developing commercial timber and estate crop plantations as part of the reforestation program [...would] sharply reduce the abatement potential of reforested areas. This is because large volumes of CO_2e would be emitted at the end of the plantations' rotation period.'[258]

The only carbon that plantations can reasonably be assumed to sequester is the time-averaged carbon content of the living plantation. Thus, in the case of fast-growing, short-rotation pulpwood plantations, for instance, the average carbon content is half the carbon at harvest.

Indonesia's assumed annual carbon uptake of 8tC/ha/yr implies a near fourfold increase in productivity over the maximum current national average.[259] Given these ambitious assumptions on productivity improvements, time-averaged carbon held within pulpwood plantations would amount to about 28tC/ha (about 100tCO_2e/ha), not taking into account any losses due to fire or non-performing stands, for example.[260] This is about 14% of the carbon Indonesia estimates as held in logged-over (secondary) forests within the HP zone, and just 7% of the carbon it ascribes to primary forests.[261]

Plantations with short planting cycles are carbon neutral at best.

DNPI–East Kalimantan govt. 'East Kalimantan Environmentally Sustainable Development Strategy', September 2010

ASSUMPTION 2: PLANTATIONS ON 'DEGRADED' LAND WOULD INCREASE INDONESIA'S FOREST CARBON STOCK

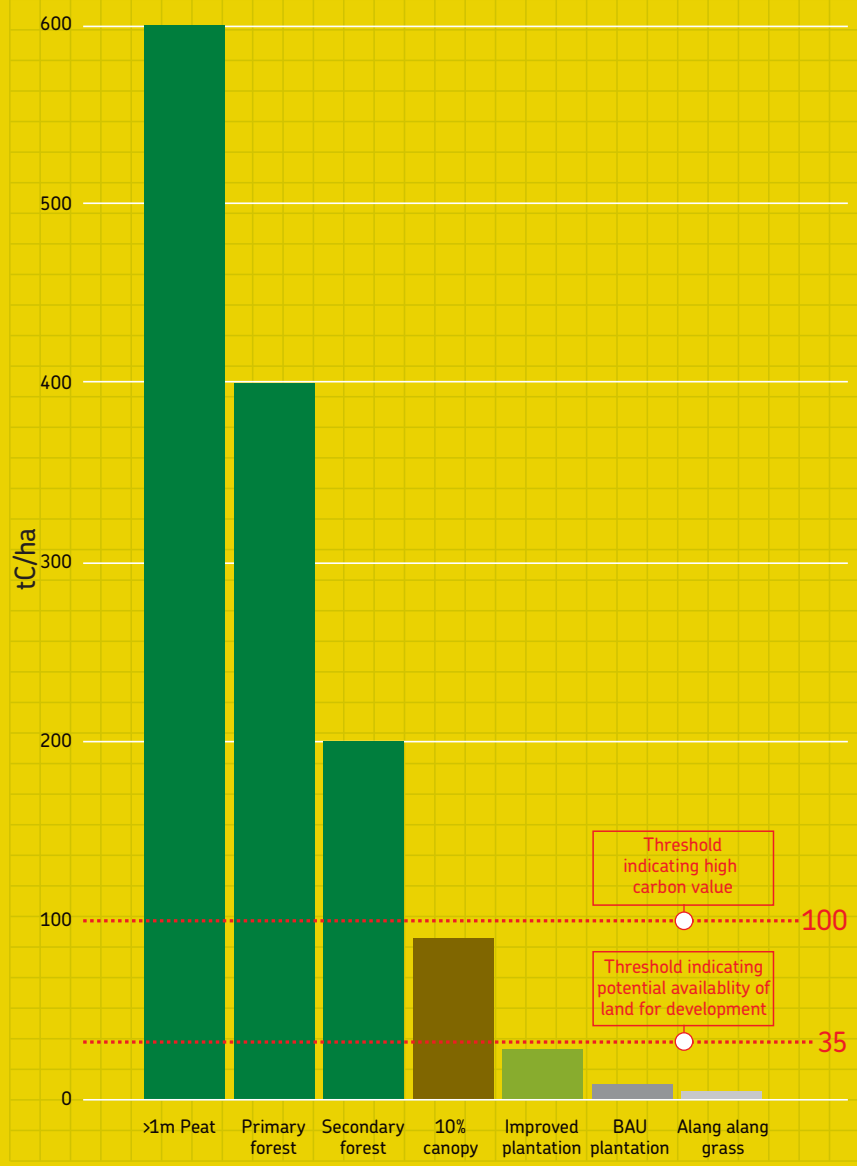
According to the Ministry of Forestry, non-primary (ie 'disturbed', 'secondary', logged or otherwise degraded by human industry) natural forest holds an average of 200tC/ha[262] and primary forest holds 400tC/ha.[263]

Peatland holds 600tC/ha per metre depth.[264]

Hence, any meaningful ambitions to 'enhance [Indonesia's] forest carbon stocks'[265] in line with the Bali Action Plan Paragraph 1b (iii) (so-called REDD+) through plantation establishment must be based on the assumption that plantation establishment will result in a net carbon gain.

Indonesia's 2010 GHG cost curve is unclear as to which areas should be available for plantation establishment – notably, whether industrial plantations are to replace natural forests or not, and if so what the definition of a 'degraded

Figure 16: relative carbon stores of different forest and plantation



Source: Bappenas–UN-REDD (2010), Hooijer et al (2006), Ministry of Environment (2009), MoFor (2009c). Wardoyo and Sugardiman (2009), DNPI (2010a), MoFor (2009c).

forest' will be. It does, however, suggest that the definition of 'forest' will be >30% canopy cover.[266]

Such a high definitional baseline for 'forest' has huge risks for REDD in terms of inadvertently subsidising increased GHG emissions, as Ministry of Forestry documents reveal. Calculations based on Ministry of Forestry assumptions[267] suggest that even 10% canopy cover (the FAO threshold for definition of forests) would classify as 'high carbon' according to the joint Indonesia National Development Planning Agency–UN-REDD draft National REDD+ Strategy.[268]

The priority must be for government to provide transparent definitions and methodologies, to map areas identified for protection and areas where development can be relocated, and to reduce land pressure through regulatory incentives to increase productivity.

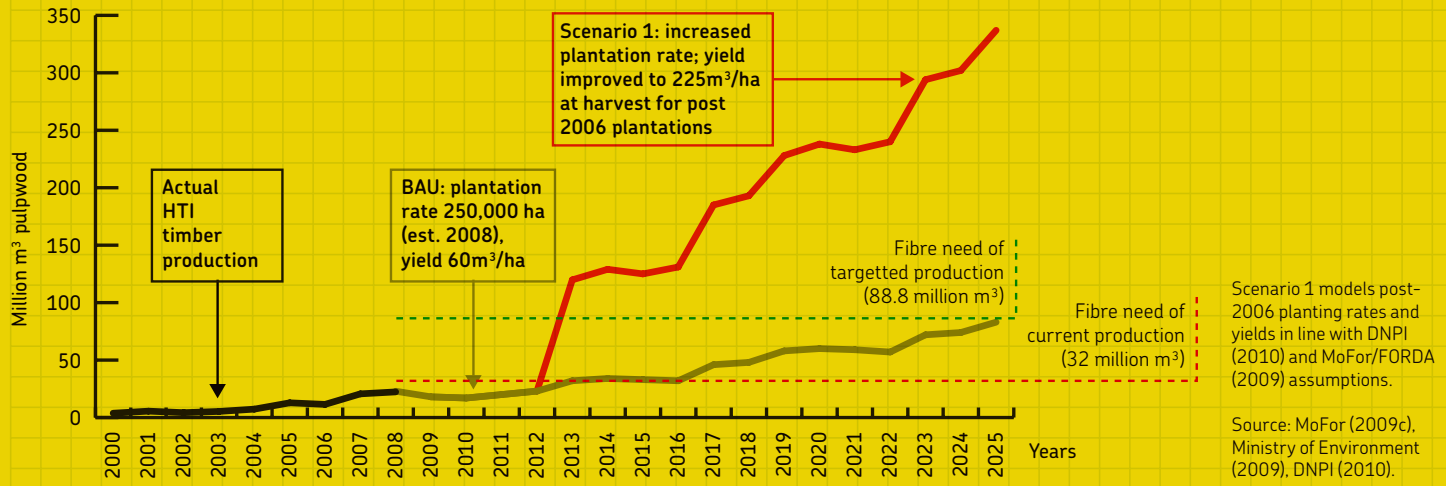
ASSUMPTION 3: PLANTATIONS REDUCE DEFORESTATION PRESSURE

The DNPI 2010 GHG abatement cost curve suggests that with REDD+ funding, about 542,000ha[269] of of natural forest loss could be avoided annually (or up to 15 million ha over the 2010–2030 period)[270] through preventing the establishment of pulp and oil palm plantations on forest land, and that plantations (both timber and palm/estate crops) could form part of the program for reforestation/ afforestation of an additional 10 million ha of 'degraded non-forest and forested' land'.[271] The supposition is that 'developing commercial timber and estate crop plantations as part of the reforestation program could help to reduce the pressure on remaining forest areas'.[272]

Given the multiple land-use pressures Indonesia is facing and the lack of clarity on definitions of forests to be protected and 'degraded' lands available for development, Indonesia's pulp and oil palm sectors have a critical role to play in shifting Indonesia onto a low-carbon development pathway. In addition to supporting a strong, effective moratorium, these sectors have the potential for dramatic improvement in productivity within their plantations. If such improvements were made, the pulp sector would cease to provide a lucrative market for other operations to clear forests (disincentive), and land-pressure would be reduced. More broadly, improving productivity would reposition the pulp and oil palm sectors relative to their global competitors as world-class clean industries.

CAN THE PULP AND PALM OIL SECTORS SUPPORT LOW-CARBON DEVELOPMENT?

Figure 17: fibre demand (current, projected) and plantation fibre availability based on BAU plantation rates and yields and Scenario 1 improved rates and yields



Scenario 1 models post-2006 planting rates and yields in line with DNPI (2010) and MoFor/FORDA (2009) assumptions.

Source: MoFor (2009c), Ministry of Environment (2009), DNPI (2010).

Indonesia's 2010 GHG abatement cost curve suggests that with international REDD funding equivalent to approximately $20,000/ha[273] of avoided deforestation, natural forest loss associated with pulp and oil palm plantation establishment can be halted.

Yet, industry figures show that – with improved productivity as a primary objective – the pulp sector already controls sufficient surplus land area to meet targeted expansion in production volumes, and the palm sector would need only a marginal increase in its land area. Thus, by contrast with DNPI projections, no further extensive land allocations and no further extensive conversions within existing concessions should be necessary.

Enforcing a strict moratorium on further peatland and forest allocations would be a vital incentive to industry to improve productivity and sustainability to levels on a par with or better than those of Indonesia's global competitors.

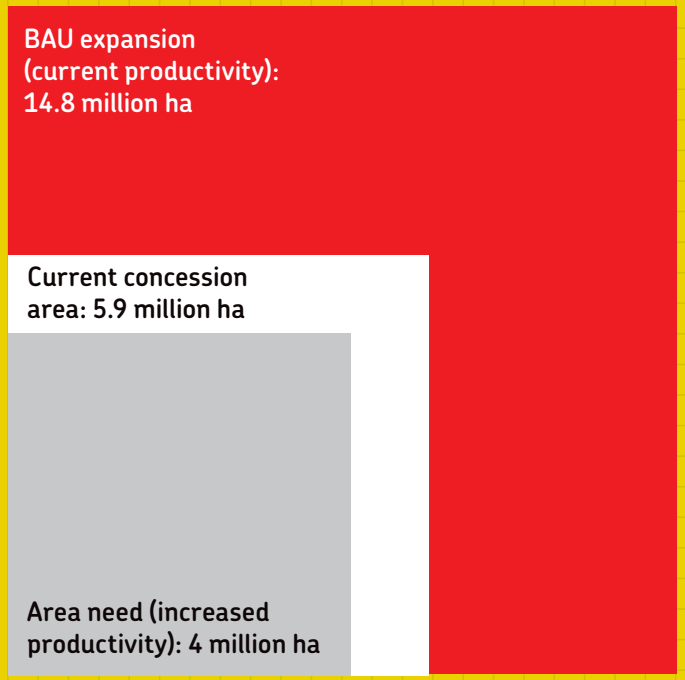
I am confident that we can reach this goal [GHG emissions reduction targets], while also ensuring sustainable and equitable economic growth for our people.

President Susilo Bambang Yudhoyono, 26 April 2010

PULP SECTOR: POTENTIAL TO QUADRUPLE PRODUCTIVITY, NO ADDITIONAL AREA NEEDS

- **2008 planted HTI areas:** 4.3 million ha[274] (net pulp plantation area in 2008: 2.4 million ha).[275]
- **HTI area allocated as of 2008:** 10 million ha (net pulp allocation area: est. 5.9 million ha). [276]
- **Government planned HTI plantation area to 2030/2050:** 11.6 million ha.[277]
- **BAU land-use to meet HTI expansion target:** 11.6 million ha planted, representing 70% of total area required due to infrastucture and legal requirements for setting aside land = 16.6 million ha total concession area.
- **Development objective:** treble pulp production to 18.5 million tonnes by 2025.[278]
- **Fibre needs for trebling of pulp production:** 89 million m³.
- **Maximum average current yield on seven-year rotation:** 60m³/ha.[279]
- **Land required to meet 2025 pulp production target using maximum average current yield:** 10.4 million ha planted as 70% land required = 14.8 million ha total concession area.
- **Projected harvest using DNPI assumption of 8tC/ha/yr carbon uptake:** 224m³/ha.[280]
- **Land required to meet 2025 pulp production target using DNPI assumption (224m³/ha yield at harvest):** 2.8 million ha planted as 70% land required = 4 million ha total concession area.

Figure 18: BAU vs best practice: area needs to meet pulp sector development targets



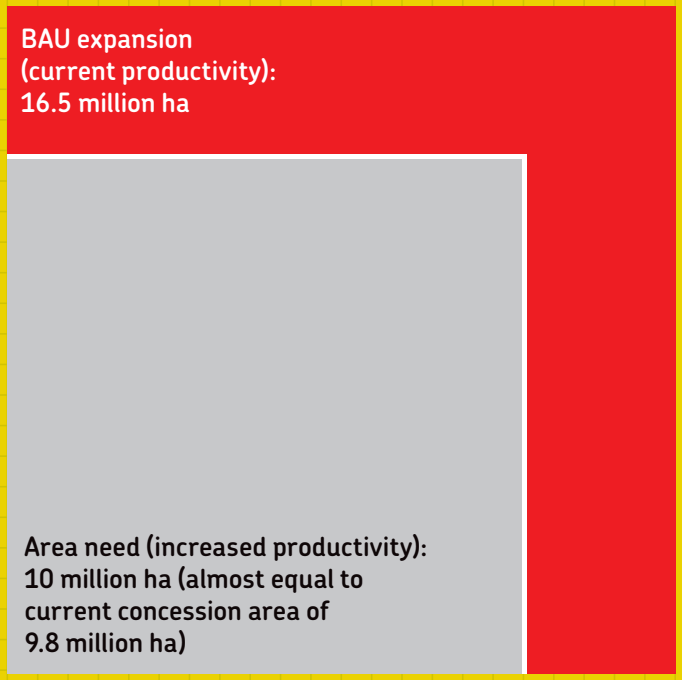
INDUSTRY PRODUCTIVITY CLAIMS

Sinar Mas claims for industry productivity potential:[281] 490–700m³/ha at harvest (595m³/ha average), or even 924m³/ha[282] (based on claimed 33tC/ha/yr uptake). Sinar Mas figures suggest total planted land requirement of just 963,000–1,810,000 ha.

PALM OIL SECTOR: POTENTIAL TO DOUBLE PRODUCTIVITY, NO ADDITIONAL AREA NEEDS

- **Development objective:** more than double production by 2020 to 40 million tonnes.[283]
- **2008 rotational average yield, including non-mature plantations:** 2.4t/ha.[284]
- **Land required to supply projected palm oil production at current yield**:[285] 16.5 million ha total planted area.
- **2008 planted/concession area:** 7.9/9.8 million ha.[286]
- **Additional planted area needs:** 8.6 million ha.
- **Net additional concession area needs:** 6.7 million ha.
- **Projected yield using DNPI productivity assumptions:** 5.9-6.4t/ha mature plantation.[287]
- **Land required to meet to meet palm oil production target at DNPI projected yield:** 10–11 million ha.
- **Additional concession area needs:** 0–1 million ha.
- **Projected yield using Ministry of Agriculture assumptions:** doubling of current yield. 288
- **Additional area needs:** 0 ha.[289]

Figure 19: BAU vs best practice: area needs to meet palm oil sector development targets



So it [is] feasible for the government to set 40 million tons of palm oil production without expanding plantations.

