REDDI

REDUCING EMISSIONS FROM DEFORESTATION AND FOREST DEGRADATION IN INDONESIA

REDD Methodology and Strategies Summary for Policy Makers

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Bali - Indonesia

IFCA
INDONESIA FOREST CLIMATE ALLIANCE

THE MINISTRY OF FORESTRY
REPUBLIC OF INDONESIA

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OVERVIEW

I. Overview

1.1 INTRODUCTION

Increased emissions of Green Houses Gases (GHG's) since the mid-19th century have resulted in significant changes in the global climate. It is predicted that there will be increased drought and aridity, more destructive floods and storms, and rises in sea level affecting billions of coastal people, including the deltaic mega-cities of Asia.

Some 18% of GHGs are caused by deforestation, yet the international climate regime does not yet provide developing counties with the necessary financing to address it. The potential for avoided de-forestation to offer new incentives for sustainable forest management has nevertheless galvanized tropical forest countries. Many now want to see it included as an essential building block of a post-2012 framework. Indonesia is no exception and looks to gain significantly from a future regime to reduce emissions from deforestation and forest degradation (REDD). Amongst others, REDD has the potential to optimize the existing potential of Indonesia's forests and to revitalize forest industries.

There is global consensus that developing country participation in REDD is voluntary, and respects national sovereignty. With that in mind, the President of Indonesia initiated a declaration of the world's major tropical rainforest nations in September 2007. This undertakes to slow, stop and reverse forest loss, so long as Annex I countries support these voluntary efforts through capacity building, research and development and technology transfer, as well as new and additional financial resources.

Under a REDD mechanism, countries that are successful in reducing their rates of emission through improved forest protection and sustainable production methods would be eligible to receive benefits on the basis of carbon credits saved. However, there are a number of issues that still need to be resolved before a REDD mechanism is adopted by the COP. These include:

- the method to be used to define an emission reference (baseline);
- the definition of forest, deforestation and degradation to be used for REDD;
- the form of a REDD carbon market and compensation mechanisms; and
- the protocol for REDD implementation.

Indonesia therefore wishes to see COP13 in December 2008 endorse a clear programme of work to resolve outstanding methodological (and financial issues on REDD in advance of 2012. It also hopes for an early start to REDD pilots to inform this and national policy processes.

1.2 REDD Process in Indonesia

Indonesia is committed to piloting REDD, to build a national framework for long-term implementation and to inform outstanding methodological issues.

This document summarizes a set of ongoing studies, and is the first step in a longer process of analysis, policy development and site-based testing. It reflects an initial 4-month stock-take of available analysis and data, as well as the existing legal and policy framework governing the forest sector. It is not a statement of current Indonesian forestry policy, and remains subject to ongoing analysis and discussion.

The Ministry of Forestry's Research and Development Agency (FORDA) worked in consultation with national stakeholders to outline terms of reference for the Indonesia Forest Climate Alliance (IFCA). IFCA is a study group consisting of Ministry experts as well as researchers from a range of national and international institutions. A wider reference group of government officials, civil society and academia was also identified to provide inputs to the core research process.

A core group of donors provided financial and technical support, spanning the World Bank, the UK Department for International Development (DFID), the Australian Government and Deutche Gesellschaft fur Technische Zusammernarbeit (GTZ).

At a kick-off meeting in July, identified experts were invited to develop a work plan for eight separate studies on REDD methodology, financing and implementation, as well as for the wider consultation process. Further information can be viewed on http://www.dephut.go.id/INFORMASI/LITBANG/IFCA/IFCA.htm or http://redd.pbwiki.com/ along with the list of IFCA participants.

The IFCA studies were developed by leading experts and the Ministry of Forestry through a process of internal discussions within the Ministry of Forestry as well as through a series of public consultations. These include two national workshop in August and October 2007, and regional consultations in Papua and Aceh. Each of the national workshops was preceded by an IFCA writing retreat in which external and Ministry of Forestry experts worked to review findings.

The research process included an analysis of:

- available data on carbon stocks and land-use change;
- priorities for action in respect of the key drivers of deforestation and degradation;
- mechanisms for engaging with the carbon markets and for managing REDD payments; and well as opportunities within the current legal and policy framework to take action.

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Building a REDD Value Chain

II. Building a REDD Value Chain

Five key sectors were examined – forest conversion to oil palm, forest land-use change for pulp and paper plantations, natural production forest management, protected area management and forests and peatlands.

A consolidation team was established to ensure methodological consistency and data exchange across the studies. This team also worked to draw together results and identify the next steps and criteria for REDD pilots. A consolidated report is being prepared.

Indonesia has already started work to examine these and other issues of specific importance to the country. Specially, the Ministry of Forestry formed the Indonesian Forest Climate Alliance (IFCA), a group of national and international experts and other stakeholders on forest management, carbon and governance. IFCA's work is funded by the World Bank and the British, Australian and German Governments.

Table 2.1: The REDD value chain, and the issues at stake

Emissions reference (baseline)	Strategies to reduce emissions	Monitoring	REDD markets/ financing	Payment Distribution
What are historical emissions have occurred from deforestation and degradation? What future emissions will occur with business as usual (BAU)? What will be the impact of additional planned deforestation? What is a suitable benchmark, given REDD's potential and future development needs?	What are the key drivers of deforestation and degradation? What measure can be taken to tackle drivers/ mitigate emissions? What are strategies likely to cost, given opportunities foregone through not deforesting? What are the enabling conditions for strategies to work?	How can we prove that reduced deforestation and degradation have taken place? Who has the right to sell carbon?	Who can sell carbon? Who can the price of carbon be fixed? How might carbon transactions take place and how should they be regulated?	How might carbon payments be distributed to give incentives to those who have reduced deforestation? Who has the right to received payments? How can equity and fairness be guaranteed?

No one element of this 'value chain' can work by itself. Without reduced deforestation and a credible means of monitoring and verifying this, it will not generate funds. Without a system to effectively disburse payments, reduced deforestation and degradation will not occur.

Definitions of forest, deforestation and degradation

The UNFCCC has agreed some definitions, and the Marrakesh Accords (MA) prescribes the definitions for afforestation/reforestation under the Kyoto Protocol. These definitions could be applicable to REDD but may also be inadequate, and negotiation is still required in the COP.

As in UNFCCC COP decision no. 19/CP9 (A/R CDM), forest is defined structurally on the basis of crown cover percentage, minimum height and minimum area of stand:

- Forest area: 0.05 to 1 ha (Indonesia decided on 0.25 ha)
- Potential to reach a minimum height at maturity in situ of 2-5 m (Indonesia decided on 5 m).
- Tree crown cover (or equivalent stocking level): 10 to 30 % (Indonesia decided on 30%)

It is only when cover falls below the minimum crown cover that it designated as deforestation. However, if this is only a temporary change, such as for timber harvest with regeneration expected, the land remains in the forest classification.

The UNFCCC Decision 11/CP.7 defines deforestation as the direct, human-induced conversion of forested land to non-forested land.

When human-induced changes occurring in a forest do not reduce canopy cover below the defined minimum threshold degradation has occurred. However, a large number of definitions for degradation have been proposed and need to be standardized.

The IPCC has suggested that degradation may be defined as a direct, human-induced, long-term loss (persisting for X years or more) or at least Y% of forest carbon stocks [and forest values] since time T and not qualifying as deforestation. The parameters X,Y and T have not been defined.

The group of experts has since worked together with the Ministry of Forestry and other stakeholders, including two major national consultations, to unpack and examine the key elements, strategies and architecture of an REDD system and to begin laying a roadmap for REDD pilots to launch at COP 13.

The key elements of an REDD system as examined by the IFCA team includes:

- A **baseline** against which to benchmark reductions in deforestation and degradation;
- **Strategies** to reduce emissions and to ensure their permanence;
- Means of **monitoring and verifying** emissions reductions, and preventing leakage;
- **REDD markets/financing;**
- **Mechanisms to manage and distribute payments** to those bearing the costs of avoided deforestation and degradation.

Building on IFCA's work, Indonesia wishes to take a lead in piloting REDD. The next step will be to establish and trial an REDD infrastructure and emissions reduction plan. Lessons learnt from pilot projects to be commenced in 2008 will be used for refining the REDD structure and system for its implementation before it is fully adopted in 2012.

2.1 BASELINE: Setting an emissions reference level

A baseline is a projection of emissions from deforestation and degradation and allows reductions in emissions to be measured. It is a function of projected area change combined with the corresponding change in carbon stocks. Both parameters must be estimated with an acceptable level of certainty, or the least certain measure will lend its accuracy to the assessment.
The baseline can be expressed as a benchmark forest cover map showing forests locations and how they vary in relation to carbon, or for other national needs. The map may also include locations of likely planned development goals, and, with outputs from spatial modeling, where unplanned changes are likely to occur.
Baselines may consist of:

1. A linear projection of past emissions or an average of past conditions (historic).
2. A modelling projection based on unplanned (unsanctioned) activities and planned land use to meet development goals.

The most appropriate choice for a baseline depends on whether the drivers of deforestation/degradation are planned or unplanned.

Unplanned deforestation and degradation in native, natural production forests or protected areas lend themselves to an historical spatial analysis. Reallocation of forest lands for industrial tree plantations for pulp and paper; or the excision of land from the Forest Estate for non-forest uses such as oil palm estates or settlement, benefit from modeled projections.
Which approach to take has still to be decided. No policy guidance yet exists on how a baseline is developed. This will need to be negotiated among Parties. Whichever approach is agreed, a credible baseline of emissions from REDD should be established using existing scientific and technical tools and models. In the short term, it may be easier for REDD pilots to start with a historical baseline. But whichever approach is negotiated, a credible baseline of emissions from REDD could be established using existing scientific and technical tools and models.

Historic baseline projection

The time frame chosen for an historic baseline projection influences the result. Average rates of deforestation for Indonesia between2000-2005 suggest all forest will be cleared 34 years sooner than the projected average rate for the period 2004-2005. Depending on which baseline is chosen there are substantial differences in the potential pool of carbon credits. Preliminary estimates of emissions by region indicate wide variation between provinces. The two highest are Sumatra which contributes 60% of the total 257 million t CO2/year, and Kalimantan which contributes 23%. So regions with lower deforestation rates may not benefit from REDD payments to the same degree as the ‘smoking provinces’. As international credits will be awarded against a National baseline only, future Government of Indonesia policy may need to consider the best way to administer baselines whereby regions with high intact forest cover also see benefits.

Modeled baseline

Modeling identifies and interprets future affects of deforestation drivers such as population growth and economic growth. Modeling future projections allows particular country circumstances to be identified. Economic models can be used to project deforestation based on planned development, taking into account regional differences within a country. This might benefit regions with very low historical deforestation but which may accelerate land conversion in the future.
For unplanned deforestation, spatial modeling has produced good future estimates. GEOMOD is one possible tool which has been used to simulate where, and at what rate, land is converted from forest to non-forest, and to depict the specific location and quantity of the simulated non-forest category. GEOMOD identifies important drivers of deforestation like: distance to infrastructure, population centers and already cleared areas. Often a combination of drivers is needed to predict the deforestation pattern.
A quantified baseline generated by either historical projections or modeling may be moderated by country specific circumstances based on factors such as projected development activities, population growth, GDP, and other development trajectories.

Commencement baseline – an alternative?

For countries with a very low rate of deforestation and forest degradation, an alternative to a modeled baseline is one that is set up according to the carbon stock existing at the commencement of the REDD commitment. The payment will be made based on the total carbon stock that will be retained in the forest in the future. To prevent the market being flooded with too many credits, such an approach could be restricted to areas of forest which have already been allocated for conversion to other land uses. For these forests REDD provides a potential financial incentive for decisions on conversion to be reversed.
A Commencement Baseline may also be applicable to protection/conservation forests.

2.2 Emission Reduction Strategies

The legal and policy framework already exists through which Indonesia could exercise a significant reduction in future carbon emissions. Key pieces of enabling legislation include:

- Regulation PP6/2006 on forest management and utilization;
- Ministerial Decree SK. 159/Menhut-II/2004 related to the restoration of degraded ecosystem in production forest areas;
- Presidential Instruction Inpres 4/2005 on illegal logging;
- Presidential Decree Keppres 32/1990 prohibiting development on peat >3m deep;
- Presidential Instruction Inpres 2/2007 on rehabilitation of the ex-Mega Rice Project in Central Kalimantan;
- Ministerial Decree KepmenEkuin 14/2001 on Integrated Water Resources;
- Regulation PP 4/2001 on Forbidding the use of fire; and
- Ministerial Decree KepMenHut 260/1995 on guidelines for fire control and prevention.

This existing legislative and policy framework works to support some of the enabling conditions necessary to guarantee the permanence of emissions reductions. This includes efforts to review the Protected Area (PA) Estate, consisting of all Kawasan Konservasi and Hutan Lindung to ensure clarity, consistency and capacity between the national and local governments concerning planning and enforcement of protection from illegal activities causing degradation and deforestation.

Current law and policy also supports a range of measures with potential to generate REDD payments. This includes:

1. Improving natural forest and plantation forest management systems following the international guidelines for Reduced Impact Logging (RIL), to which Indonesia is signatory.
2. Development of wood-chip plantations and estate crops on already cleared or highly degraded land, in line with existing policy.
3. Focusing extractive timber operations and conversions for plantations and estate crops on mineral soils.
4. Controls on peat land development and management, in line with existing regulations. This includes limits on development of deep peat, hydrological management and fire control.
5. Engaging local communities in conservation and sustainable management of Conservation Forests, Protected Areas and Production Forests and to ensure that they become major beneficiaries of GOI's plans for establishment of new forest and oil palm plantations on degraded forest lands.

The value of carbon credits is determined by a market which is responsive to its quality, (i.e., its credibility and permanence) and its quantity (which partly depends on Annex I countries adopting deeper emissions cuts). The extent to which Indonesia is prepared to invest in ensuring the highest quality for its potential REDD Carbon Trade will to some extent depend on what the country, its institutions and its industries and people can expect to gain.

A measure of potential gain is the opportunity cost of avoided deforestation and forest degradation, i.e. foregoing the benefits generated by the land uses that would have replaced the forest or would have degraded it.

Land use activities that result in deforestation include large and small plantations of oil palm, rubber, cocoa and coffee, as well as small land clearing for other smallholder activities, including swidden agriculture. Logging in forest concessions results in forest degradation, and often it precedes plantation development. Each of these activities bear their own opportunity cost, which carbon prices need to match and ideally outweigh if REDD is to provide a viable alternative.

At the lower end are smallholder cassava, rice fallow, rubber and timber, demanding a break-even carbon price of USD 0.1 – 0.7 USD/tonne of avoided CO2 emission. At the higher end is oil palm, demanding a break-even carbon price of USD 21.6/tonne.

2.3 Monitoring Emission Reductions

Under a REDD mechanism, countries will need to show credible reductions in emissions from deforestation and degradation measured against the baseline at specific intervals in time (e.g. annual or bi-annual). Monitoring will show the success of REDD policies and interventions measured as reduced emissions against the baseline. This includes success in preventing displacement of deforestation and degradation from one area to another (leakage). Performance against the baseline will translate into tradable carbon credits.

The two parameters to be monitored are:

- Change in forest cover which includes change in forest area and reduction in forest cover; and
- Change in carbon stocks and emissions of non-CO2 gases.[1]

Forest cover change will need to be monitored using remote sensing techniques (satellite and aerial sensors); and carbon stocks by a combination of field measurements and modeling.

Carbon emissions estimates require knowledge of the changes in area (called activity data) as well as carbon stock estimates. The accuracy (or, statistically, the level of uncertainty) will be determined by the coarser of the two estimates. A highly accurate measure of area change linked to a low accuracy estimate of carbon stock will produce an estimate of high uncertainty. The Level of certainty will determine the quality of the carbon credit being traded and therefore its price.

2.4 REDD Markets & Financing

There is still uncertainty about the form that a REDD market will take. The form will depend on international discussions which may take several years to resolve. The three factors which will influence the outcome are:

- Whether a negotiated agreement on REDD is reached at the international level.
- Whether the international REDD financial mechanism is market or fund-based.
- Whether the credits in any market-based system are fungible (exchangeable) with other credits in the regulatory international carbon markets, or traded under a separate protocol.

It is expected that future REDD markets could involve large financial flows, although it is impossible to put a firm figure on the size of a future emissions market, estimates vary from $1 – 18 billion per year depending on the assumptions used. Considering the size of Indonesia's forest resources and the scope of its industry, the portion of this market that could be expected to accrue to this country in REDD credits after 2012 is very significant. This is the first time that financing of this level could be made available for key forestry reforms and sustainable forest management.

Another issue is whether the geographical scale for the calculation of the baseline should be national, sub-national or project-based. Approaches to REDD using national baseline and accounting are likely to generate larger financial flows and reduce overall risks compared to sub-national ones, but they could involve higher transaction and implementation costs and greater inefficiencies. A mix of national and sub-national; fund and market based; and voluntary and regulated approaches to REDD could be preferable to increase learning before 2012, and to increase the range of REDD options available to sellers and buyers.

1 Though, so far, the case for measuring non-CO2 emissions from forestry (in the same way as for agriculture) has not been made.

