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Why are we seeing "REDD"?

An analysis of the international debate on reducing emissions from deforestation and degradation in developing countries

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Abstract

Reducing emissions from tropical deforestation and forest degradation (REDD) in developing countries has emerged as a new element to complement ongoing climate policies. The strategy involves the provision of financial compensations for the reduction of greenhouse gas (GHG) emissions from deforestation and forest degradation. Although excluded from the first commitment period of the Kyoto Protocol, the idea was submitted by Papua New Guinea and Costa Rica in 2005, on behalf of the Coalition for Rainforest Nations (CfRN), at the 11th Conference of Parties (COP-11) to the UNFCCC in Montreal. The proposal has initiated a two year examination process, characterized by extremely high participation of the concerned parties, and decisive steps on the subject are anticipated at the COP-13 in Bali in December 2007. Based on the main country proposals, this paper examines the current debate on REDD and discusses some of the main remaining controversies within the debate, notably the REDD financing mechanism (mandatory markets versus voluntary funds) and the institutional framework for REDD (inside or outside of the post-2012 Kyoto regime). In doing so, the paper contributes to an improved understanding of the scientific, economic and political aspects associated with the debate.

Résumé

La réduction des émissions issues de la déforestation et de la dégradation tropicale (REDD) dans les pays en développement apparaît comme un nouvel élément pouvant contribuer à l'avancée des actuelles négociations sur le changement climatique. Le principe de la REDD est d'octroyer une compensation financière pour la réduction des émissions des gaz à effet de serre (GES) issues de la déforestation et de la dégradation tropicale. Exclue lors de la première phase de négociations du Protocole de Kyoto, cette idée a été introduite par la Papouasie Nouvelle Guinée et le Costa Rica lors de la 11e Conférence des parties (COP-11) à la CCNUCC (Convention cadre des Nations unies sur les changements climatiques) à Montréal en 2005. Cette proposition a permis d'initier un processus de discussion qui aura duré deux ans, et aura été caractérisé par un très fort investissement des diverses parties concernées. Il est notamment attendu et espéré que la COP-13, ayant lieu à Bali en décembre 2007, donne lieu à des décisions déterminantes sur cette question. Fondé sur les propositions faites par les principaux pays concernés, cet article éclaire l'actuel débat que la REDD a soulevé. Il en aborde ainsi les principales controverses, en particulier les mécanismes financiers de la REDD (marchés obligatoires *vs* fonds volontaires) et son cadre institutionnel (inclusion ou non dans le régime post-Kyoto).

Cette analyse vise ainsi à contribuer à une meilleure compréhension des aspects scientifiques, économiques et politiques du débat lié à la REDD.

Introduction

Climate change has become a major threat to human well-being and all life on Earth. Caused by the accumulation of greenhouse gases (GHG) in the atmosphere, it is mainly a result of industrialization. Many countries already face the costs of adapting to regional temperature changes and associated natural catastrophes. According to a recent report commissioned by Greenpeace, global warming could create some 200 million climate refugees by 2040, especially from poor countries (Jakobeit and Methmann 2007).

The severity of the situation and the urgency to act has now become international consensus. Key substantiating contributions include the scientific evidence from the 4th assessment reports of the Intergovernmental Panel of Climate Change (IPCC) and the Stern review (2006), which first assessed the economic costs of climate change and, most importantly, the costs of inaction. In particular, Sir Nicholas Stern stressed the benefits of early climate change mitigation policies: a 25% emissions reduction target would cost only 1% of global annual GDP by 2050, and would limit the temperature increase to approximately 2°C; compared to aggregate financial costs due to climate change consequences of about 5 - 20% of annual global GDP if no action is taken (Stern 2006).

Proposals to compensate emission reductions from deforestation in developing countries have been put forward to complement ongoing policies to mitigate climate change. Influential contributions include the World Bank's policy research report on tropical forests, which argued in favor of mobilizing international carbon finance to reduce deforestation (Chomitz et al. 2006). Although excluded from the first commitment period of the Kyoto Protocol, the idea was submitted by Papua New Guinea and Costa Rica in 2005, with the support of the Coalition for Rainforest Nations (CfRN), at the 11th Conference of Parties (COP-11) to the UN Framework Convention on Climate Change (UNFCCC) in Montreal. The proposal has initiated a two year examination process, characterized by extremely high stakeholder participation, and decisive steps are expected at the upcoming COP-13 in Bali in December 2007.

Following on from Tom Griffith's 2007 "Seeing RED" report, this paper presents an analysis of the international debate on reducing emissions from deforestation and degradation (REDD), seeking insights as to why and how it has become such an important subject in international climate negotiations. The objectives of this paper are to:

i) document the role of tropical forests in the natural climate system and within the current international climate regime,

ii) analyze the general principle of REDD, based on country proposals discussed within the international climate negotiations, and

iii) discuss the main controversial issues, thus deriving an insight into the potential direction of the debate on REDD as a climate change response measure.

The methodology is based on an extensive literature review and several expert interviews. The interviews were conducted during April and May 2007 with experts from the French government, development agencies, the European Commission and other think tanks, using semi-structured, non-standardized questionnaires. Annex 1 provides the list of interviewees and the interview questions.

The paper is organized as follows: section two presents the role of forests in the natural climate system and the international climate regime; section three analyzes the current discussion on REDD to identify common and divergent points among the different national positions; section four discusses the findings from section three to draw insights on possible future avenues for REDD; and section five concludes with final remarks.

Setting the stage: the role of tropical forests in international climate policy

Forests, especially tropical forests, provide an array of important environmental benefits. These include, but are not limited to: carbon sequestration, biodiversity conservation, hydrological functions, scenic beauty and cultural values. This section focuses on the role of tropical forests in international climate policy, explaining how forests can contribute to the reduction of GHG emissions, and examining the evolution of this factor within international climate negotiations.