Deputy Agriculture Minister Bayu Krisnamurthi, 28 September 2010

If we can achieve at least a yield of four tonnes a hectare we would only need total plantation land of 10 million hectares.

Indonesian Palm Oil Board Chairman, 27 May 2009

Riau, 2009: Greenpeace with the local community construct a dam across peatland drainage canals in the Kampar Peninsular.

THE MORATORIUM IS AN OPPORTUNITY TO SHIFT TO A LOW-CARBON DEVELOPMENT PATHWAY

PROGRESSIVE INDUSTRY AND GOVERNMENT WANT A STRONG MORATORIUM

As part of the $1 billion Indonesia–Norway climate deal, Indonesia announced a two-year moratorium on any 'new concessions on conversion of natural forests and peatlands into plantations'.[290] The agreement casts a wide net and the clear focus on protecting 'natural forests' is evident throughout the text. However, since the announcement, the exact nature of the moratorium – what land areas are included and what its potential impact will be on pulp and palm oil expansion plans – has been hotly debated in the press.

As observed in a *Reuters* interview with Agus Purnomo, the President's special advisor on climate change: 'The two-year ban on clearing natural forest, which begins in 2011, has spooked palm oil and mining firms who fear it would stifle expansion and earnings. In a nation noted for corruption and the power of its resources firms, the move will test resolve to use donor cash transparently.'[291]

In the interview, Purnomo sought to reassure investors that firms holding licences to clear forested land in these areas would be exempt from the moratorium.[292] Further, he admitted that the moratorium would begin 'with the very minimum level of commitment'.[293] He said that the exact definition of 'natural' forest was not crucial as the initial aim was to protect much of the primary forest that remains in Indonesia.[294]

This statement is ominous, given that primary forest covers less than half total forested area in Indonesia, and the majority (70%) of primary forest is found in protected zones[295] that are not legally available for timber or oil palm plantation development. Such an approach would therefore provide little or no additional benefit to the climate, wildlife or people that depend on Indonesia's forests.

Further, undeveloped forests and peatlands within pulp and palm oil concessions allocated prior to 2011 are not covered by the two-year moratorium. This means that within existing 10 million ha of HTI concession areas, BAU expansion on peatlands and forested areas could continue, leaving substantial carbon and biodiversity values at risk. Greenpeace analysis of the land allocated to HTI concessions as of 2010 shows that over 4 million ha is still forested (2.5 million ha dryland forest; 1.6 million ha wetland forest).[296] Substantial areas, representing nearly one-fifth of total concessions (1.8 million ha) were granted full concession rights (SK Definitif) in 2009 and the first half of 2010.[297]

The Letter of Intent contains provisions to facilitate a review of existing concessions, and to swap areas to degraded lands.[298] However, these provisions are currently being challenged by elements of government and industry.[299]

Greenpeace, together with a broad coalition of NGOs, as well as corporations, is calling for immediate protection of all peatlands and for the moratorium on natural forest clearance to apply within both new and existing concession areas.

Critically, in order to create the institutional framework within which the Indonesian government can fulfil its low-carbon, high-value development objectives, a rigorous moratorium would provide the necessary opportunity to overhaul the land allocation process in order to ensure that industrial development does not compromise ecological, biodiversity, social, legal and economic values.

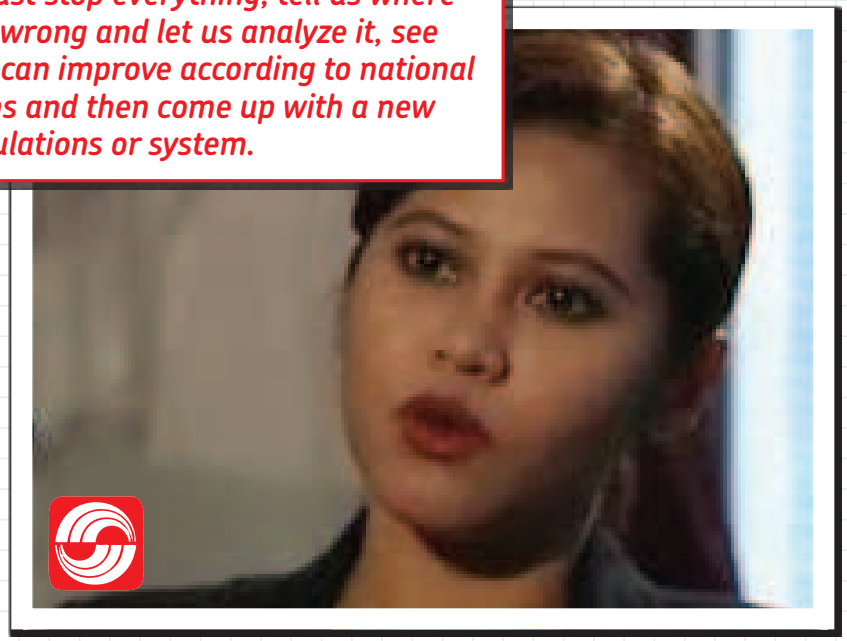
Such a moratorium would create an incentive for industry to increase productivity dramatically within existing plantation areas.[300] Equally, it would create an incentive for industry to use the lands it has already cleared for further development.[301]

Progressive elements within the Indonesian government share this vision. The September 2010 report by the DNPI and the regional government of East Kalimantan sees the moratorium as an opportunity to 'accelerate'[302] efforts to increase productivity rates within existing plantations and shift further development to low conservation value land outside natural forests or peatlands.

The study notes that significant reductions in annual GHG emissions 'can be achieved by first setting a clear plan for palm oil in terms of CPO [crude palm oil] production as opposed to hectares planted and using productivity gains to replace some expansion of concessions. Next, we can reduce carbon loss from deforestation. Our first option is to use our existing degraded lands for new concessions and use land swaps for existing concessions with forest cover.'[303] The study indicates that more than three-quarters of land within pulpwood concessions has been cleared but has not been planted and remains idle;[304] this suggests that there are large areas of forest land that have already been cleared which industry ought to have planted.

Rigorous enforcement of a strong moratorium would encourage best industrial practice without compromising high conservation value land, really would be 'a new development pathway'.[305]

I think it is really good to have a break. From [1980] until 2010, we have been under enormous criticism from all over the world. So let us just stop everything, tell us where did we do wrong and let us analyze it, see where we can improve according to national regulations and then come up with a new set of regulations or system.



2010: Aida Greenbury, Sinar Mas/ APP.

Kerumutan, 2010: Clearance of deep peat, Sinar Mas concession.

Bukit Tigapuluh, Jambi 2009: Orang Rimba women in a Sinar Mas timber plantation – much of their natural forest has been cleared from this area.

GRAFT AND POOR GOVERNANCE IN THE FORESTRY SECTOR THREATEN DEVELOPMENT

The Government of Indonesia has acknowledged that a history of high deforestation and forest degradation rates are a consequence of inadequate forest governance. [...]

These are pervasive or systemic problems that go beyond the sector, such as high levels of corruption and elite capture [...]. Forest crime is a threat to governance as it undermines the rule of law, exacerbates social conflict, and threatens sustainable forest management.

The prevention, detection, and suppression of forest crimes continue to be hampered by corruption in the justice system at each step from criminal detection and investigation, through case preparation and prosecution, to adjudication and appeal.

The sheer number and complexity of overlapping,inconsistent, and contradictory regulations in the forest sector provide ample opportunity for administrative corruption, as officials either sell their services as brokers to navigate the bureaucratic tangle or else take bribes to circumvent it.

Ministry of Forestry, August 2009 draft National REDD+ Strategy

The absence of transparency and participation of stakeholders also result in the minimum knowledge of the society, especially those living in the forest area, to be involved in the decision making process in the licensing process and to conduct supervision for the said violation of license. This results in not only the unavailability of more reliable data during the decision making process, but also misuse of authority by the decision makers, the authorised officials, in an undetected licensing process which is not adequately supervised by the people.

DNPI–UN-REDD, October 2010 draft National REDD+ Strategy

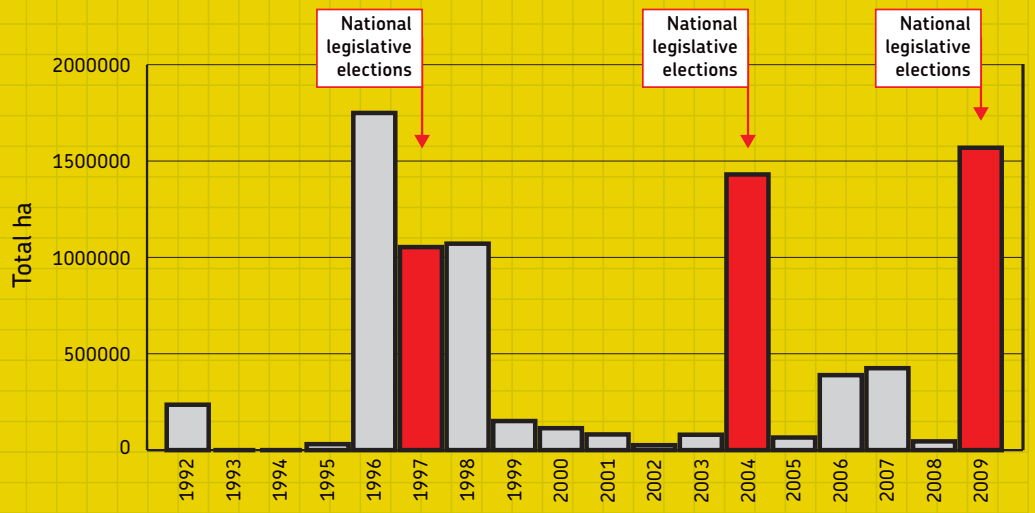
It is essential for the future development of the palm oil sector that existing regulations regarding permits, the use of fire for land clearing, and illegal land clearing are enforced. Without enforcement, the lowest cost and quickest option to establish a palm oil concession would be to pay a bribe to plant on forest lands.

DNPI/East Kalimantan govt., 'East Kalimantan Environmentally Sustainable Development Strategy', September 2010

[The forestry sector] is a source of unlimited corruption.

Chandra M. Hamzah, deputy chairman of Indonesia's anti-corruption agency KPK, *Reuters*, 17 September 2010

Figure 20: area of HTI concession allocations per year and dates of national elections



Sources: HTI data: MoFor (2009b); MoFor (2009c). Graph shows HTI concessions granted SKI Definitif and SK Sementara permits in any given year. MoFor (2009a).

Ensuring national and international support for measures to end deforestation and peatland degradation is successfully implemented requires good governance and sound financial management by participating governments, institutions and industry.

The Chairman of the Climate Change Working Group at the Ministry of Forestry – one of the lead negotiators for Indonesia's climate delegation in Copenhagen in December 2009 and a key architect of its Reduced Emissions from Deforestation and Degradation (REDD) programme – appears at times to favour the status quo: 'We want to elaborate the terms of a forestry moratorium because the [Letter of Intent] could be dangerous for the Indonesian economy.'[306]

The ability of the Ministry of Forestry to oversee the finances associated with REDD projects is questionable. As reported in a September 2010 *Jakarta Globe* article, at least one seniour official has been named as a corruption suspect by Indonesia's anti-corruption agency (KPK).[307]

The Ministry of Forestry acknowledges that the forestry sector, including government officials, has a history of poor governance.

INDONESIA'S EXPERIENCE OF 'REFORESTATION' FUNDING IN THE ABSENCE OF GOVERNANCE

As noted by a recent Center for International Forestry Research (CIFOR) study,[308] Indonesia's experience with its Reforestation Fund (*Dana Reboisasi*) offers important lessons in the risks of finance to the forestry sector in the absence of governance.

Established in 1989, Indonesia's Reforestation Fund is the single largest source of government revenues from the forestry sector.[309]

Managed by the Ministry of Forestry for most of this period, the fund lost $5.25 billion between 1994 and 1998, according to an Ernst and Young audit.[310]

The stated intention of the fund is to support reforestation and rehabilitation of 'degraded' forest lands[311] – an echo of Indonesia's current REDD proposals.

Historically, this subsidy for plantation development has encouraged overharvesting in logging concessions and clearing of so-called 'degraded' natural forests.[312] Timber companies had a strong incentive to mismanage the forests in their

concessions so that they would be eligible for Reforestation Fund subsidies to convert these areas to plantations. Only 60% of the areas for which funding was dispersed have ever been planted (3.7 million ha funded, 1.5 million planted).[313]

The recently formed Forest Development Funding Agency Public Service Unit – which now manages at least $2.2 billion of the reforestation funds – has failed (at least as of mid-2009) to disperse any of its funds budgeted for plantation development during the 2008–2009 period.[314] The current Ministry of Forestry administration is intending to use the fund to promote the development of the 9 million ha of new plantations planned by 2016 to 'revitalise' the nation's commercial forestry sector.[315] As Greenpeace analysis shows, significant areas within current concessions and planned developments hold substantial areas of forest and peatland.[316]

These facts have led CIFOR to conclude that – coupled with an absence of political or institutional accountability – the fund has created perverse incentives to clear forests, has created opportunities for corruption and fraud, and has led to inequitable distribution of benefits. This provides a stark illustration of why REDD financing in Indonesia should focus on forest protection activities and not fund risky and tangential endeavors such as industrial plantations.

Riau, 2009: Peatland forest destruction for plantations on Kampar Peninsula.

CONCLUSION:

BIG DEAL

For human development to become truly sustainable, the close link between economic growth and greenhouse gas emissions needs to be severed.

UNDP, 'Human Development Report 2010' November 2010

'A number of key challenges must be addressed in order to achieve low-carbon development in Indonesia. [...] The mainstreaming of climate change priorities into the national development plans: Climate change and the economy are perceived as unrelated concepts in Indonesia, especially by the capital market and the banking community. This inhibits the pursuance of low-carbon development and the implementation of financial instruments to support such development.'

UNFCCC (2010) 'National economic, environment and development study

THE INTERNATIONAL SIGNIFICANCE OF INDONESIA'S GHG ABATEMENT PLANS AND THE IMPORTANCE OF SOUND DEFINITIONS

Indonesia is not the only country to produce deforestation emissions reductions plans based on McKinsey's cost curve, and a net GHG emissions reduction based on a strategy that promotes plantations. International conferences (UNFCCC, UNCBD), financing institutions (World Bank, GEF, UNREDD) and donors must ensure that all financing for REDD is directed in a manner that tackles deforestation, rather than seeks to offset it.

Central to this is the international challenge to set clear criteria for the definition of forest for protection and of genuinely degraded land appropriate for low-carbon development. These criteria should include not only carbon, but also biodiversity, legal, economic and social metrics.

As Greenpeace analysis and mapping shows, within Indonesia entire zones currently being redefined as degraded, unproductive or idle wasteland contain considerable biodiversity and carbon values. Given the extensive forest and peatland areas within these zones, the vast majority of this area clearly falls outside the technical criteria for low-carbon development proposed within the joint Indonesia National Development Planning Agency (BAPPENAS)–UN-REDD October 2010 draft National REDD+ Strategy. [317]

Indonesia has solution options that – if adequately supported and incentivised – could deliver significant reductions in deforestation emissions and set the nation on a low-carbon, high-value development pathway.

The question is, will Indonesia, Norway and other REDD donor governments align themselves with a 'no regrets' policy on REDD – one that prioritises forest and peatland protection, with a zero deforestation objective – or will they tie themselves into carbon accounting schemes that deliver GHG emissions on paper, but allow continued degradation of natural forests? The steps that must be taken are clear:

STOP FOREST DESTRUCTION

- **Implement an immediate moratorium on the conversion of natural forests and peatlands**
- **Improve governance**

SUPPORT LOW-CARBON DEVELOPMENT

- **Establish a new national land-use plan**
- **Shift to clean industry**
- **Develop a credible carbon abatement strategy**

FUND FOREST PROTECTION

- **Ensure REDD funds benefit forest communities and biodiversity**

Riau, 2007: Greenpeace and local volunteers construct a dam to halt peatland drainage.

TAKE ACTION FOR DEVELOPMENT

1. STOP FOREST DESTRUCTION

IMPOSE AN IMMEDIATE MORATORIUM: Suspend the conversion of natural forests and peatlands

Issue a decree implementing an immediate moratorium on the conversion of all natural forests and peatlands as a first step toward a zero deforestation policy, and help Indonesia shift to a genuine low-carbon development pathway.

ENACT A ZERO DEFORESTATION POLICY: Protect natural forests and peatlands

End natural forest loss and reclassify all peatland as Protection Forest, regardless of depth.

Halt further allocations of forest or peatland areas for plantation or agricultural development.

Relocate existing concessions to degraded lands with low carbon, biodiversity, ecological, social and economic values.