2.5 Payment Distribution Mechanisms

The objective of a REDD payment distribution mechanism is to support policies and measures that reduce deforestation and degradation through transfer of revenues from international REDD funds or carbon markets to (or within) national levels. REDD may only work if an appropriate balance is found between efficiency and equity, embedded within a system that is accountable and transparent, focuses on long term sustainability goals and improves the ability of stakeholders to engage with the system. Based on an analysis of existing experience with regulatory, fund and market-based forest management in Indonesia, IFCA's preliminary findings indicate that performance will have to improve significantly for REDD to work.

Therefore, existing institutions will need strengthening and new institutions may be needed where existing arrangements cannot accommodate REDD. These will include fund managers for receiving and redistributing funds; registries for tracking emissions reductions credits; legal institutions for adjusting existing laws, enforcing REDD laws and resolving disputes; monitoring and verification entities for ensuring that emissions reductions are real and achieved in environmentally and socially acceptable ways; implementing and administrative organisations for handling contracts and logistics; and the sellers of carbon themselves who may need to organise internal redistribution mechanisms.

Separating regulatory from fund management and trading roles will be crucial in order to increase accountability. The allocation of rights, responsibilities and authority between local, national and independent entities for the regulation and sale of REDD credits, and for payment distribution, needs to be addressed. Amongst others, this requires capacity building of decentralised institutions. Strong legal institutions and access to legal processes will be crucial in order to avoid corruption and distortions in the system.

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Testing the REDD Value Chain

III. Next Steps: Testing the REDD Value Chain

The period 2008 to 2012 provides an opportunity for Indonesia to undertake pilot activities to investigate and to fine-tune issues related to the implementation of a REDD scheme. The purpose of these pilot activities is to examine situations on-the-ground but also to investigate and trial institutional structures and options that will maximize benefits and strengthen the Ministry of Forestry's policy.

3.1 What are the objectives of pilot activities?

Key objectives are to:

- Build trust and confidence in Indonesia's capacity as an early player in the REDD carbon market and therefore to maximize returns on the new market.
- Investigate opportunities for REDD in existing law and policy governing forest and land management (e.g. under Regulation PP6/2007 on forest management).
- Validate existing carbon stock estimates for different forest categories.
- Test approaches to baseline setting, monitoring and REDD financing, with the potential to inform post-COP13 work on outstanding methodological and financial issues.
- Trial institutional structures for monitoring, regulation of the carbon markets, and the just and transparent distribution of payments - as an input to legal and policy reform.
- Examine the practicality of emissions reduction strategies in different forest-use sectors, from a technical and economic perspective.
- Test the quality and permanence of the carbon credits that can be achieved.

3.2 What types of pilot activity should be supported?

The IFCA team has identified a number of potential pilot activities, to address deforestation and/or degradation in five key sectors:

- Oil palm plantation development
- Pulp and paper plantation development
- Production forest management
- Conservation and Protected Area management
- Forest on peatlands

Drawing on the five sector studies, the IFCA team has recommended pilot activities to:

1. Put in place the institutional infrastructure needed for REDD to work.
2. Strengthen the enabling conditions for REDD investment, with a focus on underlying governance.
3. Mobilize carbon payments for sustainable forest management outcomes.

Pilots may take place at different scales (national, provincial, district or local), depending on how they relate to national or local-government competencies; as well as on the type and scale of emissions reduction activity in question (e.g. across provincial or district boundaries, or within individual forest units).

3.3 An institutional infrastructure for REDD

Putting in place the necessary institutional mechanisms for REDD is a first priority under future pilot activities. Priorities include:

- Strengthening structures and capacity to interpret and ground-truth satellite imagery for carbon mapping and monitoring.
- Setting national (and possibly also sub-national) emissions references or baselines
- Building on existing information platforms including the forest transparency initiative FOMAS, to establish mechanisms for annual or bi-annual monitoring and reporting
- A national register to track movements of REDD credits and increase accountability now and in the future.
- Developing and testing financial management and payment distribution at national and sub-national levels, learning from equivalent experiences with reforestation funds, payments for environmental services (amongst others).
- Mechanisms to monitor and recoup lessons from pilots, as an input to national and international policy processes.

Crucial also is capacity building of decentralized institutions, where responsibility for REDD implementation will need to distributed between local and national levels. This includes the capacity of Forest Management Units (KPH), with devolved authority for forest management and monitoring.

3.4 Strengthening the enabling conditions for REDD investment

Pilot activities need to address underlying governance if REDD to be a success. This includes:

1. consolidation and gazettement of forest areas;
2. effective forest law enforcement and governance; and
3. efforts to clarify rights, roles and responsibilities in respect of REDD implementation.

Consolidation and gazettement of forest areas (biophysical and forest land-use baseline)

If REDD is to be mobilized in ways that optimize existing forest potential, pilot activities will need to collect, improve and review spatial data and analysis of the current Forest Estate. This includes the: quality of remaining forest cover; peat lands, rainfall and soils; current and proposed permits; forest and concession boundaries; and, community lands. Processes to allocate resources within Forest Management Units (KPH), including mapping, boundary setting and forest inventory are a way of achieving this.

This will allow the Ministry of Forests to: (i) settle outstanding community claims to land and forest resources; and (ii) review, delineate and gazette the Forest Estate, as well as management categories within it spanning Conservation, Production and Protection forest.

It in turn provides a basis for identifying:

- Those areas of natural forest best retained for sustainable management, ecosystem restoration and conservation at variety of scales (community, local and national government) – in which REDD could invest.
- Degraded or non-forest areas on mineral (as opposed to peat) soils, for oil palm development and for engaging local communities and smallholders in pulpwood establishment – which REDD payments could also support where it reduces pressure on natural forest.

A clear and secure biophysical and forest land-use baseline is essential to long-term investments in forest carbon, in particular to prevent leakage and guarantee permanence. REDD payments resulting from such investments may be mobilized to offset the opportunity costs of re-designating forest land, to re-focus plantation development on degraded and bare land, and to provide incentives for sustainable management.

Strengthening forest law enforcement and governance

Pilot activities will need to:

- Strengthen interdiction of illegal logging and encroachment, including work to tackle barriers and bottlenecks in existing enforcement.
- Improve official supervision (monitoring and verification) of logging operations in the Production Forest zone.
- Develop local capacity for outcome oriented independent monitoring of private sector company forest harvesting and management practices.
- Improve financial due diligence processes to ensure more effective wood supply analysis by industry in advance of mill expansions.
- Strengthen of GOI capacity for implementation of Environmental Impact Assessments.

Effective forest law enforcement is also essential to secure long-term investments in forest carbon, and REDD payments may be used to offset the cost.

Finally, pilot activities need to clarify the rights, roles and responsibilities for REDD implementation, through learning by doing. Key issues for resolution include:

- Who has the right to sell carbon (local communities, licensees, forest management units, local government, national government)? Amongst others, this demands action to clarify land tenure and forest management rights.
- Who has the right to receive payments? This will depend on stakeholders' rights in forest land and resources, the degree to which they bear the cost of not clearing or degrading forests, and rules governing revenue distribution.
- The respective roles of national and local government, civil society, the private sector and independent entities in carbon trading, regulation and fund management. Pilots could test alternative arrangements, spanning both sub-national and national schemes.

3.5 Mobilizing REDD payments for sustainable forest management

REDD payments present an opportunity to better realize the total value of natural forest resources, in respect of both timber and environmental services (optimizing forest function). This includes incentives for Reduced Impact Logging (RIL), community empowerment and law enforcement. In respect of oil palm and pulp and paper, REDD could work to increase productivity in order to reduce pressure on natural forest. The break-even cost of carbon in offsetting deforestation and degradation does, however, vary depending on the sector and location. The study team therefore recommends that pilot activities are designed to test REDD transactions across a range of scales and forest management categories.

In protected areas, for example, pilots could be selected to represent the range of protected-area categories. This is because differences in management authority and responsibility for financing could have

implications for how REDD payments are managed and disbursed. So pilots could be initiated in:

- National Parks, where the management is national based and implemented through a independently funded unit (UPT);
- Strict Nature Reserves, where the management is nationally based but implemented through an authority (Balai) paid for from the general budget allocation;
- Protection Forests (TAHURA) where management is Provincially based and administered through funding from the Provincial budget; and
- Protection Forests (HL) where the management is District-based and administered through the local government budget.

In production forests, pilots are proposed to test how REDD might apply to a range of licenses, such as commercial timber concessions (HPH), Ecosystem Restoration Licenses and community forest licenses (HKM etc). This includes the potential contribution of REDD payments to:

- Meet commitments on Reduced Impact Logging (RIL) and High Conservation Value Forest (HCVF);
- Support transitions to mandatory and voluntary certification;
- Tackle degradation in logged over areas, before it reaches the point of no return; and
- Enhance monitoring and verification.

In the pulp and paper sector, pilots are proposed that mobilize REDD financing for large-scale extension programs to allow smallholders to benefit from increased opportunities in timber production and forest management, and to help meet demand for raw material, under the community plantation or Hutan Tanaman Raykat scheme.

In respect of forest conversion to oil palm, pilots might consider testing how REDD payments may be mobilized to:

- improve the yields of smallholder plantations and assist with replanting programs to optimize the use of existing land already converted to oil palm;
- support zero burning;
- improve water management in existing plantations lying on peatlands to ensure that water tables are maintained at 0.5-0.7 m from the soil surface to prevent excessively rapid depletion of the peat soil layer;
- encourage companies to return organic waste to the soil; and
- apply integrated pest management.

Finally on peatlands, pilots are proposed to mobilize REDD payments for restoration through water management and fire control, prioritizing those areas or districts with deep peat, for example:

- The ex-Mega-Rice Project zone of Central Kalimantan;
- The Berbak National Park Buffer Zone; and
- The Sembilang and Merang Kepahayang Peat swamp Forest.

3.6 Criteria and variables for the selection and development of pilots

A number of basic criteria could be established to assist in the selection of REDD pilot activities. These include:

- Availability of information for planning and monitoring of impacts over time.
- Biophysical variation, prioritising areas of deep peat, and high standing carbon stocks.
- Level of threat, prioritising forests at high risk of fire, encroachment and conversion.
- Social equity, i.e. there is a clear pro-poor dimension.
- Economic viability, i.e. REDD payments are sufficient to generate lasting reductions in deforestation and degradation within a given sector.
- Tenure, i.e. clarity over rights in land and forest resources, and consequently in the sale of carbon and the receipt of payments.
- Governance, with clear allocation of roles and responsibilities for REDD implementation, and measures in place for improved forest law enforcement.

For a programme of pilots to genuinely test the viability of REDD, and to inform law and policy development, it is also important that a representative sample is selected. As referred to above, key variables include:

- Rates of historical deforestation and degradation, spanning both 'smoking provinces' such as Riau and those with very low past emissions from deforestation and degradation such as Papua.
- A range of forest management categories, spanning conversion (HPK), production, conservation and protection, and related drivers of past deforestation and degradation including oil palm, pulp and paper, unsustainable logging, illegal logging and smallholder agriculture – each commanding their own break-even carbon price.
- A range of forest management licenses spanning community forestry (hutan desa, HTR, HKM and company – community partnerships), environmental service provision (IUPJL), commercial logging (HPH), and ecosystem restoration, as provided for in PP6/2007.
- Distribution of rights, roles and responsibilities for carbon trading, regulation and fund management, spanning both sub-national and national schemes.

The Government of Indonesia plans to further develop and refine these criteria and variables through a process of national and local consultation post COP13, as the basis on which to formulate a credible portfolio of pilot activities in early 2008.

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Annex:

Preliminary findings from initial consultations and analysis

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BASELINES AND MONITORING: CONCEPTS AND ISSUES

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MAJOR FINDINGS ON REDD BASELINES AND MONITORING

1. REDD is a new mechanism on emissions from deforestation and degradation for which many terms, activities, definition and other elements are not yet clear and no definitions have been agreed. These will be negotiated between the Parties.
2. There are means and guidance from the UNFCCC processes that provide a starting point for consideration of REDD methodologies that may be relevant. These approaches are not yet accepted for use in REDD.
3. Whatever decisions are made regarding a market based system or not, it will be a performance based standard. Such a standard requires a **baseline** and a system to **monitor** emissions through time.
4. A baseline is a future projection of emissions from deforestation and degradation and serves as a reference for measuring and monitoring reductions in emissions.
5. There are a number of methods that might be used to prepare a baseline for Indonesia; Historical trends; Modelling of trends, and a Moderated negotiation/development adjustment factor for a trend.
6. Under REDD mechanisms; countries will need to show credible reductions in emissions from deforestation and degradation measured against the baseline at specific intervals in time so Monitoring is crucial.
7. The technical and human capacity exists for Indonesia to make the needed improvements in the near future. FOMAS and The Forest Resource Information System (FRIS), currently being considered, provide a potential basis for a Government-wide integrated decision and policy support system.

A. BACKGROUND AND CONTEXT

REDD is a new mechanism to reduce emissions from deforestation and degradation that is being considered by the UNFCCC. Efforts to measure the multiple aspects of gases, emissions, carbon, vegetation, biomass, conversion factors, emission factors and other elements have been undertaken by institutions and researchers for many years under the overall umbrella of the UNFCCC. The Kyoto Protocol provided specific requirements to consider in the measurement and monitoring of emissions and of carbon sequestration by vegetation.

For the requirements of REDD two pivotal aspects of measuring loom large:

- The baseline against which change will be considered; and
- The monitoring of changes in emissions from the baseline.

There are some questions and techniques for Baselines and Monitoring that are the same. The two are confused from time to time. They are in fact two different things and do not necessarily have to adopt the same means or mechanism of measuring and estimating missions.

Means and guidance exists for accounting and reporting greenhouse gas emissions for the Land Use, Land Use Change and Forestry (LULUCF) sector. This is the only sector where the reporting requirements for the UNFCCC and the Kyoto Protocol are not the same because of differences in the LULUCF activities that they include.

Various guidelines developed by the IPCC (a technical body that advises the UNFCCC) provide the guidance required for producing national carbon inventories and methods specific to LULUCF activities. This guidance provide a starting point for the consideration of REDD methodologies but they are not yet accepted for use in REDD.

B. DEFINITIONS

Decisions on means, methods, definitions etc. for REDD remain to be made but it is likely to be based on existing UNFCCC and Kyoto Protocol frameworks. Whatever decisions are made regarding a market based system or not, it will be a performance based standard. Such a standard requires a baseline and a system to monitor emissions through time.

REDD is a new mechanism on emissions from deforestation and degradation for which many terms, activities, definition and other elements are not yet clear and no definitions have been agreed.

Although the terms 'deforestation' and ' degradation' are commonly used they can vary by country. For international negotiations, specific definitions that all Parties can agree to are needed. These definitions will be agreed through negotiation among the Parties.

Discussions of REDD so far have focused on reducing "gross emissions". Gross emissions assume removal of trees; most of the biomass and that all carbon is emitted. Gross emissions do not consider the land use that replaces the forest. This is in contrast to "Net emissions" which allows for counting the carbon stocks on the area deforested if or as they are replaced. Gross emissions are clearly higher than net emissions and thus would result in a higher emissions baseline.

1. What definitions do we have?

During the UNFCCC processes there has been agreement on some definitions, and the Marrakesh Accords (MA) prescribes the definitions for the Kyoto Protocol. These definitions could be applicable to REDD but that would be agreed through negotiation in the UNFCCC processes.

The definitions as used in UNFCCC and Kyoto protocol and which may be considered for use in REDD include:

Deforestation - Most definitions characterize deforestation as the long-term or permanent conversion of land from forested to non-forested.

Degradation – Where there are emissions from forests caused by a decrease in canopy cover that does not qualify as deforestation, it is termed as degradation. There is a lack of clear definitions for degradation making it difficult for a monitoring system to be designed. Degradation presents a much broader land cover change than deforestation.

Forest land – Under the UNFCCC, this category includes all land with woody vegetation consistent with thresholds used to define Forest Land in the UNFCCC processes. Forest definitions are many although most definitions apply threshold parameters such as minimum area, minimum height and minimum level of crown cover.

2. Which definitions apply?

None of the definitions identified or discussed above yet apply. All the definitions have to be negotiated. The choice of definitions will affect baselines, monitoring methods, and potential credits and are critical for Indonesia with very significant implications for different definitions.

C. BASELINES

3. What is a Baseline?

A baseline is a future projection of emissions from deforestation and degradation and serves as a reference for measuring reductions in emissions. No clear policy guidance currently exists in REDD mechanism for how a baseline is to be developed and this will need to be negotiated among Parties.

It has been suggested that an agreement will be needed by Parties on deciding on a benchmark year, or time interval against which all future deforestation and degradation will be measured. It seems logical that the benchmark year or time interval would be no later than 2005, given that this is the year when discussions on the topic of REDD started in the COPs.

4. How is a baseline set?

A baseline is a projection of likely emissions of greenhouse gases into the future based on the projected change area of land use by categories or classes. The land use classification can be assessed for its

carbon stock and the change in area combined with the carbon stock for a land use provides an assessment of the corresponding change in carbon stocks. When carbon emissions from are estimated, often the focus is on producing highly accurate estimates of the changes in area with little attention paid to the carbon stock estimates. If the estimates of carbon stocks have high uncertainty and the area change data are very accurate, the resulting emissions estimate will still be highly uncertain. Estimates of carbon stocks also have to be made with high certainty for the results to be credible and reliable.
There are various approaches that can be used to establish a baseline, including:

- A linear projection of the past — Questions include; Over which time interval? How far back?
- An average of past conditions — Questions include; Over which time interval? How far back?
- A modeling approach based on planned land use; unplanned activities and their relationship to various factors — Questions include; Which models? How far into the future?