State and trends of tropical forests

About 30% of the world's land area is covered by forests, of which the predominant part is situated in the tropics (FAO 2006). Thethree most important tropical forest biomes are located in South America, Central Africa and South East Asia.

Although tropical forests provide important environmental functions for human welfare, the value of these functions is insufficiently integrated into markets. Therefore, forest conservation must compete with a wide range of ostensibly more profitable land-use forms, including: agriculture, logging, human settlements and infrastructure projects.

Net deforestation rates have slowed between 2000 and 2005, relative to the 1990s. This is largely due to forest plantation but natural forest re-growth following abandonment of marginal agricultural land has also been a factor. However, global gross deforestation continues at a rate of 12.9 million ha/year, especially in South East Asia and South America (FAO 2006). Forest degradation, defined as the decrease in forest density and composition, is another important contributor to the loss of tropical forests, especially in Africa.

TABLE 1

Global carbon stocks in vegetation and soil carbon pools down to 1 meter (IPCC 2000)

Biome	**Area**	**Global Cabon Stocks (GtC)**		
	(10^9 ha)	Vegetation	Soil	**Total**
Tropical forests	1,76	212	216	428
Temperate forests	1,04	59	100	159
Boreal forests	1,37	88	471	559
Tropical savannas	2,25	66	264	330
Temperate grasslands	1,25	9	295	304
Deserts & semi-deserts	4,55	8	191	199
Tundra	0,95	6	121	127
Wetlands	0,35	15	223	240
Croplands	1,6	3	128	131
World total	**15,15**	**466**	**2011**	**2477**

Tropical forests and climate change

Tropical forests play a dual role in global warming. Firstly, they can act as carbon sinks and thus contribute to the mitigation of climate change. Secondly, the removal of tropical forests (through deforestation and burning) is associated with the emission of GHG, especially carbon dioxide (CO_2).

Tropical forests as carbon sinks

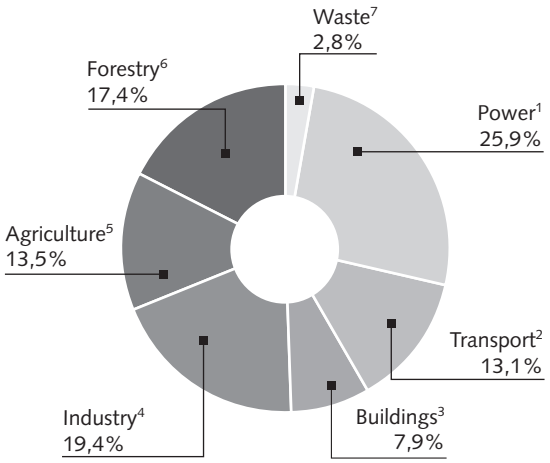
Trees and plants sequester carbon from the atmosphere through photosynthesis, especially during the growing period. Once fully grown, trees store this sequestered carbon. Table 1 shows global carbon stocks in vegetation and soil. The combined total of carbon stored in forest biomass, dead wood, litter and soil is estimated to be three times greater than the amount of carbon in the atmosphere (FAO 2006).

Afforestation and reforestation (A/R) activities can enhance the effect of forest carbon sequestration. As defined by the IPCC (2007), "afforestation and reforestation are the direct human induced conversion of non-forest land through planting, seeding, and/or the human induced promotion of natural seed sources". Afforestation and reforestation are distinguished by how long the non-forest condition has prevailed, i.e. 50 years or more for afforestation; less than 50 years for reforestation. The accumulation of carbon biomass from A/R ranges between 1 and 35 t CO_2/ha/yr globally (IPCC 2007). Between 1990 and 2005, the proportion

of carbon stocked in forest biomass increased in all regions of the world, except for Africa, tropical Asia and South America. However, although global forest areas expanded, mainly as a result of A/R policies, global carbon stocks decreased because of tropical deforestation and degradation (FAO 2006).

FIGURE 1

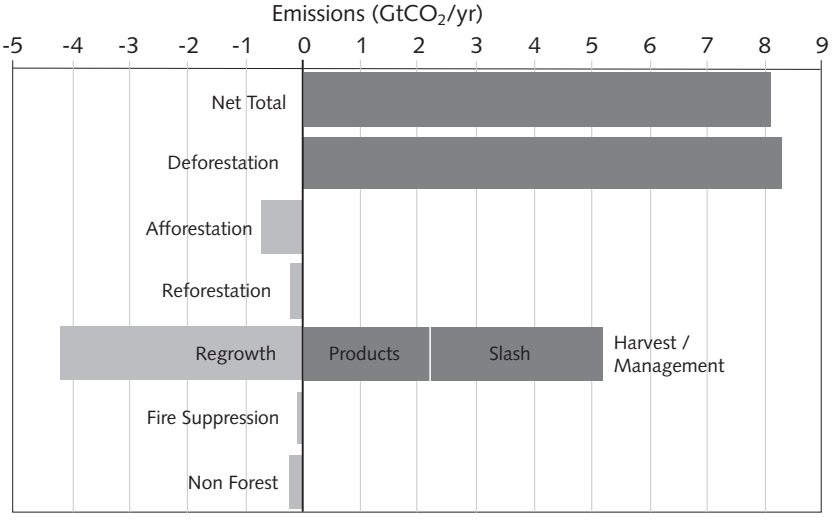
Greenhouse gas emissions in 2004, by sector (IPCC 2007)



1. Excluding refineries, coke ovens which are included in industry.
2. Including international transport (bunkers), excluding fisheries; excluding off-road agricultural and forestry vehicles and machinery.
3. Including traditional biomass use.
4. Including refineries and coke ovens
5. Including agricultural waste burning and savannah burning (non-CO_2). CO_2 emissions and/or removals from agricultural soils are not estimated in this database.
6. Data include CO_2 emissions from deforestation, CO_2 emissions from decay (decomposition) of aboveground biomass that remains after logging and deforestation and CO_2 from peat fires and decay of drained peat soils.
7. Includes landfill CH4, wastewater CH4 and N2O, and CO_2 from waste incineration (fossil carbon only).