PROMOTE GOOD GOVERNANCE: Implement effective measures to tackle corruption, control industry, and protect forests and the national interest

Enhance transparency and accountability in the forestry sector, and establish an independent institution for national monitoring, reporting and verification (MRV) of deforestation rates. This should include clear baseline data on deforestation and clear criteria for land available for low-carbon (REDD) development.

Tackle corruption within the forestry sector.

Revoke illegal or inactive concessions.

Improve management standards and law enforcement activities in legal, active concessions

2. SUPPORT LOW-CARBON DEVELOPMENT

ESTABLISH A NEW NATIONAL LAND-USE PLAN: Enact a genuine low-carbon development pathway

Review and amend the current spatial plans to ensure Indonesia's development pathway is genuinely low-carbon and respects biodiversity, ecological, social, legal and economic metrics.

PROMOTE INDUSTRY LEADERSHIP: Incentivise and support industries whose activities are consistent with low carbon development

Take action in support of the moratorium to help shift Indonesia onto a low-carbon development pathway, and position the country as a global leader in environmentally responsible and socially just production.

At the political level, enact legislation requiring the oil palm, pulp, and other sectors to meet and exceed international norms in production yields, processing efficiency, clean energy use, just labour contracts and community benefits.

At the corporate group level, adopt binding policies and operational management practices consistent with such legislation and the low-carbon paradigm, including policies on no conversion, best industry practices for productivity and progressive labour policies.

DEVELOP A CREDIBLE CARBON ABATEMENT STRATEGY: Utilise and surpass the Brazilian model for MRV

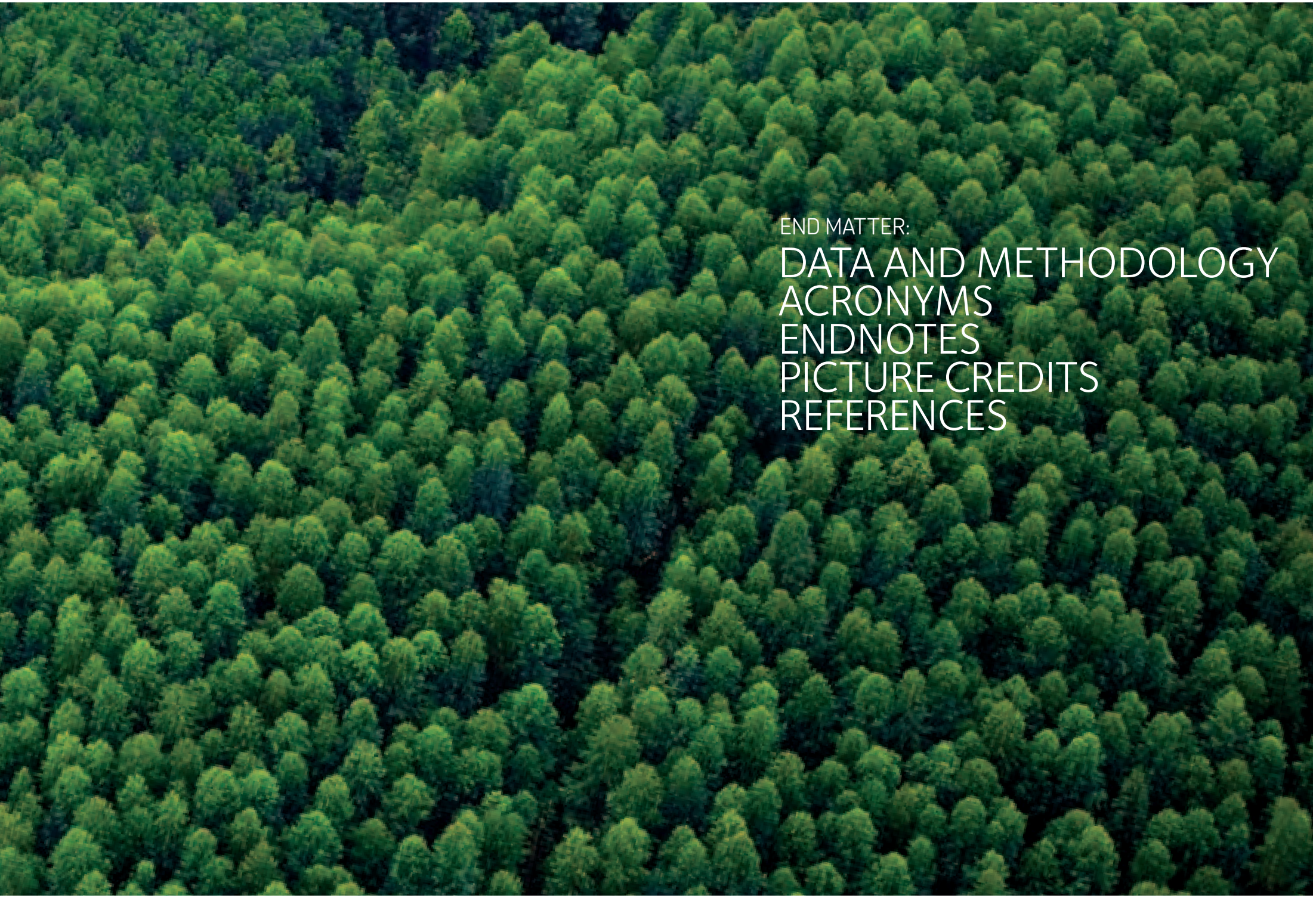
Establish simple and effective metrics to determine whether Indonesia is making progress on its climate change commitments: for instance, Indonesia should base carbon accounts on gross deforestation rates, monitored using best available satellite technology, with data made freely and publicly available for independent third-party scrutiny.

3. FUND FOREST PROTECTION

ENSURE REDD FUNDS BENEFIT FOREST COMMUNITIES AND BIODIVERSITY: Support forest protection, not industrial plantations

Implement a REDD financing policy that focuses resources on the protection of natural forests, respecting the rights of indigenous peoples and local communities and protecting biodiversity.

REDD financing policies should prohibit direct financing of industrial plantations and actions that promote the conversion of natural forests to other uses.



END MATTER:

DATA AND METHODOLOGY
ACRONYMS
ENDNOTES
PICTURE CREDITS
REFERENCES

DATA AND METHODOLOGY

METHODOLOGY AND DATA SOURCES

Greenpeace data sources and values assumptions are derived from the best available official, government or expert sources. Landscape values assessment is based on the Ministry of Forestry 2006 landcover map, United Nations Environment Program (UNEP) habitat maps and Wetlands International peatland maps. Forest, plantation and carbon stock figures are derived from Ministry of Forestry documents, Indonesia's Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC), the National Climate Change Council (DNPI) national and regional abatement plans and the joint Indonesian National Development Planning Agency (BAPPENAS)–UN-REDD draft National Strategy for the Reduction of Emissions from Deforestation and Forest Degradation (Nastra REDD+).

These are largely the same data sets and values assumptions used by the DNPI.

Independent analysis of the impact of pulp and palm oil sector operations is hampered by lack of government and industry transparency; this includes difficulty in acquiring current or sufficiently detailed data. Such deficiencies in data quality and other evidence available from official sources mean that the analysis must be understood as an indicative risk assessment, and some elements need to be confirmed through field validation. On the regional scale, any margins of error within the source data even out, though any biases in assumptions behind values estimations – eg, a conservative estimate of peatland carbon stores – are amplified.

Given these acknowledged issues, Greenpeace has chosen to use government or industry data rather than seeking alternative – perhaps more scientifically up-to-date – data sources. The significance is in the general findings revealed through analysis of the government's own data, rather than the precise numbers: the scale of the threat to Indonesia's forests and global climate, and the huge potential for low-carbon solutions based on clear-sighted land-use planning and world-class productivity from industry.

ACRONYMS, TECHNICAL TERMS AND UNITS

All ministries and other government bodies referred to are Indonesian unless specified otherwise.

$ – Dollars (US)

□ – Euro

APKI – Indonesian Pulp and Paper Association

APL – Areal Penggunaan Lain – non-forest land

APP – Asia Pulp and Paper

BAPPENAS – Badan Perencanaan Pembangunan Nasional (Ministry for National Development Planning)

BAU – Business as usual

bn – Billion (thousand million)

BPN – Badan Pertanahan Nasional (National Land Agency)

CAIT – Climate Analysis Indicators Tool. Available at http://cait.wri.org

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.

CIFOR – Center for International Forestry Research

CO_2 – Carbon dioxide

CPO – Crude palm oil

CTF – World Bank Clean Technology Fund

DNPI - Dewan Nasional Perubahan Iklim (DNPI) or National Council on Climate Change (NCCC)

EPA – US Environmental Protection Agency

ERM – Environmental Resources Management

EU – European Union

FAO – Food and Agriculture Organisation of the United Nations

FORDA – Ministry of Forestry, Forest Research and Development Agency

GHG – Greenhouse gas

GoI – Government of Indonesia

Gt – Gigatonnes (billion tonnes)

ha – Hectare(s)

HCVF – High conservation value forest

HP – Hutan Produksi – permanent production forest

HPH – Peta Hak Pengusahaan Hutan – natural forest selective logging concessions

HPK – Hutan Produksi Konversi – conversion production forest – forest allocated for conversion

HPT – Hutan Produksi Terbatas – limited production forest

HTI – Hutan Tanaman Industri – industrial plantation forest, for pulpwood or lumber

HTR – Hutan Tanaman Rakyat – community plantation forest, for pulpwood or lumber

IFC – International Finance Corporation

IFCA – Indonesian Forest Climate Alliance

IMA – Indonesian Mining Association

INPE – Instituto Nacional de Pesquisas Espaciais – Brazilian Institute for Space Research

IPB – Institut Pertanian Bogor (Bogor Agricultural Institute)

IPCC – Intergovernmental Panel on Climate Change

Kyoto Protocol – The Kyoto Protocol, an international and legally binding agreement to reduce GHG emissions worldwide, 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.

LULUCF – Land use, land use change and forestry

m – Million

MAI – Mean annual increment – volume of timber gained per year in a plantation

MoF/MoFor – Ministry of Forestry

Mt – Megatonnes (million tonnes)

NGO – Non-governmental organisation

REDD, REDD+ – Reducing Emissions from Deforestation and Forest Degradation (REDD+ includes role of conservation/sustainable management/enhancement of forest carbon stocks)

RSPO – Roundtable on Sustainable Palm Oil

SMG – Sinar Mas Group

SOE – State-owned enterprise

t – Tonnes

t/ha – Tonnes/hectare

UN – United Nations

UNDP – United Nations Development Programme

UNEP – United Nations Environment Programme

UNFCCC – United Nations Framework Convention on Climate Change

UN-REDD – United Nations collaborative initiative on Reducing Emissions from Deforestation and forest Degradation (REDD) in developing countries

USDA – United States Department of Agriculture.

ENDNOTES

1 Betts et al (2009) and www.metoffice.gov.uk/climatechange/news/latest/four-degrees.html

2 IPCC WGIII (2007): 44 Technical summary: Box TS5 'The main projected impacts for sstems and sectors'; IPCC WGI (2007): 543-544

3 IPCC (2007): Table SPM.6 Scenario one

4 IPCC WGIII (2007): Figure SPM.1

5 Comparing DNPI data (published 2009, source for 2010 report) with data from other top emitting countries (China, USA, Brazil, India, Russia) positions Indonesia is the world's 3rd largest GHG polluter in 2005:

No 1: USA 6.2GtCO2e in 2005. Source: EPA (2010): 14

No 2: China 5.6GtCO2e in 2004. Source: Government of China (2007)

No 3: Indonesia 2.4GtCO2e in 2005. (See below)

No 4: Brazil 2.2GtCO2e in 2005: Source: Brazilian Ministry of Science and Technology (2009): 19

No 5: Russia 2.0 GtCO2e in 2005. Source: UNFCCC (2009): 1

No 6: India 1.6GtCO2e. Source: Ministry of Environment and Forests (2009): 53

In 2009, the DNPI assessed Indonesia's 2005 emissions at 2.25GtCO2e (Source: DNPI (2009a, b)). In 2010, the DNPI re-released the same 'sectoral' data, but claiming 250MtCO2e potential absorption by secondary forests and plantations (Source: DNPI (2010 a,b,c). Thus, the national GHG emissions are given as 2.06GtCO2e – with the difference down to accounting methods, rather to any changes to the underlying data.

However, significant additional 360MtCO2e GHG emissions from degradation of '5 million ha of non-commercially used' peatland is identified in the 2009 DNPI report, yet this figure fails to be included in the national accounts used in either report.

In Indonesia, commercially used peatlands amount to around 4.8 million ha according to Wetlands International (Source: Hooijer et al (2006)).

The DNPI's national accounts included emissions associated with thiese 'managed and drained peatland' areas only. However, they do claim the emissions from the degraded non-commercially used peatlands as abatement potential – some 0.36GtCO2e, according to the 2009 DNPI.

If properly taken into account, these 0.36GtCO2e emissions position Indonesia well ahead of the next largest emitter, Brazil, with 2.42GtCO2e total.

6 DNPI (2010c): 5 gives net deforestation emissions as 763Mt, peat decomposition as 300Mt and peat fire as 550Mt in 2005. DNPI (2010a): 14, 19 gives the same total but divided as 772Mt from peat and 838Mt from other LULUCF sources

7 E.g. DNPI/East Kalimantan govt. (2010): 13, 54

8 DNPI (2010c): 2

9 DNPI (2010a): 4

10 DNPI/East Kalimantan govt. (2010): 7

11 DNPI/East Kalimantan govt. (2010): 7

12 Government of Norway & GoI (2010)

13 Official publications such as Indonesia's Second National Communication to the UNFCCC give only partial accounts of its forestry sector assumptions in relation to Indonesia's emissions abatement scenario. None of these expressly locates the 'degraded lands' available for plantation establishment, nor do they spell out the full extent of the Ministry of Forestry's Forest Estate land-use vision. Greenpeace has obtained an internal Ministry of Forestry/FORDA document ('Integration of climate change issues into forestry sector planning') that affords a fuller view to 2050 of the Ministry's land-use assumptions and the carbon budget the Ministry intends to claim for the implementation of this vision. This document and its assumptions – fully complementing the SNC – form the cornerstone for Indonesia's emissions reductions claims.

14 DNPI/East Kalimantan govt. (2010): 8

15 Norway: 32.4 million ha; Denmark: 4.3 million ha. Source: CIA World Factbook www.cia.gov/library/publications/the-world-factbook/rankorder/2147rank.html

16 Greenpeace analysis based on MoFor (2010b,c), MoFor (2009e), and carbon content data from Ministry of Environment (2009): 28: 400tC/ha in primary forest and 200tC/ha in secondary forest

17 Greenpeace analysis based on MoFor (2010b,c), MoFor (2009e) and Meijaard et al (2004) orang-utan habitat maps

18 DNPI (2010a): 14 gives Indonesian peatland as storing 132GtCO_2e, equivalent to 36Gt carbon. 79% of Indonesia's peatland is in development zones (Source: Wahyunto et al (2003, 2004, 2006)), giving 28Gt carbon in lands at risk

19 2005 global emissions including land-use change and forestry and international bunkers: 34GtCO_2e. Source: CAIT. 38GtC is equivalent to 140GtCO_2. 140/34 = 4.1

20 Barr et al (2009)

21 See endnote 5 above

22 According to recent estimates published by the Brazilian and Indonesian governments, these countries were each responsible for around 4-5% of global GHG emissions in 2005. Sources: Brazilian Ministry of Science and Technology (2009) and DNPI (2010a): 11 which gives total emissions of 2.055GtCO2e in 2005

23 Brazilian Ministry of Science and Technology (2009)

24 DNPI (2010a): 11: Total emissions 2.055GtCO2e in 2005, peatland emissions 772MtCO2e (38%); gross deforestation and degradation emissions 1.1GtCO2e, although a net approach is taken, hence claiming 838MtCO2e (41%)

25 Government of Brazil (2008) and Yudhoyono (2009)

26 Brazilian Ministry of Science and Technology (2009)

27 Chomitz and Thomas (2001): 14 attributes up to 90% to pasture, including abandoned land. Grieg-Gran (2006): 13 extrapolates from Chomitz' figures that 77% of deforested land is grazing + ~10% abandoned pasture land; Government of Brazil (2004): 10 states that cattle is responsible for 80% of deforested land in the Amazon region; and Barreto et al (2008): 20 citing IBGE (2006) conclude that 75–81% of land deforested up to 2005 has been occupied by cattle.