Whichever approach is negotiated, a credible baseline of emissions from REDD could be established using existing scientific and technical tools and models.

5. How is a baseline used?

The baseline provides estimates of future emissions from land use change: deforestation and degradation. Annual monitoring of actual emissions provides an actual emission value for each year. If the difference in year to year monitoring shows a reduction in emissions then there is potential for the difference between actual emissions (Monitoring) and projected emissions (Baseline) to be made available under REDD for reward or trade. The alternative is also correct that an increase in emissions, where the monitored emissions are higher than the baseline projection, has to be offset.

6. How would a baseline be developed for Indonesia?

Consequently the setting of a baseline is a critical step for a credible REDD process for Indonesia.
There are a number of methods that might be used to prepare a baseline for Indonesia. Some are described below.

Historical

The historical approach is to create a future projection based on the past that reflects historic drivers of deforestation. Potential problems with this approach are that the historic drivers may not be relevant for the future and the reference period chosen may change the outcome. The historical approach can be further sub-divided into Historical-Regional where the baseline is compiled by considering the regions of Indonesia. Although a REDD agreement will be made between nations and so a National baseline will be needed, Indonesia may decide to construct their national baselines based on different regional baselines because currently there is a vast difference between the emissions from different regions (e.g.. Sumatra island account for 60% of REDD emissions). Indonesia then would construct their baseline by determining that some regions can emit more and some less carbon based on internal criteria. Carbon credits will only be awarded on National baseline.
An alternative approach to consider is a projection based on the Historical-Regional trends as above overlain with trends that account for the different development trajectories of different provinces in Indonesia. Because deforestation and degradation in the various provinces is a result of unplanned and planned activities, different methods are needed to make baseline projections. Planned deforestation is generally linked to “conversion lands” whereas the unplanned changes are often associated with unsanctioned activities related to illegal logging and forest clearing.

Modeling

Modeling attempts to identify and interpret the future effect of drivers on patterns and rates. Links to factors such as population and economic growth have been shown to produce reasonable estimate of current trends, but may not necessarily reflect future trends. Another advantage of modeling future projections is that it allows for identifying particular country circumstances.
Different types of modeling can be used to make projections. Economic models for example can be used to project deforestation based on planned development, taking into account regional differences within a country.

Moderated negotiation/development adjustment factor

A quantified baseline generated by either historical projections or modeling may be moderated by country specific circumstances based on factors such as projected development activities, population growth, GDP, and other development trajectories. Such a baseline would need to be negotiated among Parties for a given country.

D. MONITORING

Under REDD mechanisms; countries will need to show credible reductions in emissions from deforestation and degradation measured against the baseline at specific intervals in time (e.g. annual or bi-annual).

Monitoring is crucial; as it will show the success of REDD policies and interventions measured as reduced emissions against a baseline, which identifies the number of carbon credits that the country is able to sell in the markets. There are five recognized pools or stores of Carbon in forests; aboveground biomass, belowground biomass, dead wood, litter, and soil. A sixth, harvested wood products, is under discussion. IPCC Guidelines provide methods for five forest pools that store carbon. Deforestation and degradation can also emit non-CO2 gases, which have a higher global warming potential than CO2. The IPCC reports include methods for monitoring all these pools and gases. For REDD, which of these pools and gases will be included remains to be negotiated.

There are two main components to measuring and monitoring emissions from deforestation and degradation:

- Change in forest cover
  - Change in forest area and
  - Reduction in forest cover
- Change in carbon stocks and in emissions of non-CO2 gases

Regardless of the final negotiated outcomes, forest cover change will need to be monitored using remote sensing techniques (satellite and aerial sensors) and carbon stocks by a combination of field measurements and modeling.

A system for monitoring emissions from deforestation and degradation has the following required elements:

- Credible
- Transparent
- Accurate with high certainty
- Based on good science
- Comply with the requirements of the negotiated policy framework

The various IPCC guidelines define methodologies for representing the different land categories and the conversions between them. The guidelines describe three different approaches for the area change component:

- **Approach 1** identifies the total net area change for each land category, but does not provide information on the nature and area of conversions between land uses. As this approach only identifies the net change in forest area, it is unsuitable for monitoring gross deforestation.
- **Approach 2** involves tracking of land conversions between categories. Under Approach 2, the counterbalance effects of areas of reforestation and deforestation are identifiable.
- **Approach 3** extends Approach 2 by using spatially explicit land conversion information; thus allowing for an estimation of both “gross” and “net” changes in land categories. Approach 3 that gives gross deforestation is the only practical approach that can be used for REDD implementation.

The assessment of the changes in carbon stocks in the various carbon pools of a forest can be obtained at different Tier levels:

- **Tier 1** requires no new data collection to generate estimates of forest biomass and is unlikely to deliver accurate results, has the potential for bias expressed as over or under estimates and uses

simplified assumptions to calculate emissions.

- **Tier 2** is akin to Tier 1 in employing static forest biomass information, but improves on that approach by using country-specific data and by resolving forest biomass at finer scales through the delineation of more detailed forest strata. Under a Tier 2, the assumption that carbon stocks in woody vegetation, litter and deadwood are immediately emitted following deforestation can be modified, yielding significant improvements over Tier 1.
- At the other extreme, **Tier 3** is the most rigorous approach with the highest level of effort using either actual inventories with repeated measures of permanent plots to directly measure changes in forest biomass and/or a range of model approaches. Tier 3 does not assume immediate emissions from deforestation, but models transfers and releases among pools.

As REDD aims to yield 'tradeable' emissions reductions, it could be anticipated that, as for the Kyoto Protocol, the simple monitoring methodologies would not suffice (Tier 1). It can be expected that a country would need more advanced and complete information on emission sources, and country specific methods and data for key categories. Tier 2 may suffice for early action but may not be acceptable in the long run, which will likely require a complete Tier 3 accounting framework on all GHG emissions.
Whatever policy decisions are made, a system can be designed to incorporate present and emerging science and technology to deliver the desired products with known uncertainties.

E. WHERE IS INDONESIA TODAY?

There are many land use mapping exercises carried on forest change out (1985 – 2003) with monitoring under way for 2000/5. The activities and data in hand are not yet sufficient for REDD baseline and future monitoring. For carbon stocks there is an existing forest plot network but little to no data on carbon stocks. As for area change this is not yet sufficient for REDD baseline and future monitoring.
The technical and human capacity exists for Indonesia to make the needed improvements in the near future.

F. WHAT NEEDS TO BE DONE?

In preparing for COP 13 and beyond there are aspects of the REDD process and development that involve both policy negotiations and enhancement and enabling of technical capacity.
Items for policy negotiations:

- Decide on definitions
- Decide on baseline characteristics

Items for technical capacity:

- Decide on a system for national baseline setting
- Decide on a methodology for monitoring — learn from others

For any nation to participate in REDD requires the systematic collection of policy relevant data including time series data as well as improvements in long-term data and methods. The institutional arrangements and procedures required for effectively engaging in the discussion, negotiation and then the market for REDD are important for Indonesia. As the policy parameters, guidelines and methods for REDD evolve, institutional arrangements should also be reviewed and refined.
Five steps are essential to ensure an effective and functional forest monitoring system:

- Clear understanding of responsibilities — who does what, when
- Regular and timely reporting of accurate and precise data,
- Access to data between different groups inside the ministry, government and stakeholders,
- Using the data to have improved decision making
- Using the data to enforce laws.

Institutional arrangements need to reflect the five steps above, and deliver the required monitoring products. The Forest Resource Information System (FRIS), currently being considered, is a potential basis for a Government-wide integrated decision and policy support system.

STRATEGIES FOR REDUCING CARBON EMISSIONS FROM OIL PALM PLANTATION

REDD

IFCA
INDONESIA FOREST CLIMATE ALLIANCE

REDUCING
EMISSIONS FROM
DEFORESTATION AND FOREST
DEGRADATION

STRATEGIES TO REDUCE CARBON EMISSIONS FROM THE OIL PALM SECTOR IN INDONESIA

- Oil palm plantations have rapidly expanded over the past decade in Sumatra and Kalimantan. The total oil palm area was estimated to be 6 million ha in 2006.
- Oil palm has conferred important economic benefits: foreign exchange, revenue and employment. It is also profitable (average NPV of $3,388 over a 25 year period).
- Current spatial planning processes have required that around 70% of oil palm plantations have had to be developed in convertible forest and this has resulted in above ground emissions (~ 2117 MtC02).
- Oil palm is increasingly being planted on peat soils (especially in Riau and Central Kalimantan) which store large quantities of carbon (~ 60 Kg/m3). These plantations result in peat oxidation, subsidence and large carbon emissions.
- Indonesia's oil palm industry is expected to expand by another 5-6 million ha by 2020.
- 5.5 million ha of land has already been allocated for oil palm developments in Kalimantan alone. At least 1.7 million ha of this land is forested, while close to 1 million ha is peat land.
- Future oil palm developments should be developed on available degraded lands to reduce significant carbon emissions.
- REDD financing could potentially be deployed to cover the opportunity cost of not converting forested lands and peat lands to oil palm.

INTRODUCTION

The area of land occupied by oil palm plantations in Indonesia has increased 35 fold since 1967 to occupy an estimated 6 million ha in 2005 (CIC 2007). Most of this expansion has occurred in the six provinces of Riau, South Sumatra, North Sumatra, West Kalimantan, Jambi and Central Kalimantan.

The prolific growth of the oil palm sector has conferred important economic benefits: palm oil has become a valuable source of foreign exchange, revenue and employment. Oil palm plantations are also profitable. A hectare of oil palm can result in a Net Present Value of around $3,388 over a 25 year period in Aceh, North Sumatra, Riau and West Kalimantan. The Net Present Value is reduced to $2,650 if oil palm plantations are established in more isolated regions, such as Papua. While establishment and management costs are higher for plantations on peat soils, they can produce higher yields per hectare than plantations on mineral soils and result in a Net Present Value of $4,265 per hectare[1] - but at the cost of significantly higher emissions.
Nevertheless, oil palm expansion is a source of concern because it has occurred at the expense of Indonesia's tropical forest cover. Oil palm expansion has also been held partly responsible for wildfires and peatland degradation. All of these land use changes have resulted in carbon emissions.

QUANTIFYING THE IMPACT OF OIL PALM PLANTATION ESTABLISHMENT ON FORESTS AND PEATLANDS

Historical impacts

Oil palm plantations have resulted in deforestation and carbon emissions. Available data suggests that 70% of Indonesia's oil palm plantations have replaced forest and directly resulted in above ground emissions of around 588 million tonnes of

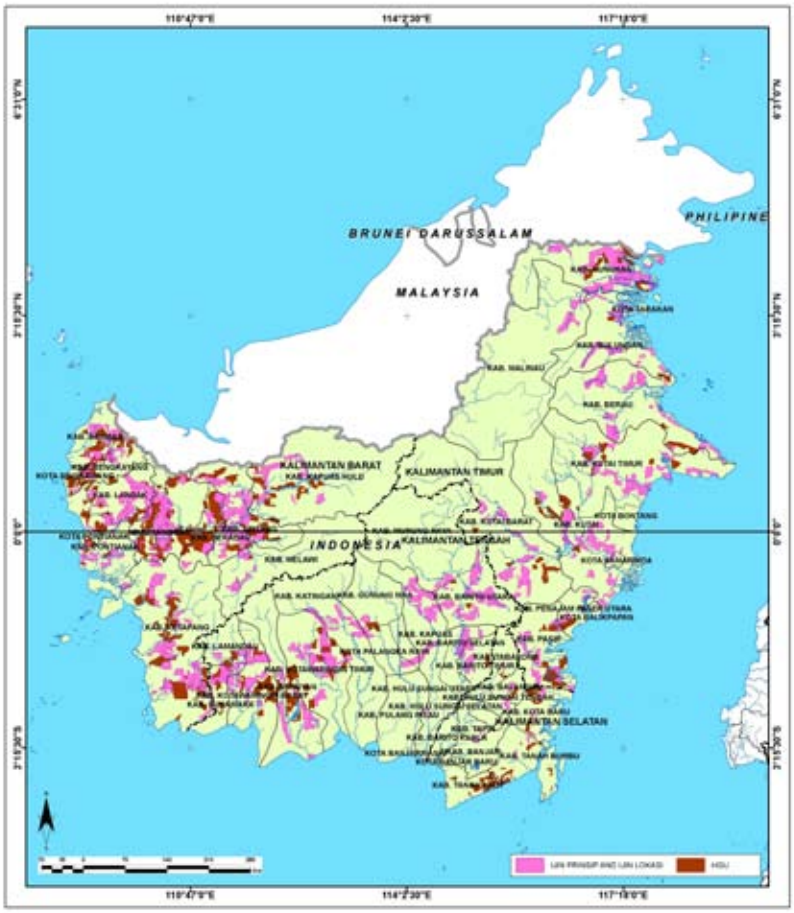
1 The Net Present Value estimates of oil palm considered a range of costs associated with oil palm establishment, including land clearing, building roads and drainage, land preparation and planting. It also considered the average yield of Fresh Fruit Bunches (FFB) over a 25 year period (20t/ha/yr) and the price of FFB in 2006 (Rp 706,638 per kg).

carbon (~2117 MtC02)[2] between the period 1982-2005. Further deforestation and carbon emissions have resulted from bogus oil palm developments that are used to acquire timber clearing permits.
Moreover, oil palm plantations are increasingly being planted on peat soils, which store large quantities of carbon (~ 60kg/m3) (Hooijer et al. 2006). Data suggests that land use permits (HGU) have been issued for 491,046 ha of peatland in Kalimantan and 97,870 ha in Riau. If all of these plantations have been realized, large quantities of carbon dioxide have been released into the atmosphere from peat oxidation and subsidence (Hooijer et al. 2006; Germer & Sauerborn 2007). Long-term studies of cultivated peat areas in Malaysia indicate that the decomposition of organic matter in peat soils is likely to exceed emissions derived from above ground biomass (Wörsten et al. 1997; Germer & Sauerborn 2007).

Anticipated future impacts under a business as usual scenario

Indonesia's oil palm sector is poised for further rapid growth and is predicted to expand by another 7-8 million ha by 2020 (Bisinfocus 2006). It is more likely to expand by another 5-6 million ha by 2020. This already implies that approximately 4-500,000 ha of oil palm will be planted in Indonesia per year (an average of 3-400,000 ha of oil palm has been planted per year between 2000 and 2006). Most of this growth is expected to occur in Sumatra first because this island has the best climate, soil conditions and infrastructure in the country for oil palm cultivation. However, growth will also increasingly occur in Kalimantan and Papua as suitable land for oil palm is becoming scarce in Sumatra.
Available data suggests that location permits for oil palm developments have already been issued for 5.5 million ha of land in Kalimantan alone (Figure 1). At least 1.7 million ha of this land is forested and 922,172 ha of this land is peat. If all of this forested land was cleared and converted to oil palm up to 255 million tonnes of carbon (~918 MtC02) could be released into the atmosphere from the loss of above ground biomass stored in forest alone.
The total amount of land already allocated for oil palm plantations in Kalimantan is almost enough to produce Indonesia's projected CPO production by 2020 (41 million tonnes of CPO). Accurate and up-to-date spatial data of issued location permits needs to be collected from provincial governments to determine how much land has already been allocated for oil palm development throughout the entire archipelago.

Figure 1: Location of land use rights (HGU) and location permits issued in Kalimantan[3]



2 This is a conservative estimate which is based on the assumption that secondary, logged over forests were replaced with oil palm. Secondary forests have been found to contain around 150 MgC/ha in Jambi, Sumatra (Mudiyarso et al. 2002; Tomich et al. 2002). Germer & Sauerborn (2007) used a slightly higher estimate (180 MgC/ha) to evaluate the impact of oil palm plantations on the greenhouse gas balance. Other studies, such as Whitmore (1990), estimate that the above ground biomass of lowland tropical rainforest could be as high as 400 Mg ha-1.
3 Kalimantan is highlighted here given the availability of data, and to illustrate the especially large number of local permits that have been issued.

STRATEGIES TO AVOID DEFORESTATION AND MITIGATE CARBON EMISSIONS

A number of strategies can be implemented to reduce carbon emissions from deforestation.