FIGURE 2

Figure 2: Sources of emissions from global land use change 2000 (Baumart et al. 2005)



Tropical forests as a source of GHG emissions

Tropical forests also represent sources of GHG emissions, mainly CO_2, as a consequence of deforestation and degradation. When trees are felled and burnt, their stored carbon is released into the atmosphere. Forest degradation, i.e. the reduction in forest biomass through non-sustainable harvest or land-use practices, can also result in substantial reductions of forest carbon stocks (Asner et al. 2005).

In 2004, emissions from deforestation were estimated to account for about 17% of global GHG emissions, and nearly 28% of global CO_2 emissions (IPCC 2007). This proportion is higher than the proportion arising from the transport sector, making deforestation and degradation the third source of GHG emissions after energy- and industry-related emissions (Figure 1).

According to the 4th IPCC Review, 65% of global carbon mitigation potential is located in the tropics and at least 50% of that total could be achieved by reducing emissions from deforestation (IPCC 2007). Indeed, when comparing the CO_2 emissions from land use change related activities, one finds that deforestation is the major source of emissions from land-use change, which is hardly compensated by current A/R activities (Figure 2). Furthermore, although afforestation practices have better long-term benefits as carbon stocks accumulate in vegetation, they require higher initial investments and take time to accumulate significant amounts of carbon. Moreover, REDD, in terms of forest protection and sustainable forest management, is considered to be less expensive and may be associated with a series of co-benefits such as biodiversity conservation (IPCC 2007).

Tropical forests and international climate negotiations

The main international forum to address climate change is associated with the UNFCCC. The objective of the UNFCCC, which was adopted at the Earth Summit in Rio de Janeiro in 1992, is to reduce GHG emissions to mitigate climate change. It started as a non-binding agreement aimed at stabilizing GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The parties to the UNFCCC are expected to act "on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities".

The Kyoto Protocol, adopted in 1997 at the

3rd Conference of the Parties (COP-3), establishes binding emission reduction targets for developed countries (also referred to as Annex I countries) of about 5% below the 1990 emission levels. These reductions have to take place during the first Kyoto commitment period (2008 - 2012). The three flexible mechanisms of the Kyoto Protocol are i) emission trading, ii) Joint Implementation (JI) and iii) Clean Development Mechanism (CDM).

In the first commitment period of the Kyoto Protocol, forests were only considered for their function as carbon sinks (via Article 3.3 and 3.4 for Annex I countries, and via CDM and JI for non-Annex I countries), notably through A/R activities. The potential of reducing emissions from deforestation and forest degradation as a climate change mitigation measure was excluded, largely due to political and methodological reasons. This section describes the role of tropical forests within international climate policies.

Valorizing forests for their function as carbon sinks

The Kyoto Protocol's CDM allows Annex I countries to buy emission credits from projects in developing countries without compromising national emission reduction efforts. Forestry CDM projects (A/R), however, face several peculiar challenges compared to energy and industry projects that limit the supply and demand of A/R project credits. These are as follows (Gardette and Locatelli 2007):

• On the supply side, the technical and administrative requirements associated with CDM are more difficult for A/R projects given the technical complexity to estimate forest carbon reductions, which often result in lengthy registration processes. Although technical obstacles are surmounted as experience and capacities grow, A/R projects still face substantial legal, financial and institutional barriers.

• Secondly, still regarding the supply aspect, it is quite difficult to assure the permanence of emission reductions from A/R projects. Land-use change, deforestation or forest degradation - caused by human action or natural events - can occur at any moment. To address this problem, forestry CDM projects issue temporary credits, i.e. temporary Certified Emission Reductions (tCER) and long-term Certified Emission Reductions (lCER).[1] Nevertheless, A/R carbon credits present some advantages given the fact that tCERs are less expensive than permanent ones (Gardette and Locatelli 2007).[2]

• Finally, demand for CDM A/R project credits is limited, as these credits are not yet accepted by the largest carbon market - the European Union's Emissions Trading Scheme (EU-ETS). However, experts and policy-makers are currently discussing the extension of the EU-ETS to CDM forestry credits.[3] Another factor limiting the demand for A/R credits is the decision made in Marrakech to limit the use of A/R credits for Annex I countries to less than an annual 1% of a country's emissions in the reference year.[4]

Despite these difficulties, the Kyoto market is still the most important market for forest carbon. Voluntary markets for forest carbon exist, with simpler modalities and including actions for reducing emissions from deforestation, but their market volume is considerably smaller.[5] In total, forestry projects have a share of about 1% in the CDM and about 56% in voluntary markets (Gardette and Locatelli 2007). Experts estimate that there is certainly more demand for forestry credits than allowed by current CDM modalities and, if more constraining emission reduction targets are adopted for the next Kyoto commitment period, this demand is expected to further increase.

Addressing deforestation as a source of GHG emissions

The role of deforestation as a source of GHG emissions has so far been largely excluded from international efforts to combat climate change. At present, there is no official instrument to induce emission reductions from deforestation. The reasons are methodological and political. Methodological challenges arise mainly because of the difficulty of measuring and monitoring effective emission reductions. Political challenges include questions of sovereignty and the risk of substitution or effort dilution 'at the source' of Annex I countries (i.e. rather than reducing emissions within Annex 1 countries themselves, emission reduction efforts are "relocated" to developing countries).