28 USDA (2004)

29 ABIOVE (2009); Marfrig (2009): 14; Greenpeace (2009); JBS (2009)

30 Government of Brazil (2008)

31 Brazilian Minstry of the Environment (2010)

32 Government of Brazil (2008)

33 Government of Brazil (2008)

34 Brazilian Minstry of the Environment (2010)

35 Decree No. 6527, 1 August 2008 www.planalto.gov.br/ccivil_03/_Ato2007-2010/2008/Decreto/D6527.htm

36 Yudhoyono (2009)

37 Yudhoyono (2009)

38 DNPI (2010a): 11

39 DNPI (2010a): 11

40 DNPI (2010a): 4

41 DNPI/UNFCCC (2009): 43

42 DNPI (2010a): 12

43 Yudhoyono (2009)

44 Yudhoyono (2009)

45 Siswanto (2010) 5, 25-26 and Simamora (2010b)

46 MoFor/IFCA (2008): xiii; also Simamora (2010b), quoting Wandojo Siswanto, Indonesia Ministry of Forestry, head of working group on climate: 'We will renegotiate the agreement with Norway. Indonesia needs money for tree planting'.

47 World Bank Group (2010a): 2

48 World Bank Group (2010a): 2

49 World Bank Group (2010b): 19

50 World Bank Group (2010a): 20

51 DNPI (2010a): 21

52 Although MoFor/FORDA (2009) gives the 2025–2050 horizon, BAPPENAS (2010): 102 assumes 'a constant effort of 1.4 million ha per year of new plantations' through to 2029 and adjusts the plantation rates accordingly in order to be able to achieve the full scheme within the period.

53 Masripatin (2010): 11

54 MoFor/FORDA (2009): 13 and Ministry of Environment (2009): 28

55 E.g. DNPI (2010a): 16, 18, 19, 20

56 E.g, PT SMART Tbk (2010); Greenbury (2010): 13; Harahap (2010); Head of Climate Change working group, Ministry of Forestry: 'We want to elaborate the terms of a forestry moratorium because the LoI could be dangerous for the Indonesian economy.' Source: Simamora (2010c)

57 See various Greenpeace reports cited above. See also BSI-CUC (2010); DNPI/East Kalimantan govt. (2010): 42, which notes 'Law enforcement is required to ensure policies and changes are fully implemented. At present, at least 60 oil palm concessions in the province are operating without the full set of legal permits.'; RSPO (2010) ,

58 For example: 'East Kalimantan's pulpwood plantations cover an area of approximately 800,000 ha, the majority of which were established during the 1990s. In line with current environmental regulations, approximately 160,000 ha have to be set aside for nature conservation (e.g., watershed protection and wildlife corridors) while the remaining area could be used for economic purposes. In theory, these 640,000 ha could yield an annual volume of approximately 23 million cubic meters, 17 more than enough to supply a viable forest products industry. However, currently only 165,000 ha are actually planted, while the remaining area is degraded, and lies idle. Low productivity, and this low rate of planting mean East Kalimantan's annual harvest is only 0.7 million cubic meters.' Source: DNPI/ East Kalimantan govt. (2010): 17; see also pages 38–39 for palm oil productivity

59 E.g. 'The RSPO [Roundtable on Sustainable Palm Oil] has repeatedly rejected the use of remote sensing, the most reliable and transparent method for monitoring the behavior of its members.' Source: Laurance et al (2009)

60 Intermap Technologies Corp (2006) 'Intermap and Sinar Mas Forestry sign $2.6 million contract' Press release 28 August 2006 www.eijournal.com/cat_content.asp?contentid=1558&catid=163

61 MoFor/FORDA (2009): 13 and Ministry of Environment (2009): 28

62 UNFCCC website 'Harvested wood products': 'CO2 is released during harvesting and manufacture of wood products and by the use and disposal of wood. In the IPCC recommended default approach (Revised 1996 IPCC Guidelines), all CO2 emissions and removals associated with forest harvesting and the oxidation of wood

products are accounted for by the country in the year of harvesting (removal). The proposed method recommends that storage of carbon in forest products be included in a national inventory only in the case where a country can document that existing stocks of long term forest products are in fact increasing. Harvested wood products (HWP) according to the IPCC good practice guidance (2003) include wood and paper products. It does not include carbon in harvested trees that are left at harvest sites. Methodologies and good practice for the estimating and reporting of emissions and removals from HWP can be found in Appendix 3a.1 in the IPCC good practice guidance for LULUCF (2003)'. Source: http://unfccc.int/methods_and_science/lulucf/items/4015.php accessed 22 October 2009

63 DNPI (2010a): 23 suggests forest rehabilitation by plantations on a 35-year rotation

64 E.g. DNPI/East Kalimantan govt. (2010): 13

65 E.g. DNPI/Central Kalimantan govt. (2010) and DNPI/Jambi govt. (2010): Exhibit A4

66 DNPI/Jambi govt. (2010): 23

67 Belford (2010)

68 Maplecroft (2010)

69 E.g. Thompson et al (2009), Locatelli et al (2008), Mackey (2008), Cotter et al (2010)

70 E.g. Seppälä et al (2009) and Robledo et al (2005)

71 E.g. Locatelli et al (2008)

72 E.g. Cotter et al (2010); IIED (2009)

73 E.g. Cotter et al (2010), Mackey (2008), Thompson et al (2009)

74 Land for low-carbon development should have <35tC/ha; land with potential to store >100tC/ha should be protected. Source: BAPPENAS/UN-REDD (2010): 41

75 According to Wardoyo and Sugardiman (2009): at 10% canopy cover, depending on crown diameter, the standing stock volume of commercial timber ranges from 75–150m³/ha. To convert these standing stock volumes into total aboveground carbon stock, two methods have been used:

1) Assuming MoFor data on aboveground C stock for secondary forests (here assumed to represent canopy cover levels ranging from 10–60%) of 200tC/ha, the average factor for converting standing stock commercial timber in secondary forests into aboveground carbon stock is 3.6. This results in a total aboveground carbon stock of 93tC/ha;

2) Using IPCC (2006) conversion factors for different standing stock volumes results in a total aboveground carbon stock of 77tC/ha at 10% canopy cover in Indonesia (range depending on crown diameter: 63–96tC/ha). Source: IPCC (2006) Guidelines Table 4.5; divided by 2 to convert AGB to total C stock.

76 MoFor (2009f)

77 Total Forest Estate – 137 million ha. Forest Estate Convertible Production Forest (land zoned for conversion out of Forest Estate to 'non-forest' uses – e.g. oil palm) – 22.8 million ha; Limited Production Forest – 22.5 million ha; Permanent Production Forest – 36.7 million ha. Subtotal = 60% (Source: MoFor (2008): Table I.1.1.)

78 MoFor (2009c)

79 Based on Greenpeace Mapping Unit analysis of Ministry of Forestry Landuse maps. Source: MoFor (2010c)

80 Greenpeace estimate based on MoFor (2010b,c) and Wahyunto et al (2003, 2004, 2006). In the APL zone, there are 17.5 million ha not covered by any identified landuse. These areas include high-carbon peatlands and forests.

81 DNPI/UNFCCC (2009): 33

82 MoFor (2007a)

83 Borhan (2010)

84 DNPI (2010a): 19

85 DNPI (2010a): 22

86 Media Indonesia (2010)

87 GoI (2009): 12–13

88 DNPI (2010a): 19

89 DNPI (2010a): 25

90 DNPI (2010a): 25

91 Legowo (2007): 21

92 DNPI (2010a): 4

93 Government of Norway & GoI (2010)

94 DNPI (2010a): 19

95 DNPI (2010a): 18

96 Assumptions within the DNPI relate to projected development of forest, not total land-use demand. Further, in terms of sector needs, many of the official or policy figures appear to relate to assumed planted area and exclude infrastructural development, minimum legal land conservation and community areas. Within timber plantations, for instance, APP assumes this represents 30% to 40% of gross concession area – e.g. APP (2007); Confidential Sinar Mas document (2007), copy held by Greenpeace International (interested parties may contact Greenpeace for a copy of this document if unable to obtain it from APP directly). For the purpose of this analysis the more conservative figure of 30% has been used.

97 DNPI/East Kalimantan govt. (2010)

98 NPI/UNFCCC (2009): 33 and MoFor (2007a): 11. Based on 2007 production levels of 5.7 million tonnes, i.e., increase to around 18.5 million tonnes of pulp production annually

99 DNPI (2010a): 19

100 Verchot et al (2010): 5 reports 'total new production capacity of approximately 8 million tonnes of pulp'; Harahap (2010) citing Industry Minister M.S. Hidayat: 2009 production capacity 7.9 million tonnes

101 DN PI/ East Kalimantan govt. (2010): 13, 56

102 According to the Industry Minister, as of 2009 Indonesia has an annual pulp production of 6.52m tonnes (Source: Harahap (2010)). MoFor (2008) Table IV 2.2.A gives HTI production as 22,321,885m3, which is sufficient to supply only 4.65 million tonnes pulp at a conversion factor of 4.8m3/tonne pulp, leaving 1.87 million tonnes fibre (29%) that must come from other sources, assuming 2009 HTI production was on a par with 2008.

103 75% of fully granted HTI concessions (SK Definitif) were pulpwood, according to MoFor (2007b) (corresponding figure not available in following year's report)

104 Including SK Definitif, SK Sementara and SK Pencadangan titles. Source: MoFor (2009a)

105 MoFor (2009c)

106 Barr (2008); Verchot et al (2010): 5

107 MoFor (2009c) Table IV 2.2.A gives HTI production for 2008 as 22,321,885m3, Chap. IV p3 gives area of planted HTI as 4.31 million ha. Of this, Greenpeace estimates pulpwood plantations to have accounted for 2.4 million ha (projection from last available figure of 1.9 million ha in 2006). Assuming – which is unlikely, thus the highly favourable results – that all HTI yield in 2008 originated from pulpwood concessions, and zero from timber plantations, the yield would have been 58m³/ha. Even this yield is questionable. It is based on figures claiming that total HTI yield roughly trebled in the five years to 2008, despite a decrease in area planted in the years that should have supplied these harvests. CIFOR suggest this discrepancy results from early harvest of plantations, suggesting future yields may fall. Sources: MoFor (2009c) Table IV 1.4; Verchot et al (2010). Figures given within DNPI/East Kalimantan govt. (2010) report suggest yields are closer to 30m3/ha.

108 In its 2007 CSR, APP assumes a MAI (mean annual increment) of 21m³/ha, not taking into account losses, or a harvest of 147m³ (7-yr rotation cycle). Including losses, assumed to be 30%, the harvest would be 116m³/ha.

109 'Currently only 165,000 ha are actually planted, while the remaining area is degraded, and lies idle. Low productivity, and this low rate of planting mean East Kalimantan's annual harvest is only 0.7 million cubic meters.' Source: DNPI/East Kalimantan govt. (2010): 17. Assuming a seven-year rotation, 700,000/165,000 x 7 = 30m3/ha.

110 18.5 million tonnes of pulp require 88.8 million m3 of pulpwood (conversion factor 4.8). With a harvest of 60m³/ha over a seven-year rotation cycle, this requires 10.3 million ha of fully established plantations.

Currently, there are only 4.31 million ha of HTI planted, of which Greenpeace estimates 2.4 million to have been dedicated to pulpwood. Source: MoFor (2009c): Chap. IV p3

Thus, the plan requires an increase of around 7.6 million ha over current levels to reach 10.3 million ha.

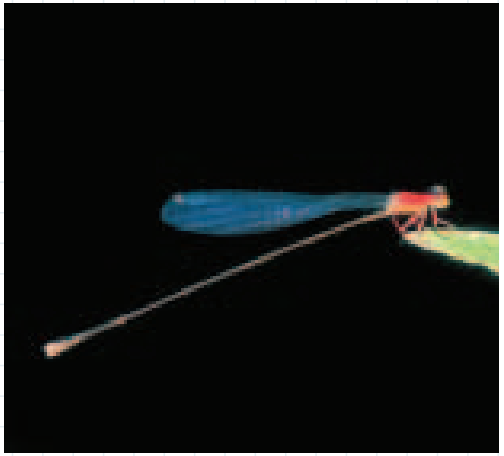
This figure excludes pre-harvest losses, assumed by APP to be 20%. Source: APP (2007). Thus, total planted area needs are 12.9 million ha (10.3 million/0.8)

This figure excludes infrastructural development, minimum legal land conservation and community areas, which represent 30–40% of the gross concession area. Source: see e.g. APP (2007)

Thus, the gross concession area needs are about 19 million ha (12.9/0.6 = 21 million ha and 12.9/0.7 = 18.4 million ha)

111 Jakarta Post (2010a), Jakarta Post (2010b)

112 I.e. increase to 13 million tonnes of pulp. Hidayat said that in 2009, Indonesia had 14 pulp companies and 81 paper companies with a capacity of 7.9 million tons and 12.17 million tons per year, respectively. 'The realization, however, was only 6.52 million tons



and 9.31 million tons'. Source: Harahap (2010)

113 Jakarta Post (2010a)

114 Jakarta Post (2010b)

115 6.5 million tonnes pulp x 4.8m3 fibre = 31.2 million m^3 of fibre. Area needed by division with m3/ha. 50m^3 = 637,000ha. Source: Sinar Mas Forestry confidential 2007 documents. 100m3 = 318,500ha. Source: IFCA (2007): 3–4

116 Plywood, veneer and block board industries: 23 million m^3; sawnwood industry: 21 million m^3. Source: MoFor/FAO (2009)

117 MoFor (2009c): Table IV.2.2.A

118 MoFor/FAO (2009): 3 Figure 2

119 MoFor/FAO (2009)

120 Santosa (2009)

121 In 2005 supply amounted to 12.5 million m^3 (see MoFor (2009a). See also endnote 116. Greenpeace estimates roundwood consumption, based on MoFor (2009a) statistics, to have been 17.8 million tonnes (conversion factors from m^3 product to m^3 RWE use: sawn timber: 1.8; plywood_2.55; joinery: 3; block board: 2.55; veneer: 2.14)

122 DNPI (2010a): 18

123 DNPI (2010a): 19

124 Although MoFor/FORDA (2009) gives the 2025–2050 horizon, the ICCSR synthesis report from March 2010 assumes 'a constant effort of 1.4 million ha per year of new plantations' through to 2029 and adjusts the plantation rates accordingly in order to be able to achieve the full scheme within the stated period. Source: BAPPENAS (2010)

125 MoFor (2007a): 88

126 To address the wood-processing sector's supply deficit and support the 'revitalisation of the forestry sector', the Government of Indonesia proposed to develop joint industry–community forest plantations (Hutan Tanaman Rakyat/HTR). The programme initially aimed to establish 5.4 million ha of plantations on degraded production forest areas between 2007–2016. Source: MoFor/FAO (2009)

In 2009, the Director General of Land Rehabilitation and Social Forestry, Bambang Jaka Wibawa, reasserted ambitions to expand the area of HTR to close the deficit of timber raw materials for the forestry sector. http://nasional.kontan.co.id/v2/read/nasional/23065/Pemerintah-Kembangkan-Hutan-Rakyat-Kemitraan

127 MoFor (2010d)

128 MoFor (2007a): 88 and MoFor/FAO (2010) Indonesia country profile: 'People forest is forest plantation on private land or non forestland, mainly planted with fast growing hardwood species.'