1. **Review the permit allocation process for oil palm developments**. The first strategy is an essential step that needs to be undertaken to ensure that oil palm plantations no longer result in deforestation, peat degradation and carbon emissions. It requires a comprehensive review of location permits that have already been issued to oil palm companies. This process could consider a range of factors including the location of the concession (i.e. is it located on forested lands or peat soils), overlapping land uses (i.e. logging, mining and industrial timber concessions), the proximity of the concession to a crude palm oil (CPO) processing mill, land and climate suitability, infrastructure needs and the applicants finances. Realistic guidelines and goals should also be set for oil palm developments to ensure a sustainable supply of CPO.
2. **Reallocate forest and peatlands for carbon storage**. The second strategy involves reallocating forested lands and peat lands previously slated for oil palm developments in location permits for carbon storage. This strategy is likely to have the greatest impact from a REDD perspective and is already attracting interest from provincial governments and companies. REDD financing can potentially be deployed to cover the opportunity costs lost from not converting forested lands and peat lands to oil palm. If we assume that forested lands have an average stock of carbon in the vegetation of 100 tonnes (equivalent to 367 tonnes of carbon dioxide), at a conservative price of CO2 of $4/tonne, each hectare could generate $1,468 for the country. Peat lands could generate several times that value because plantations situated on peat soils emit significantly more carbon.
3. **Review spatial plans to optimize degraded lands**. The third strategy involves identifying available degraded lands for viable oil palm plantation developments. Indonesia has around 23.2 million ha of degraded lands and only 7-9 million ha is needed to ensure that Indonesia can meet its oil palm production target by 2020 (MoF 2003). Not all of these lands are likely to be available and comprehensive analysis will need to be undertaken to ensure that degraded lands are not occupied, have already been allocated for other developments and are suitable for oil palm. In the presence of a carbon market, Indonesia could derive financial benefits by locating plantations on degraded lands instead of forested lands. The oil palm industry could continue to generate economic benefits, and Indonesia could potentially sell credits for reduced emissions from deforestation. Small carbon benefits can also be gained if oil palm is established on imperata grasslands (Germer & Sauerborn 2007).
4. **Increase yields of smallholder plantations**. REDD financing can potentially be mobilized to help smallholders to optimize land and increase their yields. In Indonesia, smallholders tend to only produce an average of 2.3 tonnes of CPO per hectare of oil palm while private estates can produce up to 3.4 tonnes of CPO per hectare of oil palm (Bisinfocus 2006). Poor smallholder yields are attributed to difficulties in obtaining good quality seedlings, incorrect plantation management and lack of sufficient capital to purchase fertilizers, pesticides and herbicides. This strategy can potentially reduce the need to convert forests and peatlands to oil palm.
5. **Replant plantations that have exceeded their economic lifespan**. A similar strategy can be deployed to support the Governments scheme to replant oil palm plantations that have exceeded their economic lifespan (~ 25 years). This strategy will ensure that land already dedicated to oil palm is re-used to produce profitable and high-yielding productive plantations.

OTHER INTERVENTIONS THAT CAN MITIGATE CLIMATE CHANGE

In addition to the above, a number of interventions can be mobilized to maintain carbon stocks or mitigate greenhouse gas emissions resulting from oil palm cultivation. These interventions may not necessary lead to avoided deforestation per se, but are worth mentioning because they can potentially lead to the ultimate goal of mitigating global warming and climate change.

1. Provide support for zero burning. In Indonesia, large-scale oil palm plantations continue to use fire to clear land because it is cheaper than zero burning (mechanical land clearing). This is especially the case with peatlands, which can be between $50/ha and $150/ha more expensive to clear using zero burning than fire (Guyon & Simorangkir 2002). Smallholders also continue to use fire to clear land because they can not front up the capital needed to pay for heavy land clearing machinery. Support could potentially be mobilized to help smallholders with mechanical land clearing. Reduced use of fire could potentially curb carbon emissions because fire expedites the release of carbon stored in peatlands into the atmosphere. The sale of carbon credits could be used to compensate the higher costs of zero-burning and they could also generate a net profit for the country if the price of carbon was high enough to more then compensate for the cost of zero-burning. Reduced smoke-haze conditions would also be a significant added

benefit for Indonesia.

2. Improve water management in existing plantations lying on peat soils. Support could also be mobilized to improve water management regimes in existing plantations lying on peat soils. Available spatial data indicates that around 17% of the land use permits issued for oil palm developments have been issued for concessions lying on peat soils in Kalimantan and around 13% of the land use permits allocated for oil palm developments lie on peat soils in Riau. Gradual degradation of peat soils converted to oil palm is resulting in the release of large quantities of carbon per year. These peat soils need to be well managed to maintain a water table at 0.5-0.7m from the soil surface to prevent excessively rapid depletion of the peat soil.
3. Use chemical inputs judiciously. Finally, support can potentially be mobilized to encourage oil palm companies to judiciously use fertilizers, herbicides and pesticides. Oil palm plantations tend to require significant chemical inputs and are one of the largest consumers of mineral fertilizer nutrients in Southeast Asia (Hardter & Fairhurst 2003). Nitrogen based fertilizers (such as ammonium nitrate, ammonium sulphate and urea) are particularly potent from a climate change point of view as one kilogram of nitrous oxide (N_2O) has an equivalent impact to 310 kilograms of CO_2. Chemical inputs can potentially be minimized and judiciously applied if oil palm companies carry out comprehensive soil assessments and fertilizer trials to determine optimum fertilizer requirements, return organic waste to the soil to improve soil fertility and apply integrated pest management to reduce the need for pesticides.

POST UNFCCC COP 13 IDEAS

The following activities could potentially be undertaken after the upcoming UNFCCC Conference of Parties 13 to prepare Indonesia for the implementation of REDD after 2012.

1. Collect and improve spatial data on existing and proposed concession boundaries, community lands, forest cover, peat lands, rainfall and soils. This is necessary because spatial data is incomplete, out-of-date and unreliable and thus unable to be used to base sound decisions on.
2. Carry out in-depth spatial analysis and community mapping to accurately identify unoccupied degraded lands that are suitable for oil palm developments.
3. Review permits and spatial plans in at least five provinces (possibly in Riau, West Kalimantan, East Kalimantan, Central Kalimantan and Papua) to re-locate oil palm plantations to more suitable and unoccupied degraded lands.
4. Consider the development of a REDD policy framework to:
    - Improve the yields of smallholder plantations and assist with replanting programs to optimize the use of existing land already converted to oil palm.
    - Minimize the use of fire and assist smallholders with mechanical land clearing.
    - Improve water management in existing plantations lying on peatlands to ensure that water tables are maintained at 0.5-0.7 m from the soil surface to prevent excessively rapid depletion of the peat soil layer.
    - Encourage companies to judiciously use fertilizers, herbicides and pesticides, return organic waste to the soils and apply integrated pest management.

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STRATEGIES FOR REDUCING CARBON EMISSIONS FROM PULP AND PAPER PLANTATION

REDD

IFCA
INDONESIA FOREST CLIMATE ALLIANCE

REDUCING
EMISSIONS FROM
DEFORESTATION AND FOREST
DEGRADATION

REDD Implementation for the Indonesian Pulp and Paper and Tree Plantations Sectors: POLICY AND IMPLEMENTATION BRIEFING

Major Findings

1. It is government policy that the area of Indonesia's tree plantations will need to expand.
2. Tree plantations sequester carbon but not as much as natural forests,
3. Over extraction of natural forests during 1990s including for pulp industries contributed to significant loss of CO2,
4. Unsustainable plantation development on peat lands may lead to additional carbon emissions.
5. Indonesia's tree plantations play an important role in supporting the national wood processing industries, and have the potential to significantly contribute to national economic development and reduce pressure to natural forests.
6. Shifting plantation development to areas with little vegetation on mineral soils has the potential to avoid a large amount of the carbon emissions associated with plantation establishment, without constraining the total area of plantations that can be developed.

Background and Context

As the availability of timber from natural forests is declining, fast growing tree plantations are increasingly important as a source of raw material for pulp and plywood producers, as well as furniture manufacturers. Over recent years, there has also been a growth in chipping mills that produce pulpwood chips for export.

In response to anticipated timber demand, the Ministry of Forestry plans to increase the area of tree plantations, and has allocated over 10 million hectares for industrial plantation (HTI) concessions, most of which are still undeveloped. In addition, MOF has plans to establish another 5.4 million hectares of community based timber plantations (HTR) starting from 2008.

Underlying the development of Indonesia's tree plantation programs is the argument that intensified silvicultural management and use of genetically improved planting materials for commercial production will increase the economic productivity of forest areas that are classified as degraded and commercially unproductive, thereby providing rural development benefits. Indeed, Indonesia's tree plantations play an important role in supporting the national pulp and paper industry, and have the potential to both contribute to national economic development while also reducing pressure on natural forest.

A mature pulpwood plantation can also contain significant carbon stocks. However, unsustainable plantation development can led to net carbon emissions. In some cases, this has been accompanied by significant loss of social and environmental functions.

Emissions from Unsustainable Plantation Development and Pulp Production

Weak enforcement allowed some pulp mills to expand their processing capacity without creating an adequate plantation base. This has led to the unsustainable consumption of available supplies of mixed tropical hardwood (MTH) within a commercial distance of mills.

Unsustainable practices also affect plantation development on peat lands. In some cases, average drainage depths well over 100 cm, and up to 300 cm, are reported for pulpwood plantations. Here,

carbon emissions will depend on the bulk density and organic carbon content of the peat type, as well as the rate of subsidence.

Unless these unsustainable practices are tackled with stronger incentives for sustainable plantation development and law enforcement, there is a risk that the booming chip export market and plans to build new pulp mills may extend these pressures to areas of Indonesia that still have large stocks of natural forest remaining.

The Ministry of Forestry has initiated several efforts to address these issues, and to increase the benefits of plantations. For example, to ensure that future distributional benefits of tree plantations are improved, the Ministry has developed a law (PP6/2007) that provides significant legal space for smallholders to be more directly involved in commercial timber production. The Ministry of Forestry is also developing criteria to control the clearing of natural forests for tree plantations. These programs will require significant investments in spatial planning, monitoring, capacity building, and rural extension.

Finally, ensuring plantation development on areas with little vegetation on mineral soils has the potential to avoid a large amount of the carbon emissions associated with plantation establishment - without constraining the total area of plantations that can be developed. A REDD mechanism could be an important additional source of funding to support these measures. Such a program could be designed to complement the Ministry of Forestry's initiatives to protect productive natural forests, and to increase the involvement of smallholders in plantation development.

Strategies for Reducing Emissions

While the area under plantations will largely be a response to market forces, the environmental impacts, including the carbon emissions, from plantation development are subject to the decisions and policies of both the private sector and government. Carbon emissions from plantation development and wood sourcing for pulp production are largely avoidable in the future at low cost, provided that the government establishes a policy and investment framework that compels and allows companies to be fully reliant on plantation grown fiber from land that is suited for the purpose and where carbon losses are minimized.

Regulate the use of MTH for pulp production

Arguably the main factor leading Indonesia's pulp producers to clear large areas of natural forest has been the Government's willingness to allow the industry to utilize the MTH harvested at a highly discounted cost. However, MOF has stated that after 2009 pulp mills will no longer have access to MTH. MOF could consider strengthening this statement by putting in place binding regulations to that effect. The use of MTH for pulp production could be regulated through restrictions or through a system of fees and taxes.

Until sufficient areas of plantations are fully established, further capacity expansions at existing pulp mills and the construction of new mills are likely to compound the problems associated with the industry's unsustainable wood supply and heavy reliance on peatlands. Thus, GOI could consider the option of tying the issuance of new licenses for pulp production to the availability of sustainable supplies of timber. Given the fact that future pulp production is likely to require at most another 1 million ha of plantations, it should be possible to implement this option without restricting the growth of the industry.

Shift plantation development to areas where the carbon impact will be low

The Government of Indonesia could introduce stricter criteria for plantation development to ensure that this does not involve the clearance of natural forests and the loss of carbon associated with this. MOF

is currently designing new criteria for land allocation following the expiry of SK 101/2004 at the end of 2009. How these criteria define 'productive forest', how they allocate land for HTI, and how the criteria are enforced is likely to have a substantial impact on the extent of the natural forest converted to plantations. In addition, MOF could strengthen regulations requiring HTI and HTR license-holders to protect a designated portion of natural forests standing within their areas' boundaries.

Often the establishment of pulpwood plantations on peat soils leads to significant carbon emissions that would not have occurred otherwise, and shifting plantations away from such locations is an obvious strategy option for reducing emissions. Opportunity costs of such a strategy are likely to be low if more productive suitable mineral soils are available for plantation establishment. To minimize carbon emissions from plantations on peatlands, MOF could consider revising the rules that are specific to HTI establishment on peat soils. This could include putting in place regulations concerning water table management and drainage of peat areas following plantation establishment.

Governance and Regulatory Framework

Improve availability of suitable lands for plantation establishment

An important element of a program to reduce carbon emissions from the plantation sector would be the acceleration of spatial land use planning to identify degraded and non forested lands that are not already under intensive agriculture or agroforestry.

A critical step towards fulfilling the plantation sector's potential to provide economic benefits while reducing carbon emissions is to actively include smallholders and communities in efforts to develop commercial timber plantations, and to ensure that these stakeholders share equitably in the benefits generated by such projects. Such efforts, backed by policies that improve the rural investment climate, should make available areas of 'clear and clean' non-forested land that currently are under less productive land uses.

Promote enhanced accountability of pulp and plantations companies for carbon reductions

There is a critical need for greater transparency and accountability on the part of corporate actors in the pulp and paper and plantations sectors. Recognizing the important role that pulp and plantation companies must play in any strategy to substantially reduce Indonesia's carbon emissions, it will be essential that these actors adopt improved standards for corporate reporting and disclosure. It is particularly important that pulp and plantation companies provide regular reports on key operational variables that affect the carbon footprint of their operations. This would include, for instance, detailed data on wood utilization, land-use practices, activities affecting peatlands, energy consumption, and emissions. An option for improved monitoring that the GOI could pursue with relative ease would be to modify its Environmental Impact Assessments to include an assessment of anticipated carbon impacts of proposed projects.

The high degree of concentration of the pulp and paper industry makes it possible to achieve considerable impact quickly by changing the behavior of a few companies. The Indonesian government could require each pulp producer to present a sustainability action plan covering both social and environmental issues. This sustainability action plan would provide specific targets for actions related to reducing carbon emissions including: increasing plantation fiber production; ending the use of mixed tropical hardwoods; enforce sustainable practices in plantation development in peatlands; purchasing wood solely from verifiably legal sources; protecting high conservation value forest; stopping fires in and around the concessions; and encourage sourcing raw materials through out-grower schemes.

STRATEGIES FOR REDUCING CARBON EMISSIONS FROM PRODUCTION FORESTS

REDD

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DEGRADATION

NATURAL PRODUCTION FOREST LANDUSE CHANGE STRATEGIES: POLICY AND IMPLEMENTATION BRIEFING

Major Findings on REDD and Natural Production Forests in Indonesia

1. Projections of continued losses of forest cover on production forest areas done in this Study suggest that about 14 million hectares more (i.e. 39% of present forested area on production forests) would be lost under business-as-usual projections of forest loss by year 2030, if existing policy on Reduced Impact Logging (RIL) and tackling illegal logging is not fully implemented.
2. If the carbon emissions from these losses could be avoided, and the savings traded as offsets in an international market, then based on a conservative estimate of the market price of carbon dioxide emissions of $4 per ton, a potential carbon trade present value of about $11.5 billion would result.
3. The Government of Indonesia has announced measures to prevent conversion of natural forest areas to estate crops - which will prevent the transfer of production forest areas into the convertible forest category, and thence to clearfelling – and an intention to re-locate future HTI (and other forest) plantations onto non-forested areas from 2009. These measures, if fully implemented, have the potential to reduce losses of natural production forest areas significantly.
4. However, this potential will only be realized if supporting measures to prevent degradation and forest losses from other, underlying causes – high levels of illegal logging, occupation of forest sites by large numbers of poor local people who have few livelihood alternatives, and poor forest management and utilization practices – can be effectively be put in place. Otherwise, the result may well be to shift the causes of forest loss rather than a reduce it.
5. While much work remains to be done on testing and costing strategies to reduce forest loss in the production forests, some indicative figures calculated in this Study suggest application of a group of feasible strategies that would address the main drivers of deforestation would, if applied over the period to 2030, cost less than the value of estimated maximum carbon trade benefits.
6. If license holders meet their obligations in respect of sustainable forest management, then they stand to benefit from both REDD and timber values.

Background and context

Indonesia's natural production forests represent the largest and most economically and environmentally significant category of Indonesia's forest resource. If an international trading mechanism to reduce emissions from deforestation and degradation (REDD) is created, it has the potential to significantly increase the value of ongoing sustainable management of Indonesia's production forests relative to alternative land uses. This means programs to convert natural forests, that may have been economically justified when implemented, may no longer be so if a REDD program is adopted in Indonesia. REDD provides an additional set of incentives to look beyond timber, and to realize broader environmental service values – in line with the basic philosophy of sustainable forest management.

This does not mean that all conversion is undesirable, or that plantations and related activities should be reduced, or that wood products industries dependent upon use of natural forest raw material should be eliminated. A national REDD strategy would need to be compatible with the nation's economic development goals. It does mean, however, that in order to maximize the sustainable economic development potential of the production forests, land use decisions should be re-evaluated in a way that considers the carbon value of maintaining standing natural forest.

This Study begins to assess some of these trade-offs, and addresses underlying questions of how operations in natural production forests can be made more sustainable; and what role the very large numbers of people living in or near forests, and highly dependent on them, can play in sustainability and the realization of forest carbon values. Livelihood pressures on these people are severe, and many have been significantly involved in some of the deforesting activities outlined above. Options that offer these people viable alternatives - including carbon-market revenues - will be a necessary ingredient.
To make significant progress in reducing deforestation and degradation changes to the incentive structures that influence and drive current interest in natural production forests will need to be made. Options for mobilizing REDD investments are discussed below.