However, the debate has experienced a fundamental shift over the last two years. From a scientific aspect, the idea of compensating emission reductions from deforestation has been advocated by several experts (e.g. Santilli et al. 2005, Moutinho and Schwartzman 2005, Chomitz 2000), while recent contributions from the World Bank (Chomitz et al. 2006, Stern 2006, IPCC 2007) have probably been the most decisive force for changing international attitudes on this topic. Politically, the idea was proposed by the CfRN in 2005, presented by Papua New Guinea and Costa Rica at COP-11 to the UNFCCC in Montreal, which instigated the establishment of a two-year examination process within the climate convention. The sub-

sequent section focuses on the current REDD debate.

The current debate on REDD

This section documents and analyzes the current debate on efforts to REDD.

The concept

The concept of REDD is quite straightforward. It is based upon a system of 'payments for environmental services' (PES), which evaluates the benefits people obtain from ecosystems by providing a direct economic incentive for their provision or generation. Such benefits, also referred to as ecosystem services, include regulating services (climate or water), provisioning services (food, fresh water), supporting services (soil conservation, nutrient cycling) and cultural services (aesthetic or traditional values). PES seek to create a market for a clearly defined environmental service based on voluntary transaction and quid pro quo payments between the demand and supply side (Wunder 2005). By attaching an economic value to the environmental service, the intention is to encourage its integration into the economic decision-making process. The same principle is applied with REDD. Specifically, the objective is to recognize and value the emissions associated with (tropical) deforestation and to create economic incentives for their abatement, for instance through financial compensations.[6]

Technical challenges for REDD

Although simple and attractive in theory, the implementation of REDD is complex. Several technical and methodological challenges need to be addressed. These refer not only to the definition of the "right price" – which implies the proper assessment of the typically spatially varying benefits of forgone land uses (opportunity costs) as well as the transaction costs associated with the adoption of REDD measures – but also to the creation of a market in which REDD credits can be sold and to the capacity to accurately verify these emission reductions. In addition, as for any PES, for REDD to become an attractive investment opportunity for land managers, constant long-term financing for the service delivery has to be ensured. This requires not only the establishment of adequately designed and enforceable systems at the international level, but also at the local level (in potential REDD service providing countries), where weak governance structures may present significant additional challenges as became evident with past deforestation reduction efforts. The following section presents some of the key technical issues in the debate on REDD, such as the establishment of baselines, leakages and natural or accidental deforestation.

■ **Baselines** show emission trends that would occur if no action was taken. Sometimes referred to as the "business as usual" scenario, baselines are counterfactual scenarios that, from a positive viewpoint, help determine the magnitude of effort necessary to achieve compensation for emission reductions. The debate is focussed on whether baselines should be based on a static extrapolation of past (historic) deforestation trends, or on modelled future projections of deforestation using explanatory variables.

If baselines are based on static historical trends, there is a risk of creating adverse incentives by over-compensating countries with high past deforestation rates while penalizing those that have already taken action to reduce deforestation, or those presenting low past deforestation rates but strong economic and population growth pressures. In addition, establishing historical baselines is difficult because of yearly variations in deforestation and a lack of reliable historical data in some countries (Karsenty 2007).

For these reasons, some propose the use of projected baselines (e.g. Chomitz *et al.* 2006) in which the current deforestation drivers and their projected impact (e.g. on potential developments of relevant commodity markets) is taken into account. Yet calculating baselines based on future projections is also difficult and lacks accuracy, given the uncertainty regarding the evolution of direct and indirect causes of deforestation – e.g. the evolution of agricultural commodity prices, biofuel markets, timber goods etc. Finally, there is a risk of rewarding 'fake' emission reductions by projecting large deforestation rates or integrating large development adjustment factors for countries with high economic and demographic growth pressures (Karsenty and Pirard forth.).

Despite legitimate concerns regarding the calculation of baselines for REDD (e.g. Karsenty 2007, Karsenty and Pirard forth.), one could argue that the establishment of any baseline is difficult, but that this shouldn't result in inaction. On the contrary, one may consider that the best approach, based on the precautionary principle, would be to use the currently available methods in the best possible way while recognizing the associated uncertainties.[7]

■ **Monitoring.** Accurately estimating carbon emission reductions from the forestry sector is more difficult than for energy-based activities. This is because mitigation estimates vary significantly according to the specific characteristics of the natural ecosystem, the underlying assumptions associated with the baseline calculation and the quality of available data (IPCC 2007). In addition, forests also emit GHG, especially methane (Keppler *et al.* 2006), while uncertainty remains about the carbon uptake of mature forests and how this may be altered by climate change. This underlines the importance of calculating the net carbon benefits from forests. Despite these difficulties, considerable progress is being made in many developing countries, especially Brazil and Indonesia, in data acquisition and tools for the estimation of deforestation and forest degradation through field studies and remote sensing (DeFries *et al.* 2007, Kintisch 2007, Chomitz *et al.* 2006).

Additionality concerns the need to ensure that projects result in emission reductions that would not have been achieved in the absence of the project. For example, economic resources are allocated less efficiently if REDD projects are financed in areas with already low rates of deforestation, where the additionality would be minor. Conversely, financing REDD in tropical forest frontiers that are vulnerable to deforestation and where deforestation rates are highest, may limit access to inner forest and thus increase additionality (but also the costs since the opportunity costs may be higher in frontier areas compared to non-frontier zones). Ensuring additionality is a particular challenge in the context of REDD since large-scale generation of non-additional REDD credits will be counter-productive to the ultimate climate objective (Karsenty and Pirard forth.).