129 Media Indonesia (2010)

130 Planted area in 2008: 7.9 million ha. Harvest in 2008: 19 million tonnes. Source: Jakarta Post (2009). Total planted area needed for 40 million ha: 16.5 million ha (ratio between total planted area and harvest in 2008: 2.43). Source: Deptan (2010)

131 DNPI (2010a): 19 Exhibit 9

132 DNPI (2010a): 23

133 GoI (2009): 12–13

134 FAOSTAT (2010)

135 Indonesia Today (2010), Franken (2010)

136 Ekawati and Al Ahzari (2010), Franken (2010)

137 Indonesia Today (2010)

138 FAOSTAT (2010)

139 DNPI (2010a): 19

140 Bappenas–UN-REDD (2010): 27

141 DNPI (2010a): 25

142 DNPI (2010a): 25

143 DNPI (2010a): 27

144 World Bank Group (2010a): 10

145 Legowo (2007): 21

146 A total of 5.25 million ha will be allocated to develop these crops: 1.5 million ha for oil palm, 1.5 million ha for cassava, 1.5 million ha for jatropha and 750,000 ha for sugar. Source: Legowo (2007): 20

147 Ghani (2007)

148 Legowo (2007): 21

149 DNPI (2010a): 19

150 DNPI (2010a): 30

151 1.5 million ha of oil palm dedicated by 2010 and subsequently 2.5 million ha of oil palm. Source: Legowo (2007): 20, 21

152 Production almost tripled from 2000 (77m tonnes) to 2007 (217m tonnes). Source: CDI-ERM (2008)

153 DNPI/East Kalimantan govt. (2010): 66–68

154 DNPI (2010a): 5

155 Climate Investment Funds (2010): 14–15 citing BPPT (2010)

156 535,211 ha of 'PKP2B' (producing coal concessions). Greenpeace analysis is based on MoFor (2010b) and Petromindo-APBI (2009)

157 Greenpeace analysis is based on MoFor (2010c) and Petromindo-APBI (2009)

158 Sources: MoFor (2010e), Down to Earth (2010), Simomara (2010b)

159 DNPI/UNFCCC (2009): 31–34

160 'The analysis of energy efficiency opportunities for pulp and paper industry is based on the data provided by PT Pindo Deli, one of major pulp and paper companies in Indonesia.' Source: DNPI/UNFCCC (2009): 31. PT Pindo Deli is part of the APP pulp and paper division of the Sinar Mas group. Source: e.g. www.sinarmas.com/en/business-units/

161 In 2009, APP's pulp mills consumed 14.3 million m^3 of plantation and natural forest fibre, equivalent to a pulp production of about 2.9 million tonnes. Source: MoFor (2010a)

162 'The Carbon Footprints range from a minimum of 0.79tCO2/t-paper in Pindo Deli 2 to a maximum of 2.32tCO2/t-paper in IKPP Perawang with a weighted average of 1.56tCO2/t-paper for the APP Group.' However, 'APP's Carbon Footprint in 2006, with the plantation sequestration, reduces considerably to a weighted average footprint of 0.03tCO2e/t-paper. The reduction of footprint is due to the absorption of CO2 by the APP's plantations.' Source: ERM (2008): 5, 7

163 APP/ERM (2008)

164 DNPI/UNFCCC (2009): 31

165 DNPI/UNFCCC (2009): 31

166 Investor Daily (2009)

167 Investor Daily (2009)

168 The product specification provided by Sinar Mas Mining gives carbon content of 55–72% for its coal; thus, conversion to CO2 (factor 3.667) gives 20.2–26.5MtCO2 from APP current coal use. Source: 'PT Bumi Kencana Eka Sakti' www.sinarmasmining.com accessed 28 October 2010

169 Norwegian Pollution Control Authority (2009) gives 2007 GHG emissions of ~55MtCO2e excluding claimed LULUCF sequestration

170 APP (2007)

171 Paper production in 2009 amounted to 9.31 million tonnes (Source: Harahap (2010)). Current emissions: 5.57tCO2/t product (Source: DNPI (2009)). The DNPI (2009) NEEDS report is unclear which steps of the production chain are included in this assessment of carbon intensity per tonne of product – ie, whether pulp and paper are assessed separately or not; however, Greenpeace analysis assumes figures relate to the entire process involved in paper production. Given that 40% of Indonesia's pulp is exported, this means that a considerable share of the sector's emissions cannot be quantified from the data.

172 55 million tonnes, of which 32 million are paper (based on 2009 paper to pulp ratio). DNPI/UNFCCC (2009): 43 states 'The GHG emission intensity in ton CO2 per ton product will increase from 5.57 to 6.29 under business as usual scenario. However, if energy efficient measures are to be applied, GHG emissions will be reduced to 5.19 ton CO2 per ton product.'

173 DNPI (2010a): 25

174 APP 'Myths and Realities' website: http://appmnr.app.co.id/env_app-mr_tst/index.php?option=com_content&view=section&layout blog&id=1&Itemid=67&limitstart=3

175 MoFor (2009b)

176 MoFor (2009e)

177 MoFor (2010c)

178 MoFor (2010b)

179 Wahyunto et al (2003, 2004, 2006)

180 Sumatra Important Ecosystem with Tiger Distribution Map. From research data of conservation Institutions: Wildlife Conservation Society (WCS), Fauna and Flora International (FFI), Yayasan Badak Indonesia (YABI), World Wildlife Fund (WWF), Zoological Society of London (ZSL) and Leuser International Foundation (LIF). Source: Roosita and Sulistyawan (2010) and WWF/SaveSumatra.org website: www.savesumatra.org/index.php/newspublications/map/0/Species%20Distribution%20Map downloaded May 2010

181 Meijaard et al (2004)

182 Norway: 32.4 million ha; Denmark: 4.3 million ha. Source: CIA World Factbook www.cia.gov/library/publications/the-world-factbook/rankorder/2147rank.html

183 BAPPENAS/UN-REDD (2010): 41

184 Land for low-carbon development should have <35tC/ha; land with potential to store >100tC/ha should be protected. Source: BAPPENAS/UN-REDD (2010): 41.

185 According to Wardoyo and Sugardiman (2009): at 10% canopy cover, depending on crown diameter, the standing stock volume of commercial timber ranges from 75–150m^3/ha. To convert these standing stock volumes into total aboveground carbon stock, two methods have been used:

1) Assuming MoFor data on aboveground C stock for secondary forests (here assumed to represent canopy cover levels ranging from 10–60%) of 200tC/ha, the average factor for converting standing stock commercial timber in secondary forests into aboveground carbons stock is 3.6. This results in a total aboveground carbon stock of 93tC/ha;

2) Using IPCC (2006) conversion factors for different standing stock volumes, results in a total aboveground carbon stock of 77tC/ha at 10% canopy cover in Indonesia (range depending on crown diameter: 63–96tC/ha). Source: IPCC (2006) Guidelines Table 4.5; divided by 2 to convert AGB to total C stock.

186 Greenpeace analysis based on MoFor (2010b), Wahyunto et al (2003, 2004, 2006)

187 DNPI (2010a): 19 Exhibit 9, 21 Exhibit 12

188 DNPI (2010a): 4

189 E.g. 'Palm oil is a strategic product for the growth and development of Indonesia and for the alleviation of poverty.' Source: SMART (2010); APP (2010); Head of Climate Change working group, Ministry of Forestry: 'We want to elaborate the terms of a forestry moratorium because the LoI could be dangerous for the Indonesian economy.' Source: Simamora (2010c)

190 DNPI (2010a): 14

191 Amazon = 8,235,430km2, United States (including Alaska and Hawaii) = 9,629,091 km2. Mongabay.com: http://rainforests.mongabay.com/amazon/

192 Area of UK = 24m ha (CIA World Factbook: https://www.cia.gov/library/publications/the-world-factbook/). Area of Indonesian peat: 22 million ha according to Wetlands as cited by DNPI (2010a): 10

193 DNPI (2009a) reports peatland decomposition emissions through drainage as 29.5% of 1.03GtCO2 – 303MtCO2. 303MtCO2 divided by 73tCO2/ha/yr (emissions used by MoFor/IFCA (2008)) = 4.15 million ha. Although not included in its national emissions calculations, the DNPI (2009a) identifies potential peatland emissions savings of 360MtCO2 associated with the rehabilitation of 5 million ha of 'non-commercially significant' peatland. Total: about 10 million ha.

194 DNPI (2010c): 5 gives peat decomposition as 300Mt and peat fire as 550Mt in 2005. DNPI (2010a): 14, 19 gives the same total but divided as 772Mt from peat and 838Mt from other LULUCF sources

195 UK 2009 provisional emissions: 575MtCO2. Source: UK Department of Energy and Climate Change (2009)

196 Greenpeace calculations based on carbon figures from DNPI (2010a): 14

197 DNPI (2010a): 15

198 DNPI (2010a): 16

199 DNPI (2010a): 17

200 DNPI (2010a): 22. Further, the October 2010 draft Nastra REDD+ document states that the Presidential Decree protecting all peatland >3 metres deep 'cannot be accommodated in the forestry regulations, so that the peat moss lands [sic] become production forest which can be used for economic interest'. Source: BAPPENAS/UN-REDD (2010): 61

201 MuÐoz (2009)

202 Ministry of Environment (2009): 28 Table 6

203 Norway: 32.4 million ha; Denmark: 4.3 million ha. Source: CIA World Factbook www.cia.gov/library/publications/the-world-factbook/rankorder/2147rank.html

204 Greenpeace analysis based on MoFor (2010b,c), MoFor (2009e), and carbon content data from Ministry of Environment (2009): 28: 400tC/ha in primary forest and 200tC/ha in secondary forest

205 DNPI (2010a): 19 Exhibit 9

206 Costs given in the cost curve as $28–29/tonne C02e, though simplified in the text to $30/t (Source: DNPI (2010a): 21 Exhibit 12). The cost curve's assumption of 192tC/ha of forests (rather than 200tC, as used elsewhere in MoFor and GoI documents) is equivalent to 705tC02e – giving an opportunity cost of $19,740–$20,445/ha. Source for carbon assumption: DNPI (2010a): 22

207 DNPI (2010a): 21

208 DNPI (2010a): 21

209 DNPI (2010a): 22

210 DNPI/Jambi govt. (2010): 23

211 Calculated based on $28/tC02e (DNPI cost curve August 2010 p21 Exhibit 12), multiplied by 381.9MtC02e forecast emissions reduction from plantation REDD (Source: DNPI (2010b): 4) = $10.69bn

212 E.g. BAPPENAS (2010)

213 See for example: Maplecroft (2010), Thompson et al (2009), Locatelli et al (2008), Mackey (2008), Cotter et al (2010), Seppälä et al (2009), Robledo et al (2005), IIED (2009)

214 See www.wri.org/stories/2010/11/faq-indonesia-degraded-land-and-sustainable-palm-oil?utm_source=twitter.com&utm_medium=worldresources&utm_campaign=twitterfeed

215 Edwards et al (2010)

216 DNPI/Central Kalimantan govt. (2010): 54; DNPI-East Kalimantan govt. (2010): 27

217 MoFor (2009c)

218 MoFor (2009c)

219 BAPPENAS (2010): 74

220 BAPPENAS/UN-REDD (2010): 21

221 DNPI/East Kalimantan govt. (2010): 89, Exhibit 62

222 FAO (2006)

223 Anatara news (2010), see also www.walhi.or.id/in/kampanye/advokasi-kebijakan/54-uu-psda/825-pp-11-tahun-2010-tentang-penertiban-tanah-terlantar

224 Hasan (2010)

225 MoFor (2009f) 5

226 BAPPENAS/UN-REDD (2010): 46

227 MoFor (2009d)

228 In 2003, the government revoked regulations regarding maximum standing volume, allowing companies to clear forest regardless of its standing timber volume until 2009, to allow rapid plantation establishment. Source: Minister of Forestry Decree SK Menhut no.162/Menhut -II/2003 Acceleration of the Development of Estate Forest (HTI) to Accommodate the Raw Material Requirement for the Pulp and Paper Industry and Minister of Forestry Decree SK Menhut no.101/Menhut -II/2004.

In 2008, Ministry of Forestry Decree no. P3/Menhut-II/2008 concerning Delineation of HTI replaced the 2004 decree, removing any time limit to the conversion of natural forest regardless of standing volume within the Production of Conversion zones (areas available for pulp or oil palm plantation development). In early 2009, the Minister of Forestry (MS Kaban) announced that the extension was only up to 2014 (source: Inilah (2009)), however this does not appear to be backed by legislation. As a consequence, the only limits on clearance within Production and Conversion zones appear to be those stipulated in article 9 of Ministry of Forestry Decree no.P3/Menhut-II/2008 – namely HCVF, >3 metre deep peat, development within 100m of riverbanks, for example.

229 MoFor (2009d)

Govt Regulation (PP) No.7 year 1990 states that forests areas that can be developed for industrial plantations areas are the production forests that are unproductive (article 5, point 1).
-- Forestry Minister's Decree (SK) No.200/Kpts-II/1994 detailed the criteria of Unproductive Production Forests: There are less than 25 primary trees/hectare that have diameter of more than 20 cm

In 1999, Forestry Act No.41 year 1999 is enacted (the above regulations were under the umbrella of Forestry Act No.5 year 1967), so there were changes made in the subordinate regulations accordingly
According to the Forestry Act No.41 year 1999, the development of tree plantations is prioritized in unproductive production forests, in order to protect the natural forests.

Forestry Minister's Decree (SK) No.10.1/Kpts-II/2000 stated that the criteria of Production Forests for HTI is:
--> on the areas with non-forest vegetation cover (bushes, bare land, or grass land); or
--> on destroyed logged-over areas which have log/timber potential (10cm in diameter) of not more than 5m3/ha.

Govt Regulation (PP) No.34 year 2002 states that: HTI can be developed in bare land, grass land, or bushes that are located in the Production Forests

PP No.34 was replaced by Govt Regulation (PP) No.6 year 2007, which states: HTI can be developed in 'unproductive production forests'

230 MoFor (2009d)

231 Ministry of Environment (2009); MoFor/FORDA (2009)

232 APKI (2004)

233 Government of Norway & GoI (2009)

234 BAPPENAS/UN-REDD (2010): 41

235 FAO (2006): 169

236 According to Wardoyo and Sugardiman (2009): at 10% canopy cover, depending on crown diameter, the standing stock volume of commercial timber ranges from 75–150m³/ha. To convert these standing stock volumes into total aboveground carbon stock, two methods have been used:

1) Assuming MoFor data on aboveground C stock for secondary forests (here assumed to represent canopy cover levels ranging from 10–60%) of 200tC/ha, the average factor for converting standing stock commercial timber in secondary forests into aboveground carbons stock is 3.6. This results in a total aboveground carbon stock of 93tC/ha;

2) Using IPCC (2006) conversion factors for different standing stock volumes results in a total aboveground carbon stock of 77tC/ha at 10% canopy cover in Indonesia (range depending on crown diameter: 63–96tC/ha). Source: IPCC 2006 Guidelines Table 4.5; divided by 2 to convert AGB to total C stock.

237 Greenpeace analysis based on MoFor (2010b,c), MoFor (2009e) and Wahyunto et al (2003, 2004, 2006)

238 Greenpeace analysis based on MoFor (2010b,c), MoFor (2009e) and Wahyunto et al (2003, 2004, 2006) and MODIS VCF data taken from Hansen et al (2006)

239 Hooijer et al (2006): 6

240 Ministry of Environment (2009): 28 Table 6

241 Ministry of Environment (2009): 28 Table 6

242 Greenpeace estimate based on a maximum possible yield in 2008 of 60m³/ha/yr, assuming a harvest for all non-pulp HTI plantations of zero, with HTI-pulp plantations (2.5 million ha) harvested over a 7-yr rotation cycle supplying all the 22 million m³ of HTI timber harvested in 2008 (Source: MoFor 2009). 60m³/ha/yr is equal to 8.5m³ mean annual increment = 2tC

243 Ministry of Environment (2009): 28 Table 6; DNPI (2010a): 23 Ex 13

244 Munoz (2010): 14; Greenbury (2010): 21

245 BAPPENAS/UN-REDD (2010)

246 Ministry of Environment (2009): 28 Table 6; DNPI (2010a): 23 Ex 13

247 Greenbury (2010): Slide 21

248 MoFor/FORDA (2009): 13

249 Ministry of Environment (2009): 28 Table 6

250 MoFor/FORDA (2009): 13

251 DNPI (2010a): 21

252 In 2009, Sinar Mas officially consumed 2.9 million tonnes of MTH and 9.8 million tonnes of plantation fibre (Source: MoFor (2010a)). This equates to a production of 2.9 million tonnes of pulp. Total pulp production of Indonesia amounted to 6.5 million tonnes in 2009. Source: Harahap (2010)

253 GAR website (2010) 'Investor relations' www.goldenagri.com.sg/

ir_overview.php accessed 19 August 2010

254 APP (2009): 2

255 Munoz (2010): 14

256 Greenpeace analysis based on MoFor (2010b,c), MoFor (2009e) and Wahyunto et al (2003, 2004, 2006)

257 UNFCCC website 'Harvested wood products': 'CO2 is released during harvesting and manufacture of wood products and by the use and disposal of wood. In the IPCC recommended default approach (Revised 1996 IPCC Guidelines), all CO2 emissions and removals associated with forest harvesting and the oxidation of wood products are accounted for by the country in the year of harvesting (removal). The proposed method recommends that storage of carbon in forest products be included in a national inventory only in the case where a country can document that existing stocks of long term forest products are in fact increasing. Harvested wood products (HWP) according to the IPCC good practice guidance (2003) include wood and paper products. It does not include carbon in harvested trees that are left at harvest sites. Methodologies and good practice for the estimating and reporting of emissions and removals from HWP can be found in Appendix 3a.1 in the IPCC good practice guidance for LULUCF (2003)'. Source: http://unfccc.int/methods_and_science/lulucf/items/4015.php accessed 22 October 2009

258 DNPI (2010a): 21

259 Pulpwood plantations work on a seven-year rotation. Indonesia's assumed annual C uptake of 8tC/ha/yr implies a delivered productivity (ie losses already factored in) of 32m3/ha/yr = 224m3 at harvest. The maximum current national average harvest is 60m3 (see above). Sources for 8tC/ha/yr: DNPI (2010a): 23 Ex 13, MoFor/FORDA (2009): 17

260 APP (2007) factors in 20% to cover these losses

261 Based on carbon content of secondary forest of 200t/ha, primary forest 400t/ha. Source: Ministry of Environment (2009): 28

262 Ministry of Environment (2009): 28 Table 6

263 Ministry of Environment (2009): 28 Table 6

264 Hooijer et al (2006): 6

265 UNFCCC (2007)

266 DNPI (2010a): 23 footnote 23: 'Forests are described as non-annual plants reaching a height of minimum 5 m and with a crown cover of more than 30 percent of a defined area, normally one hectare'.