The process of forest loss, and REDD options

During the late 1990s, the very high economic benefits of removing wood, the challenges presented by economic turmoil and political change, and the occurrence of serious fires across Sumatra and Kalimantan combined to produce large losses within the production forests. According to Landsat data, about 12.5 million hectares of intact forest cover was lost from all forest categories within the forest zone over the 1997-2003 period. Much of this loss arose from officially sanctioned natural forest clearfelling on industrial plantation sites (HTI) on production forest, and from forested areas on sites identified for conversion to tree crops or other agricultural uses – much of which was originally forest within the production forest zone.
Since 2000, losses of forest within the production forest area have declined significantly, largely as a result of the many reform efforts within the Ministry of Forestry, including: increased interdiction against illegal logging; implementation of integrated spatial planning with local government (Paduserasi); and the wide-ranging review process to evaluate the effectiveness of natural forests concession (HPH) management
Measures to reduce natural forest loss include: re-visiting planned deforestation programs and reducing allocation of natural production forest for conversion; and re-locating future HTI plantations off intact natural forest sites. But the differing forces driving forest loss in Indonesia's production forests will not in itself necessarily reduce forest loss. The market for illegal logs from Indonesia's forests is high, both internally, and internationally. The demand for land by local people, government agencies and the private sector is greater in production-forest areas, which are often more accessible and nearer to heavily settled areas than some other forest categories. There are major issues of responsibility, jurisdiction and governance present in forested areas; as well as fiscal policy which influences the incentives available for sustainable forest management. In many cases, deforestation appears in present circumstances to be the only way in which some levels of government and local communities can generate benefits from forests. Whatever else happens, REDD benefits will have to be distributed in ways which offset this present reality, if significant progress is to be made.
This suggests that an integrated approach, rather than specific one-off changes, are going to be required if Indonesia is to reduce forest loss and to take advantage of REDD as an economic opportunity. This includes:
a) vertical integration of activities undertaken in relation to any one driver of deforestation to address the various interest groups involved, from national government through to local communities; and
b) horizontal coordination of programs and policies, so that resolution of pressure on forests from one quarter does not simply provide room for another to become predominant.

Given the scale of the challenge, it may be necessary to phase implementation, firstly by region starting with areas under most pressure and moving to those with less; and secondly through time. However, preliminary analysis also indicates that, if REDD implementation is phased in over five and ten year periods, the net present benefits decline by 12 and 25% respectively compared to the assumption of full benefits arising as the program begins.
It is important to note that definitions of deforestation and degradation have not been established in the

context of REDD. For the purposes of this study, it is assumed that clearing natural forest to establish a pulp or timber plantation is considered deforestation, regardless of whether the land stays in the forest estate. This reflects the actual carbon profile of land use, and is consistent with other guidance from the IFCA methodologies team.

Supporting strategies for reducing forest loss in the natural production forest estate

This study has reviewed a number of possible approaches to REDD implementation to reduce the loss of natural production forests. It is important to note that many of the strategies recommended here are already being considered, developed, or piloted by the Government of Indonesia. A national REDD framework will not fundamentally change the ways to achieve sustainable forest management, but it may give the additional political will, financing, and focus to make the necessary transitions happen more quickly.

1. Improving forest logging concession (HPH) management

Moving toward outcome based regulation: The present system of managing licensed forest logging operations in Indonesia, through constant application of an extremely detailed set of regulations, laws and provisions governing forest operations, is complicated and human-resource intensive for both the Ministry of Forestry, and concessionaires, and there are significant losses in the operations of the logging industry. There are alternatives, based on a certification process of scheduled inspections, carried out by skilled independent teams, which can evaluate performance of logging operations and apply sanctions or incentives accordingly. These systems, combined with reduced impact logging methodologies and performance bonding, will provide a more effective regulatory and incentive environment to maintain control over sustainable management of logging concessions. The Ministry of Forestry is currently considering a mandatory verification process which has features based on the voluntary certification model.

Strong incentives for sustainable management: Improving forest retention in HPH concessions will have a significant value under a national REDD strategy, and performance based incentives should go to those that create that value through improved management. Incentives can be directly tied to carbon outcomes, or indirectly connected based on proxy measures. For example, concessionaires that maintain certification of sustainable management could be eligible for financial incentives correlated with improved management. An annual payment of $900 per logged ha/yr may be warranted based on sustainable management of the entire concession. In addition to financial incentives, the Ministry of Forestry can create other strong incentives. For example, there is already an initiative to allow certified operators to self-approve their annual allowable cut, a major benefit to concessionaires. Strategically applying these types of incentives may quickly move concessionaires toward sustainable management.

The operational benefit of applying the improved management methodology set out above would come from efficiency based increases in log volume yields; lowered costs of conflict with local communities (since the certification approach requires attention to this aspect of forest operations).

Some controversy in implementation can be expected; it may require major regulatory change. Responsibility for design and implementation would rest with Ministry of Forestry and concessionaires. So political feasibility should be fair: the Ministry of Forestry already has in train plans for introduction of a verification system which has many of the characteristics of the system suggested here. Incentive benefits as proposed would go direct to concessionaires, and there are also experiments with enhanced management under certification operating at concession scale in the field in Indonesia at present.

2. Ecosystem Restoration Licenses

Identifying logged-over forest areas likely to be deforested and allocating land to either HPH, or Ecolog-

ical Restoration Concessions: Identification of vulnerable forested areas, utilizing forest imagery, geophysical and demographic overlays will be critical inputs. The process will also require follow-up field work to establish which areas would best be re-classified as potential HPH areas, and which should be designated as concessions for ecological restoration concessions. For the latter, options and issues for community and local government involvement in the sites identified, and negotiation of REDD-based projects to promote and support this would be undertaken. There is a need for multi-stakeholder participatory planning such as that provided for under the HCVF framework to set future forestland allocation directions. All major stakeholders need to participate in this if outcomes are to be accepted by all key groups, particularly different levels of government.

Mobilizing ecological restoration concessions and encouraging community involvement with REDD funds: Currently, only one Ecological Restoration Concession (Hutan Harapan) has been developed by the NGO Burung Indonesia. For these concessions to take hold on a large scale, private capital, including from international investors, will need to be channeled effectively. At the same time, communities living in or near the forest will surely play an important role.

3. Establishing improved governance in "open access" forest, strengthening community-based forest management.

Approximately a third of the area of the production forest zone is what is known as "open-access" forest: - areas which are occupied by neither HPH concessions, nor HTI zones. These forests can be heavily encroached, and are also vulnerable to the activities of illegal loggers. Some open-access forest with very low forest cover may not be suitable for either HPH management or regeneration, and should be considered for HTR small-scale community plantations or HTI concessions.

In more forested open-access areas, Ecosystem Restoration Licenses are a possible means to tackle further deforestation and degradation (see above). But as many as 60 million people also live in or near Indonesia's forests, often in poverty and with little access to land. Land conflict may be especially acute in 'open-access' areas. Unless these people are offered a stake in maintaining forests in a good regenerating condition, it is likely major difficulties will arise. The strategy suggested here involves a two-phase program:

(i) Identification of the most vulnerable natural production forest areas, using technical, geophysical and current deforestation information; and then

(ii) support to community-based sustainable forest management , using REDD funds as necessary - building on community forestry licenses as provided for in Regulation PP6/2007 on forest management and utilization (e.g. Hutan Kemasyaratan or HKM).

This would be an extremely large program, facing significant challenges with stakeholder consultation, governance, benefit distribution and possibly also tenure. Relationships and cooperation with local government will be vital. Major recipients of benefits will be local communities, with some revenue sharing with local governments. However, the main costs of initiation will rest with the Ministry of Forestry. Politically, this is in line with current Government of Indonesia policy on natural resource management.

4. Reducing demand for and supply of illegal logs as a driver of forest degradation

A recent Ministry of Forestry industry revitalization study suggests that around 6 million cubic metres of logs going into the wood products industry at present are sourced from illegal operations. The level of illegal logging has declined significantly in recent years, due to market issues and an enhanced logging interdiction program by the Ministry for Forestry and the national police. Illegal logging operations do not necessarily cause deforestation immediately, but it is highly likely that they do cause degradation, and if they are present in large enough numbers, then this, combined with overuse of the forest resource as a whole, will ultimately cause deforestation.

This study uses a proxy figure to quantify the deforestation effect, and the result is that illegal logging operations in the production forests are presently responsible for an equivalent of 150,000 ha per annum of deforestation. The study canvasses two short-term measures which will be needed to address

this problem, at least until medium term re-structuring of the forest industries as a whole, as suggested in the Ministry's revitalization document, is under way.

1. Continuation and improvement of the large and ongoing operation to interdict illegal logging operations in Indonesia. Some issues of coordination between the national police and the Ministry of Forestry will need to be addressed, in this regard.
2. A supporting approach would be for the Government to subsidize the transition of wood products industries to more high value-added products, such as framing, moulding, furniture manufacture and carving (a measure which is suggested in the Ministry of Forestry revitalization roadmap document). These industries would in aggregate use significantly less volume than the two dominant sectors do now, and would be able to pay international prices for the logs used. It is estimated that the net costs of this subsidy and adjustment process would be close to zero, because of improved forest value. But to avoid any underestimation of REDD costs, a net adjustment/ subsidy cost of $100 million per annum has been adopted in this analysis.
3. An adjustment scheme for sawmills and plymills will be controversial, fiscally and politically. However, Indonesia has experience with industry adjustment in many sectors, and provided the benefits to exiting and re-structuring operators are set at reasonable compensatory levels, this will be possible. Management of this program should probably rest with Ministry of Industry and Trade: initial costs will accrue to Government of Indonesia; benefits will accrue initially to high value-added sectors which will be able to expand in this environment, and ultimately to Government of Indonesia with higher revenue flows for natural log supplies. Some costs will inevitably fall upon small sawmilling and ply enterprises and employees; the adjustment program will need to include adequate attention to re-training and re-tooling opportunities.

Pilot projects ideas (description of action, criteria for selection)

Given the interlinked nature of the drivers of forest loss in the production forests, and the complementary nature of the proposed interventions, it is not possible to pilot a strategy for production forests on individual concessions, or small areas of land. A carbon finance pilot of the above approaches could be done over a large area to achieve a meaningful impact. But the area needs to be manageable, to ensure criteria for REDD pilot selection (as suggested by the Ministry of Forests in the Executive Summary) can be fulfilled. Depending on scale, such pilots could take place at the scale of a Forest Management Unit or in respect of an entire kabupaten. An alternative would be to include all of the concessionaires in a district-scale pilot, though this may not be necessary. It will also be necessary to continue developing supporting activities at the provincial and national scales. This will include enabling legislation and policy for pilot strategies related to performance bonding, timber legality, and other topics.

In addition, the strategy should be piloted in the same geography as other REDD strategies due to the reinforcing nature of the strategies, and the fact that they share many of the same enabling conditions.

STRATEGIES FOR REDUCING CARBON EMISSIONS FROM PROTECTED AREAS

REDD

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DEGRADATION

Policy Brief: Strengthening the Effectiveness of the Management of Protected Areas through Reduced Emission from Deforestation (and Degradation) in Developing Countries (REDD)

The study analyzes the options for including improved management of terrestrial protected areas in Indonesia in a national REDD strategy.

The findings on historical and business as usual forest losses:

- The total forest cover change in protected areas between 2000 and 2005 was 127,481 hectares. Losses in National Parks were 27,606 hectares (5,521 hectares per year), 19,071 hectares in Other Conservation Areas (3,814 hectares per year) and 80,804 hectares in Protection forest (16,161 hectares per year). Losses in conservation forests were fairly consistent, but losses in protection forests increased steadily from 4,751 in 2000/1 to 39.995 ha in 2004/5. Approximately 93 millions tons of carbon dioxide emissions resulted from forest loss in protected areas during this period.
- There is low certainty in the accuracy of this estimate of carbon emissions due to a) widely differing results from different monitoring approaches and b) the fact that these figures have do not account for degradation of the forest (loss of forest, but not enough to count as deforestation), which may be significant in protected areas as a result of illegal logging.
- The study illustrates that illegal logging and encroachment are considered as the most important and widespread proximate driver of deforestation and degradation within Conservation and Protection Forest.
- The Business as Usual scenario determines the maximum potential for REDD revenue, and is one of the most important issues in REDD. The base case was developed by projecting average historical rates of forest cover change and emission. Because of the rapid increase in the deforestation rate in protection forests, alternatives were considered in which emissions are projected to continue rising at historical rates.

Potential REDD Scenario

- The study describes a phased REDD strategy for protected areas with additional interventions to a) stabilize protected areas, reducing forest cover loss to zero over 5 years, and b) restoring available land to natural forest cover over the following 10 years. Restoring and rehabilitating forest within protected areas would have significant climate change benefits.
- Under the REDD scenario, the estimate shows that with a five year time frame for reducing forest losses to zero, the potential to avoid emission of approximately 20.5 million tons of CO2 in conservation forests and 88 millions tons in protection forests. Over the following ten years the study projected that a portion of land to be restored and then stabilized at a higher percent cover. It is estimated that more than 5.6 million hectares may be available for rehabilitation. The carbon benefit of this is estimated at approximately 2.8 billion tons CO2.
- The main strategies recommended to achieve the reduction are: a) upfront investment in planning for REDD, b) raising protected area funding up to an estimated ideal level resulting from needs assessment, c) significantly expanding the collaboration with communities and local government for protected area management, d) investment in institution building, particularly for protection forest management using KPH units.

Costs and benefits

- The five year estimated cost (present value) for REDD in conservation areas is USD $494,789,976 and in protection forest is USD $647,439,774. It may be possible to reduce costs by prioritizing high-threat areas
- With the extremely low average historical forest cover change used as the reference level, investment in reducing forest loss through REDD mechanism in protected areas does not appear to be viable as stand-alone option. The process at which the interventions listed are likely to be economically rational as stand-alone investment are USD $11.50 /ton CO2 for protection forest strategy and USD $37/ton CO2 for conservation forest strategy.
- Using the trend of increasing losses in protection forests as the baseline, the interventions in the protection forests appear to be cost effective at prices higher than USD $3.50 per ton of CO2.
- Protected Areas require a REDD mechanism which delivers long-term sustainable funding, recognizes that on-going investment is needed to protect the very large standing stock of carbon held within protected areas, and rewards investment in increasing the carbon stock through restoration.

Overview

The study analyzes the options for including improved management of terrestrial protected areas in Indonesia in a national REDD strategy. Protected areas include Conservation Forests (Kawasan konservasi: national parks, wildlife reserves, nature reserves, forest parks, tourism parks and hunting reserves) and Protection Forests (Hutan lindung). Protected Areas are fundamentally different in character from other forest reserves. No planned or legal deforestation and degradation occurs within them (with the rare exception of strategically important infrastructure projects). Their status means that existing carbon stocks, and those added through restoration programs, are legally protected and permanent. The deforestation and degradation which occurs is driven by a complex of social and economic factors which are difficult to analyze and model, and so business as usual and REDD scenarios have high degrees of uncertainty attached to them. Responsibility for providing resources for management of protected areas falls entirely on the Forestry Ministry, and no revenue is generated through these efforts (except for tourism incomes in a handful of places).

Summary of options evaluated

The basic options considered in this study are presented in the table below. It was assumed that the existing investments in protected areas management would remain constant, and the evaluation was based on whether REDD revenues could cover the costs of increased investment for improved management.

	STABILIZATION	RESTORATION
Conservation forest	Achieve stabilization	Restore viable areas
		Do not restore
	Continue existing management	
Protection forest	Achieve stabilization	Restore viable areas
		Do not restore
	Existing management	

Quantifying forest area change and resulting carbon emissions

Indonesia has set aside over 22.6 million hectares for the protection of biodiversity and ecosystems and a further 30.1 million hectares for the protection of environmental services including carbon. These protected areas comprise 28% of the total land area of the country. In 2003, 78%, of protected areas were forested.

There are still wide ranges of estimates for forest loss using different measurement techniques. Rates of forest loss measured from MODIS satellite imagery (2000 – 2005) are less than 8% of those derived from Landsat (1997 – 2003). For consistency with other IFCA studies, this study uses the following figures, calculated from the MODIS imagery from 2000-2005 (DepHut) which indicate:

n=		2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	Total forest loss	Loss per year	Total CO2 lost	C02 lost per yr
21	National Park	2,398	4,591	12,151	3,647	4,819	27,606	5,521	20,262,819	4,052,564
74	Other cons areas	926	4,003	4,472	5,715	3,955	19,071	3,814	13,998,114	2,799,623
27	Protection Forest	4,751	8,856	11,097	16,105	39,995	80,804	16,161	59,310,253	11,862,051
		8,075	17,450	27,720	25,467	48,769	127,481	25,496	93,571,186	18,714,237

Based on the deforestation rates outlined above, and making a simple assumption about the amount of Carbon in a hectare of forest (734 t Co2), it is calculated that 93 million tons of carbon were lost per year from 2000-2005 in protected areas.

Projection of future emissions

BAU baseline:

A business as usual (BAU) scenario is developed by projecting average historical rates of forest loss and emissions for both conservation and protection forests. Emissions for conservation forests were relatively stable over the five year period. Because of the rapidly increasing carbon emissions in protection forests, three alternative baselines were evaluated. The low case uses the 5-year average emissions. A medium case was created that assumes that the emissions from 2004/5 will continue for the next five years. In the high emissions scenario, emissions were projected to grow at 30% per year, which is conservative compared with the rate of growth of approximately 75% per year for the past four years.

REDD scenario:

A REDD scenario is analyzed in which the current forest loss in each category is assumed to be eliminated over a five year period. Over the following ten years, a portion of the land is projected to be restored and then stabilized at a higher percent forest cover.