■ **Risk of non-permanence.** Carbon removal and carbon storage from land-use is potentially non-permanent. Deforestation and degradation can take place at any moment in time (due to natural phenomena or human activity) which reverses carbon emission reductions by releasing formerly removed and stocked GHG emissions into the atmosphere. However, even short-term sequestration of carbon can be valuable and it helps to buy time for the adoption of alternative and more permanent emission reduction measures (Chomitz et al. 2006). This notion is supported by the concept of tCERs and lCERs, applied in the context of A/R CDM projects and which could also be explored for the case of REDD. Moreover, the periods of compliance assessment could be extended such that all fluctuations can be averaged and a reserve pool of about 20% of emissions could be created, allowing for unplanned losses – similar to arrangements at the Chicago Climate Exchange to account for Forestry Carbon Emission Offsets (Stern 2006). However, one may also argue that the risk of permanence is not an issue in the context of REDD as the focus lies on the reduction of emissions (i.e. flows), rather than the increase of carbon sinks (i.e. stocks). In other words, if REDD is viewed as a means to reduce overall emission flows, the reduction of deforestation-related emissions is by definition permanent – similar to emission reductions from the fossil energy sector.[8]

■ **Leakage.** This refers to the situation in which the addressed problem is relocated, both in space and time, but not solved. For example, reducing deforestation-related emissions in one area may result in a spatial displacement of the deforestation activity to another area without, in aggregate, actually solving it. Leakage may also occur when a project's output creates new incentives to increase GHG emissions elsewhere, at a different moment in time.

One proposition to overcome or prevent such leakage is to cover sufficiently large areas. In the case of REDD, this would involve adopting a large-scale approach, rather than a project-level approach (as for CDM), to thus reduce the risk of leakage. National scale action can solve the leakage problem within one country, yet not at the international level. To address international leakage, a large international or continental participation in REDD schemes would be required.

■ **Price.** Finally, the impact of REDD in climate change mitigation will depend on the price paid. Sohngen and Sedjo (2006), for example, estimated the carbon gained through REDD by 2055 over the reference case, showing how carbon benefits vary under alternative price scenarios (Figure 3). The ultimate price however is largely the result of existing demand and supply. From the supply side, for the price to be an incentive for REDD, it must at least cover the opportunity costs as well as the associated transaction costs to adhere to REDD systems. From the demand side, the willingness to pay for REDD credits will largely depend on the amount of abated GHG emissions and the degree to which REDD can help comply with emission reduction commitments.

Initial experiences with REDD

Although so far excluded from the official carbon markets, several activities involving

REDD are already taking place. These can provide valuable insights into how technical and political obstacles can be approached and how a REDD mechanism could be designed. This section presents important initial efforts exploring REDD in practice.

The Noël Kempff Climate Action Project in Bolivia

The Noël Kempff Climate Action Project was probably the very first REDD experience. It started in 1997 as a response to timber harvesting and deforestation threats in tropical forest areas adjacent to the Noël Kempff Mercado National Park in north-eastern Bolivia.[9] It was created upon the initiative of the Bolivian Government and its National Program of Climate Change by a local non-governmental organization (NGO) called Fundación Amigos de la Naturaleza (FAN), and the American NGO The Nature Conservancy (TNC). Funding was provided by three American energy companies.

To implement the idea, the project stopped forest exploitation activities (logging, and slash and burn practices) and extended the original limits of the park by incorporating an additional forest area of 832,000 ha. Upon the assessment of carbon stocks and associated emission reductions[10], Noël Kempff became the first deforestation-related emissions reduction project in November 2005, fully and rigorously certified following CDM-like practice (UNFCCC, FCCC/SBSTA/2006/MISC.5).

The Noël Kempff project provides valuable insights into many aspects. Not only did it set an example of how carbon stocks in forests and emission reductions from deforestation can be quantified, monitored and certified, but also how additionality, permanence, and leakage issues can be addressed (UNFCCC, FCCC/SBSTA/2006/MISC.5). Today, it presents the most advanced experience in terms of satellite and biomass measurement technologies which has inspired many similar projects elsewhere.

The BioCarbon Fund

The BioCarbon Fund started in 2004 as a fund solely dedicated to the forest sector. Managed by the World Bank, the fund seeks to strengthen forests as part of the CDM and of carbon markets in general, and to develop and apply methodologies to overcome technical obstacles regarding forestry projects. Another goal of the BioCarbon Fund was the creation of opportunities for the participation of Sub-Saharan Africa. In 2005, 36% of the Fund's total project value was located in Sub-Saharan Africa (Gardette and Locatelli 2007).[11]