267 Wardoyo and Sugardiman (2009): 39, 46. Standing timber volume at 10% crown cover = 74–147m3/ha. Timber: carbon conversion rate of 4:1 gives 19–37tC/ha. Total carbon content per hectare will be higher as it includes other biomass such as branches, leaves and roots of commercial trees, plus small-diameter trees, lianas, bushes, etc. To convert these standing stock volumes into total aboveground carbon stock, two methods have been used:

1) Assuming MoFor data on aboveground C stock for secondary forests (here assumed to represent canopy cover levels ranging from 10–60%) of 200tC/ha, the average factor for converting standing stock commercial timber in secondary forests into aboveground carbons stock is 3.6. This results in a total aboveground carbon stock of 93tC/ha;

2) Using IPCC (2006) conversion factors for different standing stock volumes results in a total aboveground carbon stock of 77tC/ha at 10% canopy cover in Indonesia (range depending on crown diameter: 63–96tC/ha). Source: IPCC (2006) Guidelines Table 4.5; divided by 2 to convert AGB to total C stock.

268 BAPPENAS/UN-REDD (2010): 41 establish a technical carbon threshold for land suitable for low-carbon development (<35tC/ha), as well as land meriting conservation purely for its carbon storage potential (potential to store >100tC/ha)

269 Calculated based on forecast emissions reduction of 190.95MtCO2e from each of the palm and pulp plantations (Source: DNPI (2010a): 4) = 381.9MtCO2e, equivalent to 104.1Mt carbon, divided by 192 tonnes carbon/hectare in forest. Source: DNPI (2010a): 22

270 DNPI (2010a): 19 Exhibit 9

271 DNPI (2010a): 21

272 DNPI (2010a): 21

273 Based on $28–29/tonne CO2e and 192t carbon (705tCO2e) per hectare. Source: DNPI (2010a): 21 Exhibit 12, 22

274 MoFor (2009c): Chap. IV p3 gives area of planted HTI as 4.31 million hectares

275 MoFor/FAO (2009): 17

276 75% of fully granted HTI concessions (SK Definitif) were pulpwood,according to MoFor (2007b) (corresponding figure not available in following year's report)

277 MoFor/FORDA (2009): 16

278 Based on the projection that the production of the pulp and paper industry will increase to 55 million tonnes in 2025, or about 3.24 times the production in 2007. Source: DNPI/UNFCCC (2009)

18.75 is equal to 34% of 55 million. Share of pulp production from total paper production between 2000 and 2006 – the only period for which complete data are available – was 34%, with paper accounting for 51% and waste paper recovery for 15%. Leaving out waste paper recovery would increase targeted pulp production to 22 million tonnes. However, without waste paper recovery included, multiplying 2007 production by 3.24 would likely not yield 55 million tonnes, but 51 million tonnes. Including waste paper recovery, the targeted figure would be approx. 55.6 million tonnes . Figures for 2007 are not available, as the APKI has not yet released any data more recent than 2006.

279 Greenpeace estimate based on a maximum possible yield in 2008 of 60m³/ha/yr, assuming a harvest for all non-pulp HTI plantations of zero, with HTI-pulp plantations (2.5 million ha) harvested over a 7-yr rotation cycle supplying all the 22 million m³ of HTI timber harvested in 2008 (Source: MoFor (2009a)). 60m³/ha/yr is equal to 8.5m³ mean annual increment = 2tC

280 Pulpwood plantations work on a seven-year rotation. Indonesia's assumed annual C uptake of 8tC/ha/yr implies productivity of 32m³/ha/yr = 224m³ at harvest on a 7-yr rotation. The maximum current national average harvest is 60m³ (see above). Sources for 8tC/ha/yr: DNPI (2010a): 23 Ex 13, MoFor/FORDA (2009): 17. For comparison, DNPI/East Kalimantan govt. (2010): 53–54 suggests similar figures: a possible yield of 23 million m³ annually from 640,000ha planted area, indicating an MAI of 36m³, equivalent to 9tC/ha/yr or 252m³/ha at harvest on a 7-year rotation

281 MuÐoz (2009): 35 gives MAI of >70m3 for acacia and 100m3 for eucalyptus; over a 7-year rotation, this equates to 490–700m3/ha

282 Based on uptake of 33tC/ha/yr = 132m³ MAI x 7-year rotation = 924m³. Sources: Munoz (2010): 14, Greenbury (2010): 21

283 Media Indonesia (2010)

284 Planted area in 2008: 7.9 million ha (Source: Jakarta Post (2009)). Palm oil production in 2008: 19.2 million ha (Source: ISTA Mielke (2009)). This results in a yield of 2.4 t/ha. Note: generally, yields are given per hectar mature plantation, not total plantation area. These are higher by a factor of about 1.6 (ISTA Mielke (2009) gives a yield of 3.9t/ha mature plantation for Indonesia in 2008)

285 Greenpeace assumption that 100% of oil palm concession area is available for plantation. Source: Jakarta Globe (2010)

286 Jakarta Globe (2010)

287 DNPI/Central Kalimantan govt. (2010): 53

288 Both new plantations and the ones undergoing replanting is expected to make use of new and improve seeds, which will yield twice as much as today's oil palm trees. 'So it feasible for the government to set 40 million tons of palm oil production without expanding plantations.' Source: Media Indonesia (2010); Palm oil production in 2009: 19 million tonnes. Source: Deptan (2010)

289 Media Indonesia (2010)

290 Government of Norway & GoI (2010)

291 Fogarty (2010)

292 Fogarty (2010)

293 Fogarty (2010)

294 Fogarty (2010)

295 Protection (Hutan Konservasi) and Protected Forests (Hutan Lindung)

296 MoFor (2009a); MoFor (2010d)

297 Greenpeace analysis based on MoFor (2010b,c), MoFor (2009e) and Wahyunto et al (2003, 2004, 2006)

298 Government of Norway & GoI (2009)

299 E.g. Deputy Agriculture Minister Bayu Krisnamurti: 'I don't know how such policy could be introduced.' Source: Ekawati and Reuters (2010). Further, industry is seeking to promote plantation establishment on peatland as a means of fire mitigation and sequestration. Source: MuÐoz (2009)

300 'Incentivize investment in existing timber plantations to improve yields to the levels achieved in the best of Sumatran plantations.' Source: DNPI/East Kalimantan govt. (2010): 27

'In terms of abatement, yield improvements would allow the use of a smaller plantation area to achieve the same CPO production target.' Source: DNPI/East Kalimantan govt. (2010): 37

'Downstream manufacturing investment cannot run ahead of investment in sustainable and certified sources of timber, whether from new plantations on degraded land or as a result of better productivity from existing plantations.' Source: DNPI/East Kalimantan govt. (2010): 55

301 'East Kalimantan has large areas of land that have been heavily degraded through previous deforestation, forest degradation, and the massive fires of the 1980s and 1990s. As many as 1.4 million ha are categorized as very critical (sangat kritis) and critical (kritis), with remaining tree cover of less than 10 percent and less than 30 percent respectively. Large areas of very critical and critical land are covered with Imperata cylindrical (alang-alang) and other weed species or bushes as their main vegetation with low-carbon values'. Source: DNPI/East Kalimantan govt. (2010): 36

'The increased use of degraded land could alone result in an avoided deforestation of 250,000 ha.' Source: DNPI/East Kalimantan govt. (2010): 38

302 DNPI/East Kalimantan govt. (2010): 38

303 DNPI/East Kalimantan govt. (2010): 33

304 DNPI/East Kalimantan govt. (2010): 13

305 DNPI/East Kalimantan govt. (2010): 8

306 Simamora (2010c)

307 Creagh (2010)

308 Barr et al (2009)

309 Barr et al (2009)

310 Creagh (2010)

311 Barr et al (2009)

312 Barr et al (2009)

313 Barr et al (2009): 5

314 Barr et al (2009)

315 Barr et al (2009)

316 Greenpeace analysis based on MoFor (2010b,c), MoFor (2009e) and Wahyunto et al (2003, 2004, 2006)

317 Land for low-carbon development should have <35tC/ha; land with potential to store >100tC/ha should be protected. Source: BAPPENAS/UN-REDD (2010): 41

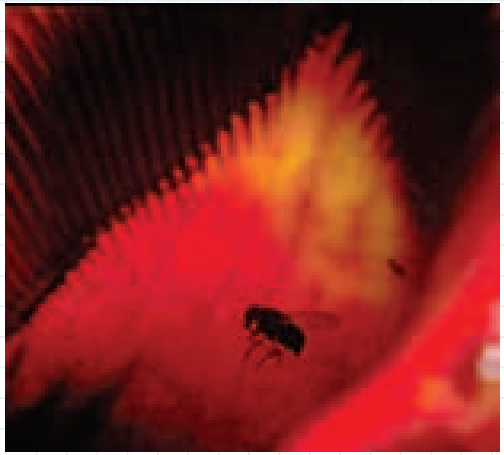


PHOTO CREDITS

Cover: Beltra/Greenpeace
iii: Van Lembang/Greenpeace
v: Beltra/Greenpeace
vi: Beltra/Greenpeace
3: Beltra/Greenpeace
4: Beltra/Greenpeace
5: AFP/Getty Images
9: Lily/Greenpeace
10: Dithajohn/Greenpeace
14: 1. Greenpeace
2. Beltra/Greenpeace
16: 1. Greenpeace
2. Novis/Greenpeace
3. Rante/Greenpeace
4. Greenpeace
5. Beltra/Greenpeace
6. Greenpeace
7. Beltra/Greenpeace
8. Greenpeace
9. Greenpeace
18: Beltra/Greenpeace
20: 1. Budhi/Greenpeace
2. Rose/Greenpeace
3. Isabelle Alexandra Ricq
4. Foodfolio/Alamy
5. Marple/Greenpeace
21: Bloomberg via Getty Images
22: Beltra/Greenpeace
23: 1. Rose/Greenpeace
2. Hilton/Greenpeace
25: 1. Frankfurt Zoological Society
2. Rose/Greenpeace
3. Beltra/Greenpeace
28: Sjolander/Greenpeace
29: Greenpeace
30: 1. Greenpeace
2. Solness/Greenpeace
3. Beltra/Greenpeace
33: 1. Beltra/Greenpeace
2. Davison/Greenpeace
3. Sjolander/Greenpeace
4. Rante/Greenpeace
35: Budhi/Greenpeace
36: Rante/Greenpeace
37: 1.Davison/Greenpeace
2 Simanjuntak/Greenpeace
3.Davison/Greenpeace
38: 1. Behring/Greenpeace
2. Beltra/Greenpeace
3. Beltra/Greenpeace
4. Greenpeace
5. Beltra/Greenpeace
6. 123RF
44: Rose/Greenpeace
46: 1. Greenpeace
2. Beltra/Greenpeace
47: IISD/Earth Negotiations Bulletin
48: Rose/Greenpeace
50: Budhi/Greenpeace
52: Beltra/Greenpeace
54: Pekny/Greenpeace
57: 1. Pekny/Greenpeace
2. Casano/Greenpeace
3. RF
59: 1. Pekny/Greenpeace
2. Beltra/Greenpeace
3. Behring/Greenpeace
61: 1. Mizukoshi/Greenpeace
2. Behring/Greenpeace
3. Pekny/Greenpeace
63: 1. Richards/Conservation International
2. Behring/Greenpeace
3. Mizukoshi/Greenpeace
Sampul belakang dalam:
Beltra/Greenpeace

REFERENCES

Ministries and government departments referred to are Indonesian unless otherwise specified.

ABIOVE (2009) 'Soy moratorium, new challenges mark the renewal of the business sector–N GO partnership' 28 July 2009 http://www.abiove.com.br/english/informa_us.html

AFP (2009) 'Indonesia to double palm oil production by 2020' www.khaleejtimes.com/biz/inside.asp?xfile=/data/commodities/2009/may/commodities_may47.xml&section=commodities 27 May 2009

ANATARA News (2010) 'Mulai 1 April, Tanah Terlantar Akan Ditertibkan' 22 March 2010 www.antaranews.com/berita/1269240006/mulai-1-april-tanah-terlantar-akan-ditertibkan

APKI (Asosiasi Pulp dan Kertas Indonesia – Indonesian Pulp and Paper Association) (2004) 'Indonesan pulp and paper industry's perspective on FSC's policy on certification of plantations' 2 September 2004

APP (Asia Pulp and Paper) (2007) 'Growing a sustainable future, Environmental and Social Sustainability Report for Indonesia' www.asiapulppaper.com/portal/APP_Portal.nsf/Web-MenuPage/5BFB083D5FD9781C472575EF0035E314/$FILE/090724 APP-2007-New Rev1Final.pdf

APP (2009) 'Asia Pulp & Paper Statement on Bukit Tigapuluh' 19 May 2009 www.asiapulppaper.com/portal/APP_Portal.nsf/Web-MenuPageA46B55144C9EC3FE472575BC0004EE20/$FILE/090519%20APP%20Statement%20-%20Bukit%20Tigapuluh.pdf

APP 'Myths and Realities' website: http://appmnr.app.co.id/env_app-mr_tst/index.php?option=com_content&view=section&layout=blog&id=1&Itemid=67&limitstart=3

APP/ERM (2008) 'APP Indonesia Releases Results of Carbon Footprint Assessment' Press Release 11 August 2008

BAPPENAS (Badan Perencanaan Pembangunan Nasional – Ministry for National Development Planning) (2010) 'Indonesia climate change sectoral roadmap – Synthesis report' March 2010

BAPPENAS/UN-REDD (2010) 'National strategy for the reduction of emissions from deforestation and forest degradation: (Nastra REDD+)' Draft, October 2010

Barr, C, A Dermawan, H Purnomo and H Komarudin (2009) 'Readiness for REDD: Financial governance and lessons from Indonesia's Reforestation Fund (RF)' Infobrief, CIFOR November 2009

Barr, C (2008) 'Indonesia's pulp and paper industry: Overview of risks and opportunities', presentation at 'Roundtable on Indonesia's Pulp and Paper Industry' Presentation, New York, 10 April 2008

Barreto P, R Pereira and E Arima (2008) 'A pecuária e o desmatamento na Amazônia na era das mudanças climáticas' Imazon, Instituto do Homem e Meio Ambiente da Amazônia www.imazon.org.br/novo2008/arquivosdb/120849pecuaria_mudancas_climaticas.pdf

Belford, A (2010) 'Indonesia Agrees to Curb Commercial Deforestation' New York Times 27 May 2010 www.nytimes.com/2010/05/28/world/asia/28indo.htm

Betts, R, M Sanderson, D Hemming, M New, J Lowe and C Jones (2009) '4°C global warming: regional patterns and timing' Met Office Hadley Centre, Presentation to International Climate Conference, Oxford University 25 September 2009 www.eci.ox.ac.uk/4degrees/programme.php

Boer, R (2010) 'Mitigation scenarios for peatland in Indonesia' Bogor Agriculture University 3 March 2010

Borhan, MH (2010) 'Indonesia to develop 3 SEZs for agri-business' International Enterprise Singapore 11 February 2010 http://www.iesingapore.gov.sg/wps/portal/!ut/p/c5/04_SB8K8xLLM9MSSzPy8xBz9CP0os3gDf4PQMFMD_1A3g2BDI0MPPwtDAwgAykeaxTu703qYmPsA-RaWbgae3o6Oxv6uxkb-robE6DawMPL1DfQL9HA0CPVw8XM2NTaAyePX7eeRn5uqH6kfZY6hyjIMrioyJzU9MblSvyA3NKI831ERAASGduk!/dl3/d3/L2dJQSEvUUt3QS9ZQnZ3LzZfMDgyTU1RTIFIQTBVSEROQzJGMTAwMDAwMDA!/?WCM_GLOBAL_CONTEXT=/wps/wcm/connect/ie/My+Portal/Market+Guide/Market+Information/South+East+Asia/Indonesia/News/Indonesia+to+develop+3+SEZs+for+agri-business

BPPT (Badan Pengkajian dan Penerapan Teknologi) (2010) 'Indonesia's Technology Needs Assessment on Climate Change Mitigation' Presentation by Prof. Dr. Jana T. Anggadiredja, Deputy Chairman of BPPT for Natural Resource Development Technology, as TNA Coordinator, 19–23 January 2010

Brazilian Ministry of Science and Technology (2009) 'Inventário Brasileiro das emissões e remoções antrópicas de gases de efeito estufa, Informações gerais e valores preliminares (30 novembro de 2009)' 30 November 2009 www.mct.gov.br/upd_blob/0207/207624.pdf

Brazilian Ministry of the Environment (2010) 'The Brazilian REDD Strategy' www.mma.gov.br/estruturas/168/_publicacao/168_publicacao19012010035219.pdf

BSI-CUC (2010) 'Verifying Greenpeace Claims Case: PT SMART Tbk' 10 August 2010 www.smart-tbk.com/pdfs/Announcements/IVEX%20Report%20100810.pdf

CAIT (Climate Analysis Indicators Tool) version 7.0. (2010) World Resources Institute http://cait.wri.org

Chomitz, KM and TS Thomas (2001) 'Geographic patterns of land use and land intensity' http://en.scientificcommons.org/523737

CIA World Factbook: https://www.cia.gov/library/publications/the-world-factbook/

Climate Investment Funds (2010) 'Clean Technology Fund Investment Plan for Indonesia' 12 April 2010

Cotter, J, C Thies and R Czebiniak (2010) 'Biodiversity: vital for climate change adaptation and mitigation – forests as a case study' in Secretariat of the Convention on Biological Diversity (SCBD) (2010) Biodiversity and Climate Change: Achieving the 2020 Targets. Abstracts of posters presented at the 14th Meeting of the Subsidiary Body on Scientific, Technical and Technological Advice of the Convention on Biological Diversity, 10–21 May 2010, Nairobi, Kenya. Technical Series 51: 116–117.