Based on the estimates from MODIS imagery, and assuming a 5 year time-frame for reducing forest losses to zero, the Base case estimate is that there is a potential to avoid emissions of approximately 20.5 million tons of CO2 over a 5-year period from conservation forests, and 88 million tons over the same period from protection forests.

OVERALL ECONOMIC ANALYSIS

Stabilization

The study describes a phased REDD strategy for protected areas which includes additional interventions to a) stabilize protected areas, reducing forest cover loss to zero over 5 years, and b) restoring available land to natural forest cover.

The actions described in the study for stabilizing protected areas are a) Up-front investment related to needs assessment and strategic planning; b) Increase management capacity through increased funding for management units up to an ideal budget level and refinement of strategies for protected areas management, c) Increase efforts aimed at collaboration with communities, NGOs, government stakeholders; d) Key investments in institutional development (especially for protection forests). Five year estimated costs are USD$ 494 million for conservation forests and USD$ 647 million for protection forests.

It is important to note that the cost estimates are probably overstated since they assume that all areas require the same level of investment. In fact, there may be many areas that are self-protecting based on remoteness, where investments may be lower or delayed, to reduce the cost of the program.

The present value of reducing forest loss to zero within five years in both conservation and protection forests would be $280 million assuming a price of $4/ton CO2, and $701 million at a price of $10/ton CO2.

Given the extremely low recorded forest cover change used in this analysis, investment in reducing forest loss through a REDD mechanism in protected areas does not appear to be viable as a stand-alone option. The prices at which the interventions listed are likely to be economically rational as a stand-alone investment are $11.50/ton CO2 for a protection forests strategy, and $37/ton CO2 for a conservation forests strategy.

Protection forests are more economically viable than conservation forests for REDD according to this analysis because the historical emissions are higher and therefore potential revenues from stopping emissions are higher. The wide range of values for forest loss in protected areas makes this analysis extremely uncertain. If the forest loss figures from Landsat 1997-2003 rather than MODIS 2000-2006 are the basis for estimating potential revenues, the break-even price is $3.50/ton CO2 for the conservation forests strategy and $6/ton CO2 for the protection forests strategy.

Applying the BAU scenario based on rising trend of losses from protection forests (high case) indicates a break-even price of $3.50.

Clearly, the choice of baseline for the conservation and protection is both extremely important and extremely challenging. Better data is needed, and political judgment is required.

Restoration

Beyond elimination of losses of forest cover within protected areas, restoring and rehabilitating forest within protected areas would have significant climate change mitigation benefits as well as creating opportunities for beneficial impacts on local livelihoods. It is estimated that more than 6.5 million hectares may be available for rehabilitation, either to natural forest cover or for establishment as agroforests. The carbon benefits of this are estimated at approximately 2.8 billion tons CO2, over 20 times greater than the carbon emissions reductions anticipated from stabilization alone. As there are no legal commercial alternatives, the opportunity costs for restoration are the costs of the management intervention and the costs of altering or moving local land uses which are within the reserve.

The scale of opportunity for restoration may be very large, depending on the current use of the land within protected areas and availability for restoration, and would be in line with the management goals of protected areas. The main assumption of the IFCA teams has been that REDD will utilize a gross accounting system in which regrowth is not credited. Seeking an accounting system that allows for crediting of regrowth in areas intended to be forested (e.g. protected areas) that were already cleared of forest in 2005, would create a large potential for the protected areas to contribute to Indonesia's overall GHG performance. Connecting the restoration with a REDD system rather than the CDM allow significant reduction in transaction costs.

REDD issues

The strategic options study on protected areas has highlighted a number of issues which should be considered in formulating Indonesian's position on REDD.

Protected areas as a fundamental part of a national REDD strategy

The analysis performed in this study shows that intensifying current efforts at reducing deforestation and degradation emissions in protected areas solely for the purpose of earning REDD payments may not be strategic. If improved satellite imagery reveals that current emissions are higher than the MODIS data indicate, this strategy may be economical as a stand-alone approach, but even considering the terms of this analysis Indonesia may choose to include protected areas as part of a national REDD strategy for two reasons.

First, if as a result of REDD-related commitments, increased effort is put into reducing forest loss in other parts of the forest, pressure and deforestation will increase inside of protected areas if there is not increased resistance to these forces. Second, protected areas may be considered by the eventual international agreement to be a pre-requisite for generation of REDD credits in other areas of the forest estate. In this way, the costs of avoiding emissions inside protected areas may be considered as enabling other REDD credits, rather than as an independent decision.

Degradation: Progressive degradation or small scale deforestation may be responsible for a large proportion of the loss of carbon from the conservation and protection estate. If REDD is limited to deforestation only, the loss of carbon from these forests will be seriously underestimated, and thus the potential to earn payments for reducing carbon emissions will be less. Measuring degradation is feasible, though more complex than deforestation. It is likely that the added costs of measuring degradation will be more than covered by the benefits from being able to include degradation in a REDD mechanism.

Net accounting: As discussed below, the potential carbon gain from restoration is more than 20 times greater than the potential emission reductions using a simple REDD scenario. A net carbon accounting method which accounts for net carbon stock change across the entire forest estate should be considered. Whilst this could produce very significant benefits in terms of additional carbon stocks being eligible for REDD payments, it would carry higher costs in terms of investment in measuring and monitoring the stock.

Legality: One view within the REDD discussion globally is that payments should not be available to stop deforestation which is already illegal. This would make conservation and protection forests ineligible for REDD payments. In countering these proposals it is important to emphasize that Indonesia has already exceeded the international target for declaring protected areas (CBD mandates 10% of the land area, Conservation forests already cover 12%). It is also important to emphasize that REDD payments are for increasing management effectiveness, and not for 'compensating' illegal activities, and that deforestation and degradation are ongoing sources of carbon emissions which need to be addressed.

Permanence of REDD payments for supporting protected areas financing: For effective protected areas management, stable flows of funding are probably more important than very high levels of short term funding. If management interventions are successful and deforestation is reduced and eventually stopped, there will be no more deforestation to reduce. REDD payments may be high initially but will eventually decrease to zero. Even if carbon sequestration from restoring deforested areas is compensated, there will be a point when all the available land has been restored and payments for sequestration will also stop. Fluctuating carbon market prices, and the whims of international investors add further uncertainty to the situation. Without a mechanism to pay for maintaining the stable state of forests, deforestation and carbon emissions will start again. As yet there is no mechanism to compensate rainforest nations for maintaining forest carbon stocks, either those existing now or those remaining after deforestation has been stopped.

Complementarity: Carbon in protected areas is only one of a suite of values which includes non-timber forest products, genetic resources and environmental services. REDD mechanisms need to be tailored to incentivize maintenance of these overall values and to maximize the overall value of standing natural forest to all stakeholders.

Areas for further analysis

Strategic reviews of the protected areas system

Reviewing the protected areas system is a priority for national strategic planning, as well as fulfilling Indonesia's obligations under the CBD (gap analysis). A regular review of conservation forests is mandated by PerMenHut 14/2007. A review project coordinated by a team within PHKA and drawing on PHKAs partnerships with conservation NGOs could address these goals and provide a basis for developing a full REDD implementation strategy for the protected areas sector.

Main activity:

Gather detailed information on threats and management inputs (costs, interventions) from a representative sample of reserves. The set chosen should ideally include the reserves used for detailed analysis of so that the links between these factors can be investigated. A detailed model for studying costs is available from CCIF (2007).

Pilot projects ideas

Protected areas strategies should be piloted in coordination with other REDD strategies to test reinforcing and complemen-

tary strategies and to minimize leakage. Encroachment and illegal logging are important issues in protected areas, HPH concessions, and open access areas in the production forest. Therefore, approaching them together can reduce costs and increase effectiveness. Applying strategies in the same place, for example at a kabupaten scale, also best simulates the conditions of a national REDD mechanism.

Pilot Different Management Mechanisms for Protection Forests

This report has highlighted that protection forests cover a large area, have large stocks of carbon, are probably under high levels of threat in many places, and are virtually un-managed at present. There appear to be significant potential for REDD payments, but testing how such payments might be used to improve the management of these forests is needed. An appropriate target would be 10 KPH protection forests with at least 2 each in Sumatra, Kalimantan and Papua. Sites chosen should represent upland an lowland agro-ecosystems and forests, large single protection forests and fragmented multi-reserve sites KPHs, high and low payment for environmental services potential (for example, hilly ground near a population centre vs level ground far from population centre). Conservation Districts which have shown a commitment to improved forest management should be prioritized for implementation of the pilot. Initial set-up costs should be invested, but running costs should be based on measured performance and co-fund environmental services payments.

Develop mechanisms and institutional arrangements for payments for environmental services in conservation forests

Conservation forests have adequate management structures but the authority to issue licenses to use environmental services rests with the Minister, making the process of issuing such licenses complex. The recently established Ministry of Forestry 'general service body' (badan layanan umum, BLU) is intended to provide a mechanism whereby financial arrangements can be handled at a level closer to the management unit. Once BLU capacity is established at regional level, it should be possible for revenue from environmental services payments to be held locally and used directly to fund management interventions, only then is any surplus sent to the central account. This process needs to be developed and tested as a precursor to REDD payment delivery

Developing a system for improving land and vegetation management through granting conditional rights to small farmers

This report has noted that encroachment is one of the major causes of deforestation and degradation in protected areas. A low-cost way of stabilizing forest clearance and involving local people in protecting the remaining forest resources is through the granting of conditional use rights to the land and resources which have already been exploited. This can be done through the Community Forestry (Hutan Kemasyarakatan, HKm) system in protection forests and the allocation of special zones in National Parks. The increased security felt by the farmers results in greater investment and more sustainable land management. Criteria for selecting reserves for trialing include status (national park, other conservation areas, protection forest), characteristics of the community (income, level of dependence on forest resources, degree of interaction with the reserve, with or without traditional claim to the land), value of the land and the crop, annual and perennial (tree crop) zones.

STRATEGIES FOR REDUCING CARBON EMISSIONS FROM PEATLANDS

REDD

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EMISSIONS FROM
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DEGRADATION

REDD Implementation on Peatlands: POLICY AND IMPLEMENTATION BRIEFING Major Findings on REDD and Peatlands in Indonesia

1. Indonesia has 21 of 25 million hectares of peat in Southeast Asia.
2. Emissions from peatlands have been estimated at 1061 Mt/y for Sumatra between 1990-2002 and 1400 Mt/y from episodic fires during 1997-2006 across Indonesia. If things do not change emissions could be well approach 2000 Mt/y.
3. The major means of emissions is through clearing and draining peat and the fires that also occur due to conversion activities. The key approaches to managing emissions from peatland are water management and fire management.
4. Peat has different characteristics in different parts of Indonesia. The wide variation and range of these identifies that wise use management approaches are required.
5. In implementing any strategies for peatlands strengthened governance, institutional and regulatory frameworks are needed. Building the capacity of public institutions including local government, parliamentarians and civil society will be critical.
6. Regulations, laws and guidelines for peatland planning, water management and fire management must be reviewed, resolved and rationalised. Once clarified enhancing the means for implementation is required.
7. Pilot sites should be selected to evaluate the various factors that must be considered for effective design and implementation of REDD in Indonesia; including biophysical; social (pro-poor); economic; governance and legal aspects.

Background and Context

Peatland is a unique ecosystem with roles in regulating water regime and flooding, habitat for numerous species, and an important part of local livelihoods. In the context of climate change, peatlands have received considerable attention for their role in the global carbon budget. Globally, peatlands cover an area of 400 Mha, which stores more than 500 Pg of carbon. The peatland area located in the tropics contains 191 Pg is, of which 60 percent is in Southeast Asia with an estimated area of 25 Mha. Indonesia has approximately 21 Mha of this concentrated in Sumatra (7.2 Mha), Kalimantan (5.8 Mha), and Papua (8.0 Mha). At least 3 Mha have been converted or degraded between 1987 and 2000. Increasingly peatland is being drained and developed for oil palm and pulpwood plantations. During 2000-2005 the rates of deforestation on peatlands were 89,251 ha/y in Sumatra and 9,861 ha/y in Kalimantan mostly occurring on deep (2-4 m) and very deep (4-8 m) peat, resulting in significant GHG emissions.

Estimates of Peat Emissions

As well as deforestation, removing forest biomass, emission from peatland is caused by oxidation when the system is drained which creates compaction and subsidence of the peat surface (Figure 1). The best available estimates of the emissions due to drainage indicate annual CO2 emissions between 355 and 874 Mt/y with a mean of 632 Mt/y for Southeast Asia.

Based on the changes of the area of each peat depth classes during 1990-2002 and peat physical properties (bulk density and carbon content) it was estimated that CO2 emission for Sumatra was 1061 Mt/y.

Fires on peatland also create emissions reported to be as much as 1400 Mt/y from episodic fires during 1997-2006. Report claim that 90 percent of these emissions take place in Indonesia.

Under the 'business-as-usual' scenario the future CO2 emissions from Indonesian peatlands could be well around 2000 Mt/y based on an estimate from a decade estimate that captured both El Nino and non-El Nino years.

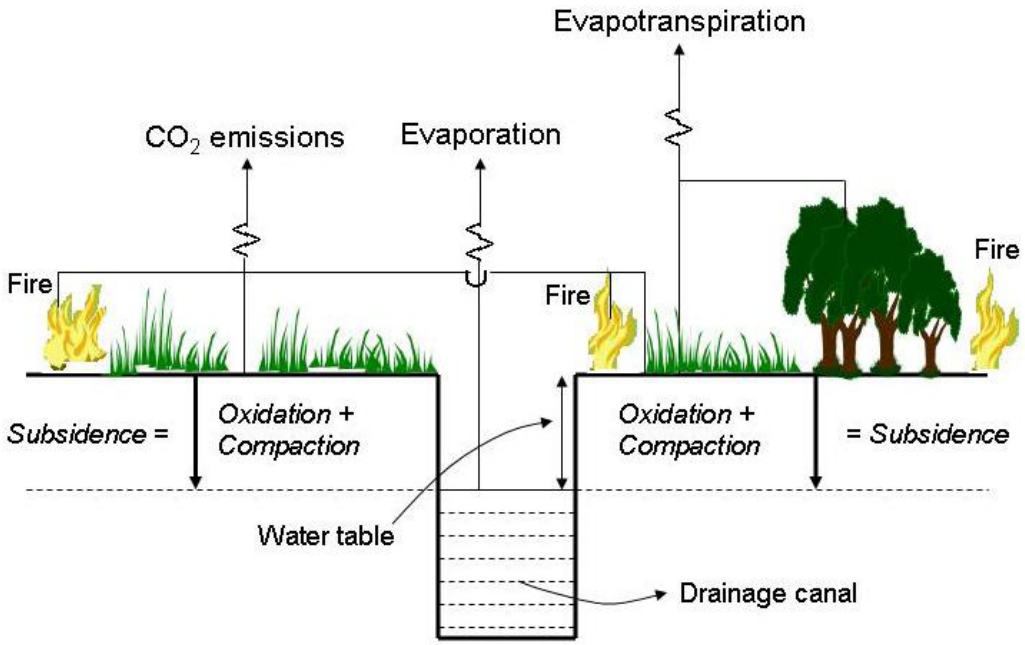

Figure 1. Diagram of peatland drainage and peat compaction measured as peat subsidence leading to peat oxidation that releases CO2.

Strategies for Peat Emissions

The incentives for developing peatlands with high carbon value should be assessed through appropriate consideration of opportunity costs. Peatland development may not be economical if the price of carbon in the conserved peatlands is more attractive.

Different peatland types require different management options. Peatlands can be grouped in “peatland clusters” based on peat depth, fire risk and deforestation rate; forested and non-forested peatlands followed by grouping by district to identify geographic distribution and administrative jurisdiction. The range of these suggests that wise use management approaches are required.

Efforts to reduce emissions should be based on the processes of how emission occurs and what emissions are caused by. Drainage and fire should therefore be the main management option to control emissions.

Water management

The initial effect of draining peatland is oxidation of the drying peat, followed by compaction that causes peat subsidence. This encourages land managers to deepening the drainage canals to maintain access, causing further subsidence (see Figure 1). In developed peatland it is very important to manage the water table to substantially prevent peat subsidence within the life cycle of the crop or land use e.g. planted pulpwood or oil palm. On degraded peatland the water table may be raised by blocking the existing drainage canals would reduce further emissions and create economic activities. Water level management therefore, plays a key role in controlling emissions from conserved, developed and degraded peatland.

Fire prevention

Although it is episodic, fire is the most direct cause of GHG emission when biomass is burned. Fire occurrence is closely associated with land-use change and land management and so fire prevention should be linked with the underlying causes of fires. In addition to the enhancement of fire fighting capacity, perverse incentives related to forest conversion and land-use change should be discouraged. Community Based Fire Management (CBFiM) that has been implemented in several places deserves incentives from carbon benefit. Like water management to avoid subsidence, there is great a need to engage and integrate multi-stakeholder processes to prevent peatland fires.

Governance and regulatory framework

In implementing any strategies for peatlands strengthened governance, institutional and regulatory frameworks are needed. Building the capacity of public institutions including local government, parliamentarians and civil society should be prioritized in the pilot phase. They may be engaged in REDD scheme using a participatory approach. Provincial and district governments will likely to take the lead. With sufficient preparatory phase and capacity building they should be able to facilitate agencies such as Dewan Wilayah Sungai, community fire brigades, local NGOs, and managers of National Park, pulpwood and oil-palm companies.