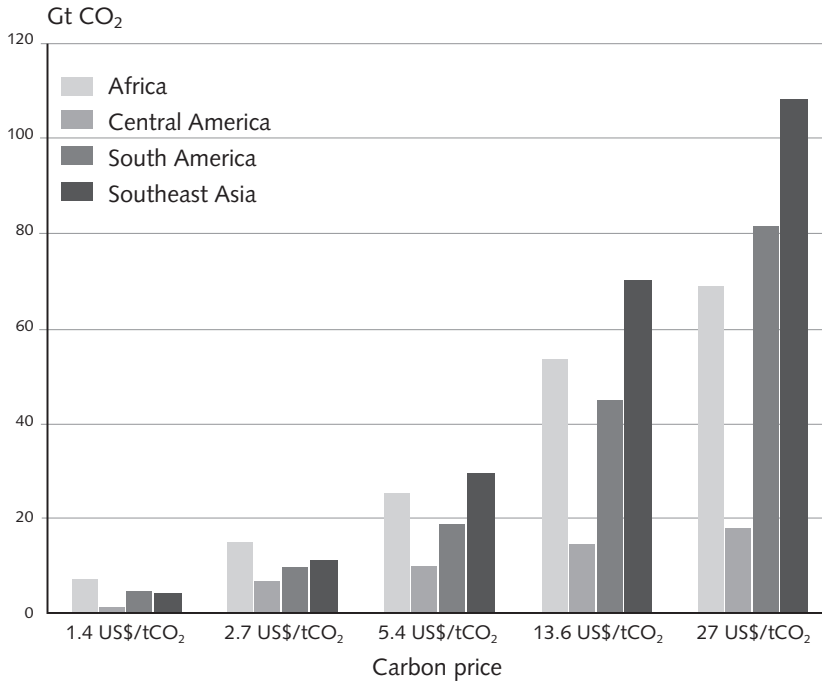
The BioCarbon fund has two windows: the first is focussed on A/R CDM eligible projects; the second on avoided deforestation projects. Examples of projects that fall into the second window are: Pico Bonito in Honduras, the San Nicolas project in Colombia, the Andasibe Mantadia project in Madagascar and the Rio Blanco project in Dominican Republic (Gardette and Locatelli 2007). While the investment fund for projects in the first window received contributions from investors (governments or private firms) in exchange for emission reduction credits, the second group has only been funded by the French Development Agency (AFD) and the Japanese company TEPCO.

The BioCarbon Fund is considered a great learning experience. Although its role was limited to the identification of projects and the purchase of attained emission reductions, the fund made important initial investments to support the set up of projects, including methodological support. In turn, four of the seven CDM A/R methodologies actually originated from Bio-Carbon Fund experience. Prices for emissions are in the range of US$ 3 - 4.5 per t CO_2 sequestered until 2017.

The Fund is now working on methodologies that will allow for precise baseline definitions, leakage accounting and emission reduction calculations that may eventually also enrich

Figure 3

Forest carbon benefits under alternative price scenarios, by region (Sohngen and Sedjo 2006)



debates on methodological issues concerning REDD (Gardette and Locatelli 2007).

The Forest Carbon Partnership Facility

The Forest Carbon Partnership Facility (FCPF) is a specialized framework for REDD, administered by the World Bank, and expected to be launched officially in December 2007. The initiative against deforestation in developing countries dates from the G8 Gleneagles summit in 2005. The long-term objective of the FCPF, in addition to climate change mitigation, is to also introduce other payments for ecosystem services such as biodiversity and watershed protection and to develop instruments and methodologies that can enrich the UNFCCC.

The Facility will have two lines of action. The first is a 'readiness mechanism' that would initially prepare 10 to 15 (then 20 to 30) countries to access the facility and thus benefit from financial compensations for REDD. The preparation is based primarily on capacity building for the definition of baselines and monitoring of deforestation-related emissions. The second line of action involves a 'carbon finance mechanism' where emission reductions in 3 -5 countries would be compensated by non-Kyoto carbon credits (Emission Reductions Agreement), guaranteed by the World Bank and issued after the delivery of emissions reductions, i.e. ex-post, over a period of 10 years. While the ultimate design of the facility is still ongoing, the start-up funding will be in the order of $250 million from both public and private donors: $50 million for the readiness mechanism and $200 million for the purchase of REDD credits (World Bank – Carbon Finance Unit 2007).

Other voluntary carbon markets

Voluntary carbon markets, also referred to as compensation markets, are not linked to official emission reduction commitments such as defined by the Kyoto Protocol or the EU-ETS. Instead, they allow firms or individuals to voluntarily buy emission reductions to compensate or neutralize their impact on climate change for ethical or PR purposes. Prior to any sale, these deforestation-related emission reductions are verified according to international standards. REDD projects, including the Noël Kempf project and projects of the BioCarbon Fund-Window 2, generate emission reductions that can be sold to voluntary buyers, for example via the Chicago Carbon Exchange.

Voluntary carbon markets are more flexible regarding eligibility criteria, localization of projects and type of activities. They accept carbon credits resulting from projects that are ineligible for CDM, and are usually associated with lower transaction costs, enabling small-scale projects with a variety of ancillary benefits to be included. Even if the transaction volume of voluntary markets is relatively low, they are expanding rapidly (Bayon et al. 2007). About 56% of the nearly 9 million credits in these markets correspond to the land-use, land-use change and forestry sector (Gardette and Locatelli 2007). However, credibility is at stake when there are no well-defined standards or a control organization to certify the quality of credits in terms of additionality, accountability of measures, permanence and transparency. This is why non-governmental organizations seek to fix standards for voluntary carbon credits, including those from forests. Examples of such standards include The World Economic Forum Global Greenhouse Register (WEF) and the Climate Community and Biodiversity (CCB) specialized in forestry projects (Gardette and Locatelli 2007).

Main proposals for REDD

Although there is an increasing amount of literature on how future climate policies could be designed to effectively account for REDD (e.g. Schlamadinger et al. 2007, Benndorf et al. 2007, Skutsch et al. 2007, Karousakis 2007), the ultimate decision will largely be shaped by political reasoning. In negotiations, such as within the UNFCCC, parties will make decisions that ultimately define whether and how REDD is to be included in climate policy actions.