Creagh S (2010) 'Graft could jeopardise Indonesia's climate deals' Reuters 17 September 2010

Deptan (2010) 'Production of Crude Palm Oil 1967–2009 – Palm Oil, Area and Production by Category of Producer', Direktorat Jenderal Perkebunan, Ministry of Agriculture, Department of Plantations http://ditjenbun.deptan.go.id/cigraph/index.php/viewstat/komoditiutama/8-Kelapa%20Sawit

Dinerstein et al (2006) Setting Priorities for the Conservation and Recovery of Wild Tigers: 2005–2015, A User's Guide. WWF, Wildlife Conservation Socity (WCS), Smithsonian, and NFWF-STF, Washington, D.C. – New York.

DNPI (Dewan Nasional Perubahan Iklim – National Council on Climate Change) (2009a) 'Fact sheet – Indonesia greenhouse gas emission cost curve' 27 August 2009

DNPI (2009b) 'Indonesia GHG abatement cost curve' media presentation 27 August 2009

DNPI (2010a) 'Indonesia's greenhouse gas abatement cost curve' August 2010

DNPI (2010b) 'Fact Sheet – Carbon Emissions and Development' 2 September 2010

DNPI (2010c) 'Setting a course for Indonesia's green growth' Press conference presentation 6 September 2010

DNPI/UNFCCC (2009) 'National economic, environment and development study (NEEDS) for climate change: Indonesia country study' final report December 2009

DNPI/Central Kalimantan govt. (2010) 'Creating low carbon prosperity in Central Kalimantan' photos.mongabay.com/10/central_kalimantan_report_small.pdf

DNPI/East Kalimantan govt. (2010) 'East Kalimantan Environmentally Sustainable Development Strategy' September 2010 photos.mongabay.com/10/east_kalimantan_report_english_small.pdf

DNPI/Jambi govt. (2010) 'Creating low carbon prosperity in Jambi' photos.mongabay.com/10/jambi_report_090810_english.pdf

Down to Earth (2010) 'Indonesia packages tree plantation expansion as emissions reduction strategy' March 2010 http://dte.gn.apc.org/84ain.htm

Edwards, D, TH Larsen, TDS Docherty, FA Ansell, WW Hsu, MA Derhé, KC Hamer and DS Wilcove (2010) 'Degraded lands worth protecting: the biological importance of Southeast Asia's repeatedly logged forests' Proc. R. Soc. B published online 4 August 2010. doi: 10.1098/rspb.2010.1062.

Ekawati, A and M Al Azhari (2010) 'Indonesian govt gives green thumbs up to plant Papua "Food Estate"' Jakarta Globe 17 January 2010 http://www.thejakartaglobe.com/business/indonesian-govt-gives-green-thumb-up-to-plant-papua-food-estate/353238

Ekawati, A and Reuters (2010) 'Shock and Uncertainty Over Forest-Clearing Moratorium' Jakarta Globe 31 May 2010

Elliott, L and M Tran (2010) 'UN report warns of threat to human progress from climate change' The Guardian 4 November 2010

EPA (US Environmental Protection Agency) (2010) Inventory of US Greenhouse Emissions and Sinks 1990–2008, U.S. EPA # 430-R-10-006, April 2010, http://epa.gov/climatechange/emissions/downloads10/US-GHG-Inventory-2010_ExecutiveSummary.pdf

ERM (2008) 'Asia Pulp & Paper – Indonesia Executive Summary of APP's Carbon Footprint Assessment' 8 August 2008 www.erm.com

FAO (2006) 'Global Forest Resources Assessment 2005' Working paper 106/E Forest Resources Assessment Programme, Rome 2006

FAOSTAT (2010) FAO Statistics Division 2010 http://faostat.fao.org/

Fogarty, D (2010) 'Indonesian Government Says Deforestation Ban To Begin Small, Grow Later' Reuters 20 August 2010

Franken, J (2010) 'Merauke food estate: weighing the agricultural balance' Jakarta Post 4 October 2010 http://www.thejakartapost.com/news/2010/10/04/merauke-food-estate-weighing-agricultural-balance.html

GAR website 'Investor relations': www.goldenagri.com.sg/ir_overview.php

Germer J and J Sauerborn (2007) 'Estimation of the impact of oil palm plantation establishment on greenhouse gas balance' Environ Dev Sustain DOI 10.1007/s10668-006-9080-1

Ghani, MRA (2007) 'Massive biofuel program to go ahead despite international concerns' Jakarta Post 6 February 2007 – article available at Malaysian Palm Oil Board website: http://palmnews.mpob.gov.my/palmnewsdetails/palmnewsdetail.php?idnews=3854

GoI (Government of Indonesia) (2009) 'National medium-term priority framework (NMTPF) 2010 – 2014 for Indonesia's external assistance in the agriculture sector (incl. forestry & fisheries)' version 31 July 2009 ftp://ftp.fao.org/TC/TCA/NMTPF/Country%2520NMTPF/Indonesia/Status/NMTPF.pdf+nmtpf+fao+Indonesia&hl=en&gl=uk&pid=bl&srcid=ADGEESShGn1bgORS-1PuXbq_zBxU0nTI0_cVACRF1TBCXKe7qHEdqhmGaXbHgSnfgH-0N0Y3L-cduXyfshS6vhANETu7Uq5L-fKNiuj52dCYhESFMcFbu0bZnVJKwTG574EcZ9ZRa0rKc&sig=AHIEtbQPfsijXn81T32_qMgPl859BUYC_g

Government of Brazil (2004) 'Plano de ação para a prevenção e controle do desmatamento na Amazônia Legal' www.planalto.gov.br/casacivil/desmat.pdf

Government of Brazil (2008) 'Executive summary: national plan on climate change: Brazil' www.mma.gov.br/estruturas/imprensa/arquivos/96_11122008040728.pdf

Government of China (2007) Press conference on climate change

program. Government of China's official web portal http://english.gov.cn/2007-06/04/content_636052.htm

Government of Norway & GoI (2010) 'Letter of Intent between the Government of the Kingdom of Norway and the Government of the Republic of Indonesia on "Cooperation on reducing greenhouse gas emissions from deforestation and forest degradation"' 26 May 2010 www.regjeringen.no/en/dep/smk/press-center/Press-releases/2010/Norway-and-Indonesia-in-partnership-to-reduce-emissions-from-deforestation.html?id=605709

Greenbury, A (2010) 'Sustainability and beyond – challenges for the next decade' Asia Pulp & Paper Presentation to RISI, 12 March 2010

Greenpeace (2009) 'Global cattle giants unite to ban Amazon destruction' 5 October 2009 www.greenpeace.org/international/en/news/features/global-cattle-giants-unite051009/

Grieg-Gran, M (2006) 'The cost of avoiding deforestation. Report prepared for the Stern Review of the Economics of Climate Change' International Institute for Environment and Development, October 2006

Hansen, M, R DeFries, JR Townshend, M Carroll, C Dimiceli and R Sohlberg (2006), 'Vegetation Continuous Fields MOD44B, 2001 Percent Tree Cover', Collection 4, University of Maryland, College Park, Maryland, 2001 www.glcf.umd.edu/data/vcf/

Harahap, R (2010) 'Pulp firms urged to double efforts', Jakarta Post, 22 July 2010, citing Industry Minister M.S. Hidayat http://www.thejakartapost.com/news/2010/07/22/pulp-firms-urged-double-efforts.html

Hasan, Z (2010) 'Guest Speaker: moratorium on natural forests, peat not prompted by Oslo grant: Forestry Minister' Jakarta Post 6 July 2010 www.thejakartapost.com/news/2010/06/07/guest-speaker-moratorium-natural-forests-peat-not-prompted-oslo-grant-forestry-minis

Hooijer, A, M Silvius, H Wösten and S Page (2006) PEAT-CO2, 'Assessment of CO2 emissions from drained peatlands in SE Asia' Delft Hydraulics report Q3943 7 December 2006 www.wetlands.org/ckpp/publication.aspx?ID=f84f160f-d851-45c6-acc4-d67e78b39699

Hooijer, A, S Page, JG Canadell, M Silvius, J Kwadijk, H Wosten and J Jauhiainen (2009) 'Current and future CO2 emissions from drained peatlands in Southeast Asia' Biogeosciences Discuss, 6, 7207–7230, 20 July 2009 www.biogeosciences-discuss.net/6/7207/2009/

IBGE (Instituto Brasileiro de Geografia e Estatística – Brazilian Institute of Geography and Statistics) (2006) 'Produção agrícola municipal' www.sidra.ibge.gov.br/bda/agric/default.asp?t=2&z=t&o=10&u1=1&u2=1&u3=1&u4=1&u5=1&u6=1

IFCA (Indonesia Forest Carbon Alliance) (2007) 'Strategies to reduce carbon emissions from the pulp and paper and plantation sectors in Indonesia – Initial draft'

IIED (International Institute for Environment and Development) (2009) 'Natural resilience: healthy ecosystems as climate shock insurance' briefing December 2009 www.iied.org/pubs/display.php?o=17078IIED

Indonesia Today (2010) 'Wilmar secures 200,000 hectares of land in Merauke Food Estate for sugar plant' 2 September 2010 http://theindonesiatoday.com/news-headline/3873-wilmar-secures-200000-hectares-of-land-in-merauke-food-estate-for-sugar-plant.html

INPE (2010) 'Are we ready for REDD? Multidimensional policies for reducing Amazon deforestation: 2001-2010'. Global Land Project: Open Science Meeting, Tempe, Arizona, October 2010 www.dpi.inpe.br/gilberto/present/gcamara_glp_osm_2010.ppt

Investor Daily (2009) 'Investasi US$ 400 Juta, Sinar Mas Ekspansi ke Batubara Harian', Investor Daily, 22 May 2009 www.tekmira.esdm.go.id/currentissues/?p=2027

IPCC (Intergovernmental Panel on Climate Change) (2006) '2006 IPCC Guidelines for National Greenhouse Gas Inventories' Chapter 4: Forest Land Conversion Biomass, table 4.5

IPCC (2007) 'Fourth Assessment Report. Climate Change 2007: Synthesis Report. Summary for Policymakers' www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf

IPCC WGI (Intergovernmental Panel on Climate Change Working Group I) (2007) 'Climate Change 2007: The physical science basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change' Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA http://ipcc-wg1.ucar.edu/wg1/wg1-report.html

IPCC WGIII (Intergovernmental Panel on Climate Change Working Group III) (2007): 'Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change' www.ipcc.ch/publications_and_data/ar4/wg3/en/spmsspm-b.html

ISTA Mielke (2009) Oil World, December 2009, ISTA Mielke GmbH

Jakarta Globe (2010) 'Palm oil industry seeks clarity from officials over plantation moratorium' 13 June 2010

Jakarta Post (2009) 'Indonesia allocates 18 million hectares land for palm oil' 12 February 2009

Jakarta Post (2010a) 'Govt eyes Papua as pulp and paper production base' 21 June 2010 www.thejakartapost.com/news/2010/07/21/govt-eyes-papua-pulp-and-paper-production-base.html;

Jakarta Post (2010b) 'Production forests will reach 10m hectares by 2014: Govt' 8 November 2010

JBS (2009) 'JBS and sustainability, notice to the market' 24 September 2009 http://jbs.riweb.com.br/JBS/Show.aspx?id_materia=ZXFGu6is/FgmeJNL34moQA==&id_canal=2dKvBqcLTgMRV0letZQE1w==

Jurnal Nasional, 'Pakar IPB: Tudingan Greenpeace Tak Berdasar' 2 November 2010

Klugman et al (2010) 'Human Development Report 2010: 20th anniversary edition. The real wealth of nations: pathways to human development' UNDP November 2010 http://hdr.undp.org/en/mediacentre/

Laurance, WF, LP Koh, R Butler, NS Sodhi, CJA Bradshaw, JD Neidel and H Consunji (2009) 'Inadequacies of the Roundtable on Sustainable Palm Oil for Nature Conservation' 25 May 2009

Legowo, EH (2007) 'Blue print of biofuel development' presentation on behalf of the Ministry of Energy and Mineral Resources, Republic of Indonesia, at the Forum on palm oil biodiesel and sustainability, Jakarta, 15 May 2007

Locatelli, B, M Kanninen, M Brockhaus, CJP Colfer, D Murdiyarso and H Santoso (2008) 'Facing an uncertain future: how forests and people can adapt to climate change' Forest Perspectives no 5. CIFOR, Bogor, Indonesia. A PowerPoint summary is available at www.cbd.int/forest/doc/wscb-fbdcc-01/Sept4/cifor-adaptation-daniel-murdiyarso-bruno-locatelli-en.pdf.

Mackey, BG (2008) Green Carbon: The Role of Natural Forests in Carbon Storage

Maplecroft (2010) 'Climate Change Risk Atlas 2011' 19 October 2010 www.maplecroft.com/about/news/ccvi.html

Marfrig (2009) Institutional presentation, November 2009 www.mzweb.com.br/marfrig/web/arquivos/Marfrig_Apresentacao_Institucional_20091116_eng.pdf

Masripatin, N (2010) 'Forestry policy for addressing climate change in Indonesia' Bogor 16 February 2010 www.iges.or.jp/jp/cp/pdf/activity20100216/D1_S3_MASRIPATIN.pdf

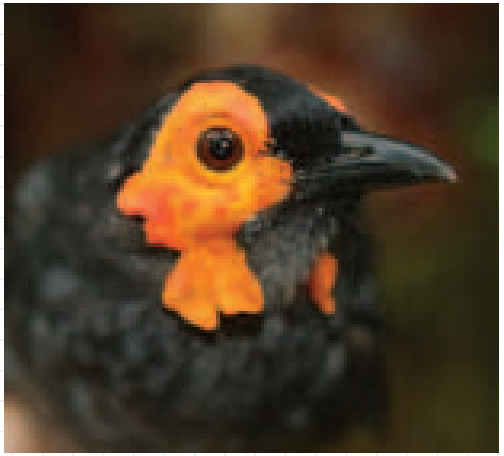
Media Indonesia (2010) 'Step Up Palm Oil Production Without Expansion' Media Indonesia 28 September 2010 www.mediaindonesia.com/webtorial/asianagri/eng/?ar_id=NzgyNg==

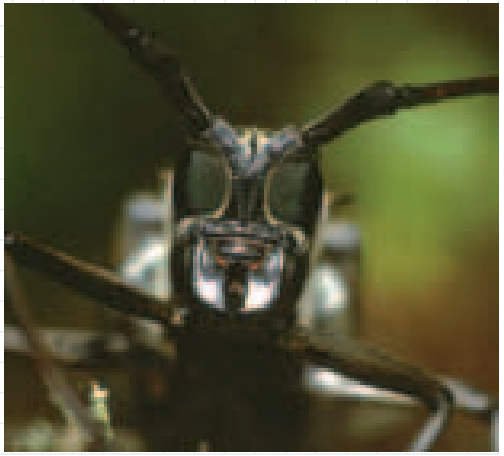
Meijaard, E, R Dennis and I Singleton (2004) 'Borneo Orangutan PHVA Habitats Units: Composite dataset developed by Meijaard & Dennis (2003) and amended by delegates of the Orangutan PHVAWorkshop', Jakarta,15–18 January 2004. Subsequently further updated by Erik Meijaard.