Additionally, considerable development and refinement is needed for the regulatory framework to implement REDD scheme and at the same time harmonize focus and respective objectives for peatlands. Presidential Decree (Keppres) No. 32/1990, one of the most relevant legal documents, set out that peat areas deeper than 3 meters should not be developed. However, it is significantly different to Agricultural guidelines, which identify that areas with up to 76 cm deep peat are suitable for conversion to agriculture. Similarly, Provincial Spatial Planning (Rencana Umum Tata Ruang Wilayah Propinsi, RUTRW) issued in 1992 indicates the delineation of all peat swamp areas to fall under the status of Protected Areas. These, and other, varying and apparently conflicting decrees, guidelines and planning requirements need to be resolved and rationalised. Once clarified enhancing the means for implementation is required.

Some aspects of legislation such as Kepmen No.14/M. Ekon/12/2001: Direction of National Policy on Water Resources; promotes the process of integrated water resources management between inter-related sectors and regions at the central, provincial, and district/town levels, and for river basins. It encourages the establishment of appropriate institutions for inter-actor coordination for rivers flowing across provincial boundaries. This approach should be reviewed, endorsed and encouraged. Models for such institutions from other countries could be examined.

There are a number and wide range of regulations that are intended to prevent damaging fires. These range from prohibiting all forest and land fires; to decrees from the Minister of Forestry of Guidelines for Prevention and Control of Forest Fire, the Director General of Forest Protection and Nature Conservation Technical Guidelines for Forest Fire Prevention and Control in Concession areas, the Director General of Estate Crops on Technical Guidelines for Land Clearance without Burning to Develop Plantations. There are some severe legal penalties for persons causing fire that range from prison sentences of up to 15 years and fines of up to 5 billion rupiah. As for regulations for peatland these, and other, varying and apparently conflicting decrees, guidelines and planning requirements need to be resolved and rationalized. Once clarified enhancing the means for implementation is required.

Potential Pilots for Peatland

The technical, management, planning and regulatory requirements and gaps in knowledge and research can be considered through the implementation of pilot sites in peatlands, designed in part to answer them as well as demonstrate the potential for REDD.

The pilots could be selected to evaluate the various factors that must be considered for effective design and implementation of REDD in Indonesia;

- biophysical (peat dept, risk to fire, and risk to conversion);
- social (pro-poor);
- economic (income, equity, delivery of payment);
- governance (rights and responsibilities, level of participation); and
- legal (land tenure, national policy, local policy).

Pilot sites may be prioritized based on the availability of information, readiness of the stakeholders to share rights and responsibilities. Areas or districts with deep peat should be high in the priority list with 12 such districts distributed in the provinces of NAD, Riau, Jambi, East Kalimantan and Papua.

REDD POLICY SCENARIOS AND CARBON MARKETS

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REDD Policy Scenarios and Carbon Markets

Policy conclusions:

- There is still much uncertainty about the form of a future REDD regime, which will depend on decisions at the international level of the next few years.
- Approaches to REDD using national reference scenarios and accounting are likely to generate larger financial flows and reduce overall risks but they could involve higher transaction and implementation costs and greater inefficiencies.
- A mix of national and sub-national, fund and market based and voluntary and regulated approaches to REDD is preferable to increase learning before 2012 and to increase the range of REDD options available to sellers and buyers.
- Early voluntary projects and pilot activities should be encouraged, but safeguards such as registries to prevent double-counting and selling must be put in place immediately
- Future REDD markets could involve large financial flows of between USD1 and 18 billion, but these depend on wide range of factors affecting a post-2012 climate regime. The performance-based nature of REDD means that sellers will have to meet the requirements of buyers in order to access financial flows.
- Risk and liability, credit quality and price are key issues for buyers of carbon credits. REDD involves high risks, especially relating to permanence and leakage. Both of these risks can be significantly reduced through the establishment of national accounting and monitoring systems
- Transaction and implementation costs for REDD are likely to be high, the revenues from carbon may not cover the full cost of projects and there could be a time lag before payments are made. Options for reducing costs must be carefully considered, additional financing may need to be found and payment schedules with buyers must be carefully negotiated.
- Sellers will need to ensure that they can meet liability rules if they fail to deliver emissions reductions, which might include payment of damages to buyers or replacement of credits. They will also need to establish rules for compensation from buyers for non-payment.

Background to carbon markets

Carbon markets operate in a similar way to those for any other traded commodity. The main differences relate to the technical procedures needed to measure and track carbon which affects the design, costs and risks of carbon projects, and the extremely important role public regulation has played in creating the markets and in driving demand for carbon credits, particularly since the Kyoto Protocol came into force in 1997.

There are two main carbon markets relevant to REDD:

- The **regulatory** market consists of three different flexible trading mechanisms operating under the internationally agreed rules of the Kyoto Protocol. They include Emissions Trading, Joint Implementation and the Clean Development mechanism (CDM). Only the CDM, in which Annex 1 countries can buy credits from projects which reduce greenhouse gas emissions in non-Annex 1 (developing) countries, offers potential benefits for developing countries from carbon finance. The value of the CDM market was USD 5.6 billion in 2006 and it is growing rapidly. Demand in the regulatory markets is driven primarily by internationally mandated emission reduction targets.
- Smaller **voluntary** carbon markets using similar emissions trading mechanisms but operating outside internationally agreed rules. Individuals, corporations and other organizations without mandatory emissions targets enter into these markets, being driven by concerns to reduce emissions and corporate social responsibility. The value of voluntary carbon markets was estimated at US$92 million in 2006 and is expected to double in size during 2007.

The types of projects that can generate credits include emissions reduction projects (e.g. renewable energy or energy efficiency projects) and carbon sequestration projects (e.g. afforestation and reforestation). A key difference between the markets is that only afforestation and reforestation projects are currently allowed as forestry projects in regulatory markets, whereas voluntary markets already allow Reduced Emissions from Deforestation and Degradation projects (e.g. through conservation concessions projects). In fact, a number of REDD projects have already been traded on voluntary markets

since the 1990s. Given the large proportion of global carbon emissions which result from deforestation and degradation, the current debate about REDD revolves around how and if REDD can be financed through the regulatory carbon markets or international funds.

Architecture of a future REDD regime

There are four main factors which influence the possible architecture of future REDD carbon markets:

- Whether a negotiated agreement on REDD is reached at the international level.
- Whether the international REDD financial mechanism is market or fund-based.
- Whether the credits in any market-based system are fungible (exchangeable) with other credits in the regulatory international carbon markets, or traded under a separate protocol.
- Whether national governments or entities at sub-national levels (e.g. Provincial/District government, villages, communities, private companies) are credited or given incentives (i.e. sellers in a market system).

When combined, these factors result in four main options for policy scenarios that could result in a future REDD regime. These include:

Scenario 1: National crediting scheme under a UNFCCC agreement: This scenario assumes the establishment of a national "baseline" or reference scenario of emissions from deforestation. Any verifiable reduction below this reference scenario would result in REDD carbon credits (either fungible with the wider carbon markets or traded under a separate REDD protocol) issued to the central government. Market or fund-based redistribution mechanisms would then be put in place to implement policies and measures that reduce deforestation and degradation. Some of the advantages of this approach include possibly large financial flows, lower risk profiles and economies of scale. Disadvantages include a highly centralised system, possibly high inefficiency and transaction costs and the likelihood of ex-post payments meaning upfront funding needs to be sourced.

Scenario 2: Project crediting scheme under a UNFCCC agreement: The level of carbon accounting and crediting would be with a sub-national entity (e.g. provincial/district government, private sector projects or communities) rather than an entire country, similar to the current CDM. Project-specific baselines would have to be established against which emission reductions are measured. It is possible that this approach could be used in conjuction with a national level reference scenario and monitoring and accounting system, but the main difference is that transactions between buyer and seller would take place in a more decentralised way. Some of the advantages of this approach include possibly large financial flows and a more decentralised system, which may bemore efficient. Disadvantages include possibly high risks inherent in separate projects, less coherence with national development goals and the likelihood of ex-post payments meaning upfront funding needs to be sourced.

Scenario 3: International fund with national-level incentives: The key difference here is that incentive payments for REDD would come from a dedicated international fund rather than from carbon markets. Incentives could be calculated in a similar way as in the market-based options using baselines, and payments could be made either to central governments or sub-national entities. In contrast to market-based options, incentives and payments from a fund could also be based on measures or commitments that are not easily quantifiable in terms of the emission reductions they achieve (e.g. policy reforms and implementation). Some of the advantages of this approach include less complicated implementation processes, more national ownership and guaranteed upfront funding. Disadvantages include lower financial flows, possibly high inefficiency and possibly less effective reduction in deforestation.

Scenario 4: Voluntary markets only (without international agreement): Credit-based incentives from voluntary markets could be the main remaining source of REDD funding if no international agreement can be reached. This option would most likely focus on project-based crediting against project baselines. They are a fallback option if no international REDD agreement is reached but could also run in parallel to a future regulatory REDD market. Some of the advantages of this approach include a possibly more diverse range of projects, less complicated and costly implementation processes and projects that prioritise social and environmental benefits. Disadvantages include much smaller financial flows, possibly lower standards and less national ownership.

There are already pilot REDD projects and voluntary REDD projects being established in advance of any international agreement on the post 2012 climate change regime. These can contribute to learning for establishing a national REDD system, and should be encouraged, but the integrity of the future REDD system will only be maintained if appropriate safeguards such as registries to prevent double-counting and selling are put in place immediately.

Size of markets for future REDD carbon credits

Estimating the future size of REDD markets and the volume and prices of REDD credits is almost impossible as it relies on assumptions about future emissions trends for countries with emissions targets and possible post-2012 market architecture. Factors such as the inclusion of the US in a future international agreement, the stringency of future Annex 1 targets, the range of sectors that have emissions targets (e.g. shipping and aviation are not currently covered in international emissions

trading) and the future performance of mechanisms such as the CDM which will could effectively compete with REDD to sell credits into the market.

The future architecture of REDD will also specifically affect demand for REDD. Important factors include whether REDD occurs through the larger regulatory markets; whether use of REDD credits is capped in regulatory markets to prevent market flooding; and the stringency of rules and modalities for REDD which could make it harder to fund projects and generate credits. This is not an exhaustive list and it is also important to remember that a future REDD agreement is only one among many factors that will shape post-2012 carbon markets.

The potential scale of supply of REDD credits can be roughly estimated using global average deforestation rates over the last few years, and calculating the possible emissions reductions that could be achieved through the implementation of REDD policies and measures that reduce these rates to different degrees (see Table 1). The scale of supply will need to be met by an equally strong demand for such estimates to be realized.

% reduction of deforestation trends in 1990-2005	Amount of emission reductions	Monetary value @ USD 5 per tCO2e	Monetary value @ USD 10 per tCO2e	Monetary value @ USD 15 per tCO2e	Monetary value @ USD 20 per tCO2e
%	MtCO2e per year	Million USD per year	Million USD per year	Million USD per year	Million USD per year
5%	153	765	1,530	2,295	3,059
10%	306	1,530	3,059	4,589	6,119
20%	612	3,059	6,119	9,178	12,237
30%	918	4,589	9,178	13,767	18,356

Table 1: Scenarios of the supply side of REDD markets. Calculations based on deforestation trends in 1990-2005 as reported in FAO 2006.

What will buyers be looking for in REDD?

Buyers of carbon credits and project developers use a number of criteria when deciding whether to invest in carbon projects. In future market-based REDD systems the same criteria are likely to apply. Broadly these include:

- Risks related to the carbon markets and to the operation of projects
- Credit quality
- Volumes of credits
- Price of credits

Forestry projects can be risky investments because forest cover can be reduced by natural causes such as fires or pests, or human causes such as illegal encroachment of land, which can result in emissions reductions that are not permanent. Underlying factors which cause forest loss, such the quality of governance, clear land titles and rights can therefore be very important in determining the risk profiles of carbon forestry projects. Buyers will generally be interested in low risk profiles illustrated by due diligence reporting of funding availability, efficient law enforcement, land tenure security, assessment of country risks and clear business plans. Risk can be managed to some extent through managing liability arrangements. The more liability is taken on by a seller, e.g. for delivering a certain volume of a certain type credits at a certain time for a certain price, the more attractive the credits become for a buyer.

Non-permanence risk is easier to manage in national REDD schemes than in project schemes or in AR CDM. With a national baseline, reporting systems and registries tracking credits from particular geographic areas, the total national emissions from deforestation and degradation to be tracked and kept below the national baseline. Any increase in emissions in one area (i.e. loss of permanence at a particular project site) could then be balanced out with increased emissions reductions in another area. A proportion of credits could also be retained at the national level (e.g. 20-30% of credits) to act as an insurance 'buffer' for any failed REDD projects. Liability would have to be transferred to project developers (whether they are provincial or district governments, private sector organizations or communities) which would help ensure compliance and that the buffer was not depleted.

At the project scale non-permanence can be dealt with by specifying the operational lifetime of the project. Perpetual (indefinite) or nominal (long term, e.g. 100 year) lifetimes imply that the projects must last for a long time frame and carbon offsets are considered 'permanent' once the lifetime has been met. This would require a strong contract ensuring that the land is not be deforested during the lifetime of the project. This could be difficult to ensure without strong legal institutions and/or

without incentive payments being offered throughout the duration of the project or effective interventions that permanently reduce pressure on the forest. Temporary credits, which expire after a shorter time period, have proven extremely unattractive to buyers in the CDM and are therefore not recommended for REDD.

The possibility that REDD projects lead to emissions in other areas (leakage) is another major concern for buyers of carbon credits. An advantage of national REDD systems is that sub-national leakage is not an issue, because any shift in deforestation activities should be recorded. However, in terms of the effectiveness of the national system in reducing deforestation and degradation rates and in terms of who is eligible to receive payments, safeguards against leakage must be put in place. These include discounting of attainable REDD credits in proportion to the scale of leakage that has occurred or the intensification of existing production systems, for example through establishing more sustainable management of natural forests. Market leakage and international leakage beyond the national borders could occur. Market leakage is hard to track and will probably not affect REDD as it is not included in any existing international carbon accounting. International leakage can be most effectively dealt with by encouraging participation in REDD by as many countries as possible.

In addition to a low risk profile there are a number of other factors which determine the quality of carbon credits, which will be equally applicable in REDD transactions:

- The use of rigorous and standardised methodologies for quantifying carbon, which make credits comparable between different contexts, and good monitoring and third party verification systems
- Additionality, which ensures that investments make a difference by financing activities that would not otherwise have happened.
- Delivery of social and environmental 'co-benefits', such as increased income for local communities. Despite the fact that REDD carries high risks, buyers appear to be willing to pay a higher price for projects that have 'co-benefits'.
- Use of standards and labelling schemes that demonstrate best practice above minimum requirements

REDD prices will vary considerably depending on risk, liability and quality, but they are also closely linked to the time of purchase and volumes. In general buyers will pay higher prices for issued (ex-post) credits. In REDD this is likely to be the case because buyers will want to ensure that emissions reductions have occurred. Buyers are also likely to prefer sellers with large volumes of credits as these offer economies of scale. In order to maximize the price for REDD as well as any other carbon credits, several conditions should be met:

- Low risk for the buyer through effective risk hedging strategies and contracts
- High quality demands and verifiability of methodologies and procedures followed
- Intentional inclusion of co-benefits
- Selling credits in a later development stage.

What are the financial implications of REDD for sellers?

The way carbon projects are set up around the interests of (Annex 1) buyers raises a set of financial issues for sellers of carbon credits, whether they are national governments, or sub-national actors.

Transaction costs for carbon projects can be high (CDM experience indicates between USD80,000-130,000 during project preparation phase). Transaction costs in REDD might be lower because, for example, remote sensing data for baseline establishment and monitoring may already be available nationally. Implementation costs are not well known for REDD, but include measures for lowering deforestation; rule enforcement and monitoring; establishing reporting and monitoring systems, and capacity building; and baseline establishment and carbon stock measurement. As previously mentioned economies of scale are likely to occur in REDD. Options for reducing transaction and implementation costs include the use of small-scale methodologies and bundling of projects. Agreements with buyers to cover some of the cost in exchange for a lower price for credits should also be considered.

Carbon revenues generally constitute a small part of total project revenue for CDM projects (usually <10% for forestry projects), meaning that projects have to be financially viable without carbon finance. Since REDD projects usually do not provide an easily accessible by-product, the proportion of carbon revenues from the sale of credits would need to be much higher for REDD projects in order to make them financially viable. Otherwise additional sources of income such as sustainable timber production from the project area or external project financing would need to be found by sellers.

The revenue schedule will also be a very important consideration in financing REDD whether transactions occur with national governments or with sub-national entities. If carbon revenues can cover a large part of the upfront costs, sellers might favour a forward sale of credits. However, these will attract a lower price, because there is a risk of non-delivery. If price is a decisive factor and issued credits are to be sold, then upfront costs will have to be covered through other means, either by the buyer, or through other project financing options. The intervals between verification and issuance of credits are also important considerations in order to ensure periodic income. Annual verification may be prohibitively expensive for REDD.