As part of the technical review initiated by the UNFCCC to explore the idea of REDD, two workshops were held – one in Rome in August/ September 2006, and one in Cairns in March 2007. In total about 20 proposals or country views were submitted to the UNFCCC. This section focuses on the four main country positions and explains the differences between them.[12]

Papua New-Guinea («PNG») proposal

The submission of this proposal, also referred to as the "PNG proposal", represented the views from Bolivia, Costa Rica, Nicaragua and Papua New Guinea. It was also supported by the governments of the Central African Republic, the Dominican Republic and the Solomon Islands. It was presented on behalf of the CfRN which is composed of several other countries that did not take part in this proposal. At the same time, Bolivia and Costa Rica presented a proposal of their own. In February 2007, the CfRN presented another proposal supported by 17 countries,

while Dominican Republic, Vanuatu and Tuvalu also presented their own proposal (Gardette and Locatelli 2007).

The PNG proposal supports the idea of financing REDD13 via a market-based mechanism, either by integrating REDD credits into existing carbon markets, or creating a parallel market for this purpose. It promotes the development of a mechanism that allows for carbon emissions saved by reducing deforestation and degradation in developing countries to be traded internationally. The carbon credits issued from REDD could be traded as a means for Annex I countries to attain reduction commitments, similar to CDM CERs.[14] Early action (of reducing emissions from deforestation) during the period 2008 - 2012 is mentioned as potentially creditable within post-2012 frameworks. However, while the proposal argues in favor of implementing the mechanism within the UNFCCC framework, it is not clear whether the proposed mechanism should be integrated under a separate protocol or under the post-2012 Kyoto regime.

Baselines would be established by each country on a national basis and voluntary reduction commitments would be negotiated for fixed commitment periods. Action and measurements would be done at a national level (thus reducing leakage at the sub-national level). At the end of each period, verified national emission reductions could be sold to other governments or to international carbon investors.

To account for each country's economic growth context, the PNG proposal considers the integration of a 'development adjustment factor' (DAF) or 'growth cap' in the definition of baselines. This growth cap basically allows for a certain amount of deforestation to occur for the purpose of a country's socio-economic development.

In order to control for non-permanence risks, a share of carbon credits (for example 20%) would be banked to compensate for potential future losses. These losses may be due to natural or accidental deforestation, or simply because emission reduction targets were not met.

Finally, two complementary funds are proposed. A "stabilization fund" to support developing countries with historically low deforestation rates seeking to stabilize their existing forest areas, and an "enabling fund" to prepare countries for participation in the REDD mechanism and in the stabilization fund. The latter would focus on building capacity so that countries can effectively implement the other two mechanisms.

Several ideas are presented concerning the sources of funding for the stabilization funds, including: taxation of Emission Reduction Units traded in Kyoto markets, taxation of carbon intensive commodities and services, taxation of industries excluded from emission reduction policies or Official Development Assistance (ODA) (FCCC/SBSTA/2007/MISC.2). Specifically, the proposal is in favor of ODA to finance readiness and pilot activities during the period up to 2012.

In its latest submission in August 2007, PNG restates the urgency to move forward on REDD as a climate change response measure, emphasizing the potential ancillary environmental and social benefits, and calls for the development of methodological guidelines to facilitate rapid implementation of incentive frameworks both during the 2008 - 2012 phase and beyond (UNFCCC/FCCC/ SBSTA/2007/MISC.14, 2007).

Brazilian proposal

Although Brazil was initially opposed to the integration of deforestation to the Kyoto Protocol (at COP-7 in Marrakech 2001), it presented a proposal in Rome in September 2006 and in Cairns in March 2007. This proposal has generated a considerable amount of debate as it distinguishes itself in several relevant points from the PNG proposal.

Brazil proposes to offer positive financial incentives to countries that voluntarily commit to reduce emissions from deforestation. It is important to note that Brazil opposes the inclusion of emission reductions from forest degradation, i.e. the focus is on reducing emissions from deforestation (RED) only.

It argues in favor of a scheme embedded in the context of the UNFCCC, but outside Kyoto, that contrary to the PNG proposal would not generate future obligations or serve Annex I countries in meeting their emission reduction commitments. Credits issued from RED would be part of a separate protocol which would not rely on market-based mechanisms for financing, but on multilateral voluntary funds or ODA.

Baselines would be defined according to historical deforestation rates, and would be periodically updated (baselines would be based on the deforestation rates of the decade before the start of the commitment period and would be updated every three years). Standard values of carbon per hectare would be established so that emission reductions can be compared periodically to a reference level. This way, countries would gain credits or debits, deducted from future incentives, according to achieved emission

reductions. In other words, emission reductions that could not be attained will be carried on to subsequent commitment periods.

The proposal states that finance for RED should be additional and provided voluntarily by Annex I countries. Transfers would be performance-based and ex-post (i.e. after verification of emission reductions). Brazil recognizes the need to finance capacity building and technology transfers and of a continuous investment to sustain RED efforts. Resources for capacity building should come from multilateral institutions and voluntary donors in Annex I countries (FCCC/SBSTA/2007/ MISC.2).

Proposal of the Congo basin countries (COMIFAC)

The submission of this proposal was presented by the Congo Basin countries together as the Commission of Central African Forests (COMIFAC). COMIFAC is in charge of common actions for sustainable forest management. It is supported by the Congo Basin Forest Partnership (CBFP), and by a set of donors including multilateral structures, non-governmental organizations and private sector representatives. The members of the COMIFAC are Equatorial Guinea, Democratic Republic of Congo, Central African Republic, Gabon, Congo, Cameroon, Sao Tome and Principe, Burundi, Rwanda and Chad. Four of its members are also in the CfRN.

The distinctive feature of this proposal is an emphasis on the extension of compensations for emission reductions from tropical deforestation to include emission reductions from forest degradation. This is because degradation constitutes the main cause of forest cover loss, likely to affect nearly 60% of productive lands in the Congo Basin. In addition, Congo Basin countries have made significant efforts to ensure the conservation and sustainable management of forest ecosystems, thereby contributing to the reduction of emissions from forest degradation. Congo Basin countries are therefore keen to promote the concept of degradation-related emission abatement as part of the future climate regime (UNFCCC/FCCC/SBSTA/2007/ MISC.14, 2007).