Ministry of Agriculture (2010) 'Production of crude palm oil 1967–2009 – palm oil, area and production by category of producer', Direktorat Jenderal Perkebunan http://ditjenbun.deptan.go.id/cigraph/index.php/viewstat/komoditiutama/8-Kelapa%20Sawit

Ministry of Environment (2009) 'Indonesia second national communication under the United Nations Framework Convention on Climate Change (UNFCCC) – Summary for policy makers'

Ministry of Environment and Forests (India) (2009) 'Results of Five Climate Modelling Studies, GHG Emissions Profile', Ministry of Environment and Forests, September 2009 http://moef.nic.in/downloads/home/GHG-report.pdf





MoFor (Ministry of Forestry) (2007a) 'A road map for the revitalization of Indonesia's forest industry'

MoFor (2007b) 'Forestry statistics of Indonesia 2006' www.dephut.go.id/index.php?q=id/node/2195

MoFor (2008) 'Forestry statistics of Indonesia 2007' www.dephut.go.id/index.php?q=id/node/5229

MoFor (2009a) Bina Produksi Kehutanan Data Release Ditjen BPK sd December 2009 wwwdephutgoid/indexphp?q=id/taxonomy/term/97

MoFor (2009b) Data Strategis 2009 November 2009 www.dephut.go.id/index.php?q=id/node/6444

MoFor (2009c) 'Forestry statistics of Indonesia 2008' http://www.dephut.go.id/index.php?q=en/node/6123

MoFor (2009d) Kebijakan pembangunan Hutan Tanaman Industri (HTI) October 2009

MoFor (2009e) Landcover Indonesia 2006, Forestry Planning Agency of the Ministry of Forestry, 2009

MoFor (2009f) 'National strategy: Reducing emissions from deforestation and forest degradation in Indonesia. Readiness phase. Draft – August 2009' Nur Masripatin et al

MoFor (2010a) 'Daftar Nama-Nama IPHHK dan Rekapitulasi Realisasi Pemenhutan Bahan Baku Tahun 2009, Nasional Kapasitas Lebih dari 6.000 m^3/tahun (31-12-2009)'

MoFor (2010b) HTI concession maps, provided by the Planning Department of the Ministry of Forestry, Indonesia (Direktorat Jenderal Planologi Kehutanan Kementerian Kehutanan Republik Indonesia) http://appgis.dephut.go.id/appgis/kml.aspx downloaded 4 March 2010

MoFor (2010c) 'Landuse maps (provincial planning maps/Forest Land Use by Consensus maps (TGHK)', General Direktorat of Planning, Ministry of Forestry; http://appgis.dephut.go.id/appgis/kml.aspx downloaded March 2010. Note: For Riau and Central Kalimantan, MoFor still uses the outdated TGHK maps. For the purpose of this report, for Riau, the draft provincial planning map as of 2007 has been used.

MoFor (2010d) 'Perkembangan Pemanfaatan dan Penggunaan Hutan Produksi' Quarter 2 July 2010

MoFor (2010e) 'Program Kehutanan Untuk Mitigasi Perubahan Iklim dan Monitoring, Pelaporan serta Verifikasinya' January 2010 www.dephut.go.id/index.php?q=id/node/6036; http://dte.gn.apc.org/84ain.htm

MoFor/FAO (Ministry of Forestry/Food and Agriculture Organisation) (2009) 'Indonesia forestry outlook study: Asia-Pacific forestry sector outlook study II' Working Paper No. APFSOS II/WP/2009/13, Ministry of Forestry

MoFor/FORDA (Ministry of Forestry/Forestry Research and Development Agency) (2009) 'Addressing climate change in forestry sector' presentation by Nur Masripatin, Secretary of Forestry Research and Development Agency, Ministry of Forestry

MoFor/IFCA (Ministry of Forestry/Indonesia Forest Carbon Alliance) (2008) 'IFCA 2007 Consolidation Report: Reducing emissions from deforestation and forest degradation in Indonesia'

Mongabay.com: http://rainforests.mongabay.com/amazon/

MuÐoz, C (2009) 'Balancing Sustainability Needs: Sustainable Plantation Forestry' Sinar Mas Forestry, Jakarta, 3 December 2009

Munoz, CP (2010) 'REDD+ Pilot Project in Indonesia: Sinar Mas Forestry International climate change workshop on research priorities and policy development UI-APRU' Jakarta, 18–19 March 2010

Norwegian Pollution Control Authority (2009) 'Greenhouse Gas Emissions 1990-2007: National Inventory Report 2009 Norway' http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php

Page, S, F Siegert, JO Rieley, HDV Boehm, A Java, S Limin (2002) 'The amount of carbon released from peat and forest fires in Indonesia during 1997' Nature 420 (6911): 61–65

Petromindo-APBI (2009) Kalimantan/Sumatra Coal Map, Petromindo & Asosiasi Pertambangan Batubara Indonesia, June 2009

PT SMART Tbk (2010) 'Independent verification reveals Greenpeace claims are exaggerated or wrong' Jakarta, 29 July 2010 http://www.goldenagri.com.sg/newsroom_verification.php

Redmond, I et al (2010) 'The Fine Print on Forest Protection' 18 November 2010 www.thejakartaglobe.com/opinion/the-fine-print-on-forest-protection/407244

Robledo, K, M Kanninen and L Pedroni (eds) (2005) 'Tropical forests and adaptation to climate change: In search of synergies' Center for International Forestry Research (CIFOR) 2005

Roosita, H and BS Sulistyawan (2010) 'Ecosystem Based Spatial Planning As a Guide for the Precautionary Approach to Conservation of HCV Areas in Sumatra'. Hermien Roosita and Barano Siswa Sulistyawan, Ministry for the Environment of Republic Indonesia and WWF Indonesia www.hcvnetwork.org/resources/training-courses-workshops/2.4%20Ecosystem%20Based%20Spatial%20Planning%20ppt-Hermien%20Roosita-Barano.pdf

RSPO (Roundtable on Sustainable Palm Oil) (2010) Letters to PT SMART, GAR and PT Ivo Mas Tunngal, 22 September 2010, available from http://www.greenpeace.org.uk/blog/forests/sinar-mas-gets-ultimatum-rspo-over-palm-oil-and-deforestation-20100923

Santosa, UA (2009) 'Pemerintah Kembangkan Hutan Rakyat Kemitraan' Kontan 13 October 2009 http://nasional.kontan.co.id/v2/read/nasional/23065/Pemerintah-Kembangkan-Hutan-Rakyat-Kemitraan

Schonhardt, S (2010) 'Businesses warm to Indonesia's moratorium on forest clearing' VOA News.com, 22 October 2010 http://www.voanews.com/english/news/asia/Businesses-Warm-to-Indonesias-Moratorium-on-Forest-Clearing-105543088.html

Seppälä, R, A Buck and P Katila (eds) (2009) 'Adaptation of Forests and People to Climate Change: a Global Assessment Report' IUFRO World Series Volume 22

Simamora, A (2010a) 'Forest policy undercuts SBY's emissions pledge' Jakarta Post 13 January 2010 http://www.thejakartapost.com/news/2010/01/13/forest-policy-undercuts-sby%E2%80%99s-emission-pledge.html

Simamora, A (2010b) 'Norway won't fund RI tree planting program: Govt' Jakarta Post 31 May 2010 www.thejakartapost.com/news/2010/05/31/norway-won039t-fund-ri-tree-planting-program-govt.html

Simamora, A (2010c) 'Ministry wants money for planting trees' Jakarta Post 16 August 2010 www.thejakartapost.com/news/2010/08/16/ministry-wants-money-planting-trees.html

Siswanto, W (2010) 'REDD-plus: toward 2020 Emission Cut' MoFor April 2010 www.apru.org/awi/workshops/climate_change2010/slides/18%20Mar/1st%20Breakout%20Session/REDD-WandoyoSiswanto(MOF).pdf

SMART (2010) 'Independent verification report to show SMART as a responsible company' Jakarta, 9 August 2010

Thompson, I, B Mackey, S McNulty and A Mosseler (2009) 'Forest Resilience, Biodiversity, and Climate Change: synthesis of the biodiversity/resilience/stability relationship in forest ecosystems' Secretariat of the Convention on Biological Diversity, Montreal, Technical series no. 43

UK Department of Energy and Climate Change (2009) '2009 provisional UK figures – data tables' http://www.decc.gov.uk/en/content/cms/statistics/climate_change/gg_emissions/uk_emissions/2009_prov/2009_prov.aspx

UNFCCC (United Nations Framework Convention on Climate Change) website: www.unfccc.int

UNFCCC (2007) 'Bali Action Plan: decision 1/CP.13' unfccc.int/files/meetings/cop_13/application/pdf/cp_bali_action.pdf

UNFCCC (2009) 'Summary of GHG Emissions for Russian Federation', GHG emissions (with Land Use Land Use Change and Forestry, LULUCF) http://unfccc.int/files/ghg_emissions_data/application/pdf/rus_ghg_profile.pdf

UNFCCC (2010) 'National economic, environment and development study for climate change: initial summary report' revised 16 March 2010

USDA (2004) 'The Amazon: Brazil's final soybean frontier', Production estimates and crop assessment division, Foreign Agricultural Service, 13 January 2004 www.fas.usda.gov/pecad/highlights/2004/01/amazon/amazon_soybeans.htm

Verchot, LV, E Petkova, K Obidzinski, S Atmadja, EL Yuliani, A Dermawan, D Murdiyarso and S Amira (2010) 'Reducing forestry emissions in Indonesia' Center for International Forestry Research (CIFOR) http://www.cifor.cgiar.org/Knowledge/Publications/DocumentDownloader?a=d&p=%5Cpublications%5Cpdf_files%5CBooks%5CBVerchot0101.pdf

Wahyunto, S Ritung and H Subagjo (2003) 'Peta Luas Sebaran Lahan Gambut dan Kandungan Karbon di Pulau Sumatera (Maps of Area of Peatland Distribution and Carbon Content in Sumatra), 1990–2002', Wetlands International – Indonesia Programme and Wildlife Habitat Canada (WHC)

Wahyunto, S Ritung, Suparto and H Subagjo (2004) 'Maps of area of peatland distribution and carbon content in Kalimantan, 2000 – 2002' Wetlands International – Indonesia Programme and Wildlife Habitat Canada (WHC)

Wahyunto, B Heryanto, H Bekti and F Widiastuti (2006) 'Maps of peatland distribution, area and carbon content in Papua, 2000–2001' Wetlands International – Indonesia Programme and Wildlife Habitat Canada (WHC)

Wardoyo, W and RA Sugardiman (2009) 'Overview of the Ministry of Forestry's Remote Sensing Capacity', Ministry of Forestry, Jakarta

Winanti, WS (2010) 'Indonesia's Technology Nees Assessents (TNAs) for Climate Change Mitigation' Technology Transfer Working Group, DNPI 5 March 2010 http://tech-action.org/WsParisFeb2010/IndonesiaTNA.pdf.

World Bank Group (2010a) 'Clean technology fund investment plan for Indonesia' April 12 2010

World Bank Group (2010b) 'Development and Climate Change: A Strategic Framework for the World Bank Group Interim Progress Report' June 2010

WWF/SaveSumatra.org website: www.savesumatra.org/index.php/newspublications/map/0/Species%20Distribution%20Map downloaded May 2010

Yudhoyono, Susilo Bambang (2009), Indonesian President's speech on climate change at 2009 G-20 meeting http://redd-indonesia.org/publikasi/detail/read/indonesia-presidents-speech-on-climate-change-at-2009-g-20-meeting-1/

Dr. H. Susilo Bambang Yudhoyono
President, Republic of Indonesia
Gedung Bina Graha Jl. Veteran 16
Jakarta Pusat

Mr Jens Stoltenberg
Prime Minister of Norway
P.B. 8001 Dep
0030 Oslo

18 November 2010

Your Excellencies,

As scientists who study tropical forest ecosystems, we would like to commend the Indonesian government for its commitment to tackling deforestation as well as the Norwegian government for the support it is providing to help Indonesia achieve this.

We would like to emphasize how important it is that both governments ensure the agreement currently under discussion not only ensures a reduction in greenhouse gas emissions, but also supports the conservation of Indonesia's rich and diverse forest ecosystems, which provide livelihoods for millions of people and sustain biodiversity. [...]

A moratorium on the granting of new concession licenses for plantations on natural forest and peatland areas for two years provides a strong starting point to help with such protection, but only if the right safeguards are established from the beginning. [...]

Government officials have been reported to state that plantation expansion will still be possible because "degraded land and forest" could still be licensed for agricultural use. Indeed, last month the Indonesian forestry minister told the Jakarta Post that "idle forest areas other than primary forests and peatlands" would be available for cultivation. We note with concern that there is still no official Government definition of what constitutes 'degraded'. [...]

This is deeply concerning. In our scientific view, habitats being considered 'degraded forests', including disturbed, logged, secondary, and other natural forest types, can be tremendously important for the protection of biodiversity and forest dwelling peoples, as well as for combating global climate change. [...]

With this perspective in mind, we call on the Indonesian and Norwegian governments to recognize and reflect in their forest protection agreements that natural forests, even when not in their primary state, may have high conservation value and are still important for the long-term protection of Indonesia's biodiversity and its forest dependent peoples, as well as for combating global climate change. Indeed, as world attention turns to Cancun, Mexico for the forthcoming UN climate talks, Indonesia is well placed to set a good example for similar schemes all round the tropical forest belt, on which the future of our global climate stability depends.

Yours sincerely,

Ian Redmond OBE,
GRASP Envoy, UN Great Apes Survival Partnership,

Co-signatories:

Prof Tor A. Benjaminsen, Norwegian University of Life Sciences, Norway
Dr Nicholas Berry, Senior Ecosystem Analyst, Ecometrica, Edinburgh, UK
Prof Corey J. A. Bradshaw, Director of Ecological Modelling, The Environment Institute and school of Earth & Environmental Sciences, University of Adelaide, Adelaide, and South Australian Research & Development Institute, Australia
Prof Robin L. Chazdon, Ecology and Evolutionary Biology, University of Connecticut, USA
Dr Susan M. Cheyne, Orang-utan Tropical Peatland Project (OuTrop) Director of Gibbon and Felid Research, Wildlife Conservation Research Unit (WildCRU), Department of Zoology, University of Oxford; Associate Lecturer, Oxford Brookes University; Scientific Director Busang River Initiative for Nature Conservation and Communities (BRINCC), Indonesia.
Dr David Edwards, Princeton University, USA, and University of Leeds, UK
Dr Simon Husson, Director, The Orangutan Tropical Peatland Project, Indonesia
Dr Simon Lewis, School of Geography, Earth and Biosphere Institute, University of Leeds. UK
Dr William F. Laurance, Distinguished Research Professor & Australian Laureate, Prince Bernhard Chair for International Nature Conservation, James Cook University, Australia
Prof Jack Rieley, Special Professor of Geography, University of Nottingham, UK; Co-Director Kalimantan Tropical Peat Swamp Forest Programme, University of Palangka Raya, Indonesia; Chairman Scientific Advisory Board, International Peat Society
Dr Douglas Sheil, Director, Institute of Tropical Forest Conservation, Uganda
Dr Ian Singleton, Director of Conservation, PanEco Foundation, Indonesia
Prof Nigel Stork, President-Elect Association for Tropical Biology and Conservation; Head of Department of Resource Management and Geography, University of Melbourne, Australia
Dr Jatna Supriatna, Conservation International, Indonesia
Prof David S. Wilcove, Ecology, Evolutionary Biology and Public Affairs, Princeton University, USA

Members of the UNEP/UNESCO GRASP Scientific Commission:

Dr Serge Wich, Chair, GRASP Scientific Commission; Director of Research, Sumatran Orangutan Conservation Programme (PanEco-YEL) and researcher, University of Zurich, Switzerland
Dr Marc Ancrenaz, Scientific Director, Hutan, Sabah, Malaysia
Dr Suci Utami Atmoko, Faculty of Biology, Universitas Nasional, Jakarta, Indonesia
Dr Christophe Boesch, Director, Max Planck Institute of Evolutionary Anthropology, Germany
Dr Tatyana Humle, School of Anthropology and Conservation, University of Kent, UK
Dr Inza Koné, Biologie de la Conservation des Primates, Laboratoire de Zoologie, Université de Cocody à Abidjan, Côte d'Ivoire
Dr Mark Leighton, Ecology, Rainforest Conservation and Management, Harvard University, USA
Dr Fiona Maisels, WCS Monitoring Coordinator, Central Africa
Dr Erik Meijaard, People and Nature Consulting International, Indonesia
Dr Willliam Olupot, Director, Nature and Livelihoods, Uganda
Dr Liz Williamson, Coordinator, Section on Great Apes, IUCN SSC Primate Specialist Group