Legal aspects of carbon credit transactions and risks for sellers

Given the high risks related to forestry carbon projects and the financial constraints described above, carbon contracts are essential for both buyers and sellers. One advantage of national REDD schemes is that if governments are the sellers of REDD credits or if they back guarantees on carbon credit sales from projects, the value of the credits is likely to increase considerably because risk will be spread more widely. From the seller's perspective four main aspects of contracts are important:

- **The specifications of volume and time frame of delivery**: Given the uncertainties in credit quantity sellers need to ensure flexibility in the volume and time frame for delivery
- **Payment schedule**: Ensuring that a proportion of payment is made upfront.
- **Price setting**. Ensuring a good price for their credits. The contract could establish a fixed price for each carbon credit, but there is a risk that the seller could lose out if the market price for credits rises over time, in which case they might opt for an indexed price option;
- **Liabilities**: Ensuring that they can meet liability rules if they fail to deliver credits (e.g. payment of damages or replacement of credits). They will also need to establish rules for compensation from buyers if they do not pay, for example through charging interest or claiming damages.

PAYMENT DISTRIBUTION AND INSTITUTIONAL ARRANGEMENTS

REDD

IFCA
INDONESIA FOREST CLIMATE ALLIANCE

REDUCING
EMISSIONS FROM
DEFORESTATION AND FOREST
DEGRADATION

Payment mechanisms, Distribution and Institutional Arrangements

Policy conclusions:

- REDD will only work if an appropriate balance is found between efficiency and equity, embedded within a system that is accountable and transparent, focuses on long term sustainability goals and improves the ability of stakeholders to engage with the system.
- Existing experience with regulatory, fund and market-based forest management in Indonesia indicate that performance will have to improve significantly for REDD to work.
- REDD transactions with international buyers/funders could take a number of forms to ensure efficiency, accountability and investor confidence.
- Allocation of REDD payments to different actors will have to address trade-offs between efficiency and fairness, possibly through redistributing funds from areas with high deforestation rates to those with low rates. Vertical distribution of funds should relate to the 'added value' each level offers in producing the carbon commodity.
- REDD payments can be made upfront or disbursed over time. To encourage compliance and increase permanence, disbursed payments might be preferable for the buyer.
- Whether payments are most suitably made in cash or in non-cash forms will depend on the stakeholders and the specific context
- Existing institutions will have to be strengthened and new institutions may need to be established for REDD. Separating regulatory from fund management and trading roles will be crucial in order to increase accountability. It may increase efficiency if the central government adopts a role as regulator of the system, rather than as a seller. Strong legal institutions and access to legal processes will be crucial in order to avoid distortions in the system such as elite capture.
- REDD mechanisms are likely to entail high risks, which will have to be well managed in order to attract investors. Use of processes to ensure transparency and accountability, such as the BLU will be crucial for strengthening financial processes. Risk of non-permanence can be more easily managed when there is a national accounting system that includes insurance 'buffers'. Clear liability arrangements, use of third party verification processes, voluntary standards and tools for addressing land conflict could be stipulated by the central government. Built in collaborative learning processes could help improve REDD implementation through time.
- Tradeoffs between complexity and access to funds will need to be carefully managed to ensure equitable access to REDD by different stakeholders and feasibility of the system as a whole.

Objective of an Indonesian Framework for REDD

The objective of REDD payment distribution mechanisms is to support policies and measures that reduce deforestation and degradation through transfer of revenues from international REDD funds or carbon markets to (or within) national levels. To ensure demonstrable results on emissions reduction, these mechanisms must be effective in targeting the wide range of agents involved in deforestation and degradation. They must reward good performance and incentivise improved performance compared to reference scenarios, and adequately compensate agents that suffer losses from changed practices. International payments are likely to be performance based, both in terms of emission reduction at national scale and the environmental and social impacts of the system. This means that accountability, transparency, risk management, adequate benefit transfer and administration mechanisms will be essential for attracting investment.

Challenges for a national REDD payment mechanism

An effective national REDD mechanism in Indonesia will have to find an appropriate balance between environmental, economic and social issues. This is because a focus on any one of these dimensions will be unlikely to achieve permanent emissions reductions. A focus solely on efficient reduction of emissions, for example, might be unlikely to have a long-term impact on the drivers of deforestation and could result in negative impacts on people, leading to further deforestation; whereas a focus on people and livelihoods might have little impact on emissions and result in few gains for investors. Triple accountability in all three dimensions requires the emergence of incentive systems that:

1. Are efficient in reducing emissions at affordable cost, linking local to international scales in ways that are accountable for emissions but that are as simple as possible,
2. Address 'climate justice', equity and fairness, within improved systems of governance and accountability from local to international scales,
3. Support transformations to sustainability for the long term within the local context of options and aspirations, and
4. Express a commitment to learning and accountability for the process.

In putting these principles into practice a number of issues are likely to emerge that will affect the detailed design of the system:

- The question of which areas, activities and actors can receive REDD funds, which will be influenced by definitions of 'forest' and the exclusion/inclusion of degradation and other land uses; attribution of causes - are forest fires naturally caused or human induced for example?; and legality of activities given the patchwork of legal, semi-legal and illegal activities, which drive deforestation and degradation in Indonesia.
- The ability of the system to deal with trade-offs that have inhibited existing carbon markets, such as safeguards against risk increasing transaction costs
- Establishing effective cross-scalar institutions that can deal with opportunity costs, liability and management arrangements arising in REDD at different levels

Existing experience with regulatory, fund and market-based approaches in Indonesia

Existing funding and incentives schemes in Indonesia give insights into the way that REDD mechanisms might work and offer possible options that could be used in payment distribution mechanisms. They include:

- Funding mechanisms from central government to local governments, companies or direct to communities, such as the Reforestation Fund, Community Forest Plantations, GERHAN, Debt for Nature swaps and the Kecamatan Development Programme (KDP)
- Smaller-scale redistribution mechanisms at a local level within villages, between local government and communities and between companies and local communities, such as Payments for Environmental Service schemes, market and fund-based company-community partnerships and timber certification

Safeguards can be put in place to minimise risks. These include measures for increasing accountability between actors through third party audit processes and 'paper trails', ensuring inclusive consultation processes and improving the bargaining power by enhancing legality and access to legal processes. The conditionality requirement of REDD mechanisms (i.e. that benefits are only received once performance has been verified) is likely to improve safeguards in REDD. Many of the existing systems in Indonesia have low conditionality requirements, with the exception of PES, company-community partnerships, KDP and timber certification. There are indications that these conditional mechanisms can perform better especially in terms of accountability, although this can be at the expense of increased transaction costs and more complex operational procedures. Conditional systems may also raise issues surrounding the provision of upfront funding, especially for stakeholders that have little available capital, which indicates that REDD will need to find ways to provide such funding either from international sources or national sources.

Learning from existing fund and incentive management, the future REDD system should have the following features: (a) create incentives for good practice; (b) be transparent and accountable in fund management; (c) support local initiatives within clearly stated goals; (d) focus on outcomes, not just inputs; (e) establish a relationship between outcome/performance and funding; (f) support clear property rights and rules on benefits, responsibilities and sanctions at the local level; and (g) facilitate and strengthen local institutions.

Designing a national Indonesian REDD payments system

Designing an Indonesian national REDD payments system will involve decisions over the best way to configure financial transfer mechanisms at different scales, how to allocate revenues, payment form and timing, the establishment of new institutional structures and new risk management options.

Transfer mechanisms

There are two main options for transactions between international buyers/funders with Indonesia: (1) transaction with the central government and (2) transaction with lower government levels or directly with projects (Figure 1) in accordance with the relative share of the location in the national baseline. Option 1 is more centralised and government funds would need to be redistributed from a central fund held at national level. Option 2 is more decentralised, but a tax or levy placed on REDD activities at sub-national level would need to be collected to pay for administrative functions such as national level monitoring and accounting. Funding mechanisms would still be required in this option in order to redistribute revenues accrued through the tax or levy.

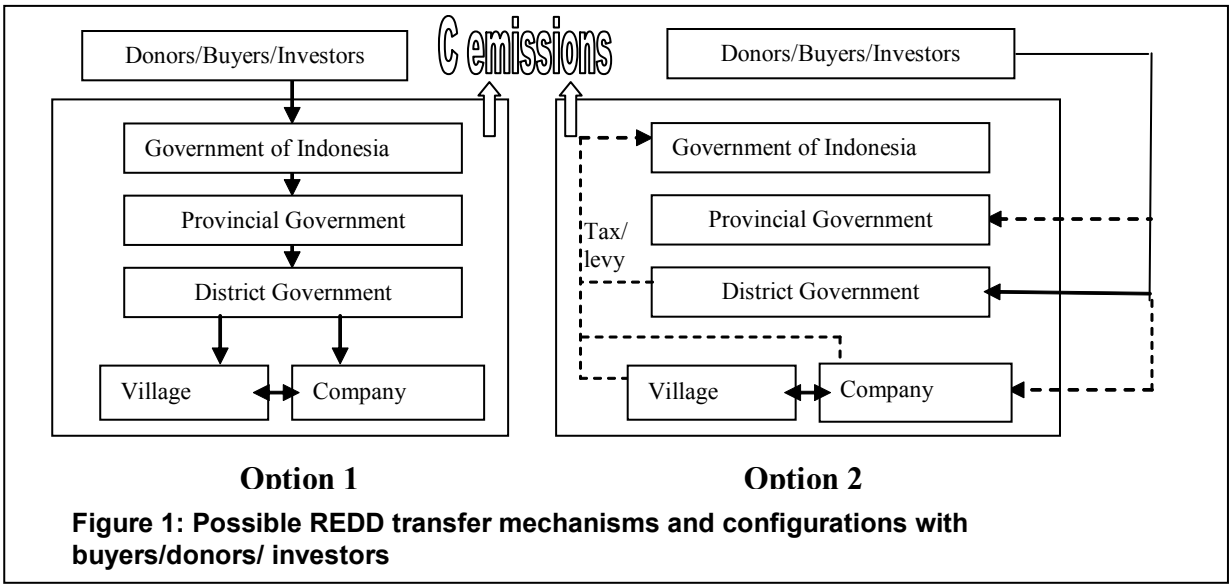

Figure 1: Possible REDD transfer mechanisms and configurations with buyers/donors/ investors

Funds could be redistributed through the government hierarchy (i.e. to provincial and district governments), through the forest sector (e.g. to landscape based integrated forest management units or Kesatuan Pengelolaan Hutan/KPH) or direct to projects and local actors. They could either be integrated into the state budget or distributed through an independent funding stream. An independent funding stream might increase efficiency and reduce the possibility of rent seeking, but it would need to be well linked to government institutions. Further redistribution of funding might be needed. For example, if the Kabupaten level has a baseline, and receives REDD funding in proportion to how well it performs against this baseline, it might need to redistribute funding at the sub-Kabupaten level. The mechanisms used would vary with the type of stakeholders involved, the type of land use and whether deforestation is planned or unplanned, and should be openly negotiated to avoid excessive influence by any given interest group.

Allocation of REDD financing

Allocation of REDD funds include decisions over the distribution of revenues between stakeholders at a particular scale (horizontal) and decisions between different administrative levels, for example between national, provincial and district governments (vertical). Possible criteria for establishing who is a legitimate recipient is in these two dimensions are those that:

- Change their behaviour and reduce emission rates in the long term
- Suffer legitimate losses from mandated REDD implementation
- Maintain low carbon emissions rates (continued conservation)
- Provide sustainable low C emission alternative livelihoods
- Act legally and have rights to sell carbon (provided this does not disadvantage the poor and those with customary rights not recognized by government)
- Exhibit high accountability, transparency and good governance
- Have included provisions for capacity building
- Include elements of long term learning

Competitive bidding processes could be used for deciding horizontal allocation. Precautions may be needed to ensure that this is not abused by decision-makers and does not discriminate against local communities who lack experience. In practice it will probably be necessary to establish a REDD system by providing some level of initial funding to all regions and stakeholders to help develop REDD systems, before introducing conditional and competitive processes that might discriminate against marginalized groups.

A problem that will have to be overcome relates to how to incentivise areas with high rates of deforestation to reduce rates,

whilst also incentivising areas with low rates to maintain low rates (the 'efficiency' versus 'fairness' tradeoff, which will influence the long-term success of REDD and possible perverse incentives). A possible solution to this problem is to create a 'stabilisation fund' for areas with low rates of emissions. Another problem will surround establishing legality of claims to compensation and rights to sell carbon that are separate from land ownership.

Vertical allocation depends on where value addition occurs in the REDD 'supply chain' and the opportunity costs occurring at each level. Existing laws governing the revenue sharing and decentralisation will also affect allocation. Appropriate liability arrangements will be vital to avoid central government or sub-national entities being put at risk. Steps that are needed in the value chain for producing credible REDD credits across the scale, include:
Local scale: Direct action to reduce current emissions (short term impacts); Changes in local economy that reduce dependence on emission causing activities (longer term)
Local government scale (forest management unit, district, province): Prevention of 'leakage'; Proof of additionality against a locally relevant 'business as usual' baseline
National scale: Dealing with 'permanence' concerns: Accountability for changes in C stocks
National/international scale: Independent verification of emission reductions

Form of payment, payment schedule and provision of upfront financing

REDD payments could either be paid as a lump sum upfront or distributed over time. A lump sum payment would need to fund forest protection perpetually or in the long term (e.g. 100 years), which would favour current beneficiaries but disadvantage future beneficiaries. It could also be difficult to enforce with weak legal institutions. An alternative option is to distribute payments over time. Current beneficiaries might gain less, but it would incentivise long-term carbon storage, and is more likely to address the permanence issue. The main challenge to be overcome would be to secure long term financing for such distributed payments.

Payments could be made to individuals or to groups. If all stakeholders are well identified, then individual payments matching their opportunity costs are likely to be most effective and there is less likelihood of elite capture if they are able to assert their rights to payments. However, the transaction costs of dealing with large numbers of individual contracts gives rise to a trade-off. Payments to groups might involve lower transaction costs for those making the payments, but mechanisms for equitable decision-making on rules and procedures for benefits sharing within the group are likely to be required.

Payments for REDD can be made as cash and non-cash transactions. In cash transactions, international buyers could pay sellers (government, community or company) through conditional bank transfers. The sellers may then redistribute the cash, for example through community-company partnership schemes. Because access to and use rights of forest lands remain a major stumbling block for sustainable rural development, conditional use rights within a 'community based forest management' (HKM) or 'village forest' (Hutan Desa) framework may be more effective than financial transfers in reducing emissions. Local negotiations on the 'currency' that is of the highest relevance are needed.

Institutional arrangements

Existing institutions will need strengthening and new institutions may need to be created for REDD. These includes fund managers for receiving and redistributing funds; registries for tracking emissions reductions credits; legal institutions for adjusting existing laws, enforcing REDD laws and resolving disputes; monitoring and verification entities for ensuring that emissions reductions are real and achieved in environmentally and socially acceptable ways; implementing and administrative organisations for handling contracts and logistics; and the sellers of carbon themselves who may need to organise internal redistribution mechanisms. It is assumed that in any form of national REDD system that the government will play a role in monitoring, accounting for emissions reductions and technical support.

Risk management

Experience with carbon markets indicates that different forms of risk play an important role in investor decisions about transactions. Risk reduction will therefore be a key issue for REDD.

Risk	Possible safeguards
Governance risks	Financial reporting, auditing procedures and transparency policies established to ensure payments reach legitimate recipients. New 'Badan Layanan Umum' (BLU) for financial management could be used at national and local levels. The supreme auditor, financial intelligence unit, the Anti Corruption Unit and NGOs should also be involved with REDD in order to improve governance of REDD funds. Village bank accounts, local credit unions and countersigning processes can be used at village level.
Governance risks in carbon supply chain	Use of third party verification of carbon accounting at national and project level, using existing accredited verifiers
Permanence and leakage risks at national and sub-national level (full description in paper 5)	National level: Use national baseline, reporting systems, registries tracking credits from particular geographic areas, use of insurance 'buffer' and devolution of liability to project level. Sub-national level: Long nominal project lifetimes (100 yrs); strong contracts and liabilities; effective alternative livelihood strategies and dispersed incentive payments
Project risks, especially those related to land ownership and conflict	Use of tools such as Rapid Tenure Assessment (RaTA), spatial planning (Rencana Tata Ruang) and gazzettement. Use of community forestry law regulations (HKM) and Hutan Desa, to provide clarity on local use rights, with conditionality attached in terms of carbon stock conservation; Existing international voluntary standards to increase project quality, especially in relation to social and environmental impacts could be used for REDD and could be made mandatory by government. Built in collaborative learning processes could help improve REDD performance through time.
Perverse incentives (e.g. incentives attracting in-migration)	Facilitation of institutional strengthening and legalizing community organizations. Other safeguards could logically include using a mixture of payments to individuals and for implementation of broader development projects across an area; offering some benefits beyond project boundaries and applying extra conditionalities to recipients, such as the length of time they have owned the land. Strong legal processes and access to legality will be crucial.

Table 1: Risks and possible safeguards in an Indonesian REDD system

Complexity in the REDD supply chain

An important factor that must be considered in developing risk reduction tools for REDD is the trade off between complexity and accountability, and equity of access to REDD benefits. Highly accountable systems can entail high transaction costs and the ability to understand complex technical procedures, which can act as a barrier to certain stakeholders. Care must be taken to reduce transaction costs and ensure that they are borne by stakeholders who can meet these costs. This can be achieved by using simplified methodologies, simplifying methodologies for stakeholders that lack technical expertise and capital, bundling projects together and negotiating with buyers for them to cover costs in exchange for lower prices.