Compensations would be financed by a mixed mechanism combining voluntary funds with REDD carbon market credits. Two further funds are proposed: an 'activation fund' to finance institutional capacity building and readiness activities, and a 'stabilization fund' to remunerate forest carbon stocks.

With respect to baselines, the proposal underlines that baselines based on historical trends would strongly penalize Congo Basin countries with low deforestation rates in the past. They therefore argue in favor of a reference scenario that, in addition to historical baselines, include a 'development adjustment factor', so that future forest exploitation development needs can be met in countries with low emissions per capita and low economic development.

Regarding the scale of action, Congo Basin countries emphasize the need to be open-minded and to allow for a national and project-level approach dependent on national circumstances. Finally, the COMIFAC proposal states that early REDD action should be rewarded and implemented to gain more experience on the design of such schemes (FCCC/SBSTA/2007/ MISC.2).

Proposal of the Latin American countries

Ten Latin American countries submitted two proposals to the UNFCCC in 2006, and another in 2007.[15] In their submissions, the need to consider emissions from forest degradation is acknowledged as well as the stabilization of carbon pools. The need for adequate, predictable and long-term sources of funding is further recognized, together with the need to offer an array of policy options adapting to each country's deforestation dynamics and capacities. Reference scenarios based on historical trends and a 'development adjustment factor' are proposed.

In terms of financing, Latin American countries acknowledge the limitation of traditional funding to ensure long-term finance of emission reductions from deforestation and are favorable towards a market mechanism that would reward REDD during the second commitment period of the Kyoto Protocol, and the integration of REDD carbon credits into the Kyoto framework. Early action crediting for future commitment periods is also stressed. In addition, the implementation of an enabling fund, financed though voluntary funds or ODA, is suggested to initiate early action and pilot activities. An additional stabilizing fund, financed through taxes on Emission Reduction Units or on carbon intense goods and services in Annex I countries, is also proposed (FCCC/ SBSTA/2007/MISC.2).

Some countries, such as Bolivia and Ecuador, stress the need to recognize project level action within the national-level approach as a means to overcome institutional and governance shortcomings that could threaten the effective functioning of a REDD mechanism. In this case, compensation for REDD would be made from either voluntary funds or carbon markets (or both) and distributed to national governments with responsibility for directly compensating

land-owners for providing environmental services (FCCC/SBSTA/2007/MISC.2).

Other perspectives

Numerous countries have submitted their views on REDD, mostly supporting the idea. While our analysis has focused on the four main proposals from tropical countries, a selection of opinions from other countries is considered below.

India and China share the view that a REDD mechanism would only favor countries with high deforestation rates, creating contrary incentives, including the risk of international leakage. In their view, as first proposed by India in Cairns 2007 and jointly since the SBSTA26 meeting in Bonn 2007, an additional mechanism of "compensated conservation" would allow countries that have implemented strong conservation measures (or reforestation policies) to be compensated for their efforts in preserving existing forest carbon pools (UNFCCC/ FCCC/SBSTA/2007/MISC.2; UNFCCC/FCCC/ SBSTA/2007/MISC.14). The position adopted by these influential nations is extremely relevant and very likely to induce a REDD system that also compensates low deforestation rates.

The European Union (EU) has actively participated in negotiations, but mainly as a mediator. In its submission in February 2007, the EU recognizes that REDD is a key element in the post-2012 agreement to halt emissions caused by deforestation and reverse them in the next two decades, although concrete actions and policies would largely depend on the development of negotiations. The EU is in favor of an incentive-based approach, including the carbon market, yet remains silent on the exact role that the carbon market should play. This is largely due to fears that the linking of REDD credits to the carbon market could produce a surplus and thus lower the carbon price, especially in the EU-ETS. At this stage, the EU is supportive of the aforementioned FCPF, and considers the option for FCPF funding, with a clear preference for the aforementioned "readiness mechanism", the first line of actions envisaged by the FCPF. The EU is also considering a preparatory scheme in the period up to 2012 to explore approaches combining national action and international support, including: assessment of national implementation of policies to combat deforestation, activities to improve the monitoring and reporting capacity, baseline definition, and positive incentives to encourage countries to take actions (UNFCCC/ FCCC/ SBSTA/2007/MISC.2, 2007). The view of European countries on this issue is relevant as they present important potential buyers of REDD credits. Indeed, the integration of forest carbon (from afforestation and reforestation CDM projects) into future commitment periods of the EU-ETS is currently being discussed. In addition, the EU is considering more ambitious emission reduction targets, provided that developing countries also show a certain level of commitment, notably in reducing emissions from deforestation (EU 2007).

Interestingly, Indonesia has so far remained rather silent – at least in the UNFCCC debate on REDD. Still, there are increasing signs that Indonesia is actively analyzing REDD and exploring its potential to complement ongoing international and national policies (Government of Indonesia 2007; Reuters, 29 June 2007). In addition, since the country will be hosting the upcoming COP-13 in Bali, which among negotiators is already termed as the "REDD COP", one can be confident that Indonesia will be taking part in the discussions by the time of the COP-13 at the latest.

Table 2 depicts the main elements of the different proposals presented in this chapter. Not surprisingly, the main players involved in the RED/REDD debate are the developing countries that contain areas of the world's largest tropical forest biomes, i.e. in Africa and Latin America. The next section of the article will discuss some of the key issues in the debate.

Discussion: open questions in the international debate on REDD

As the UNFCCC-induced examination process on REDD takes place, significant progress has already been made regarding several methodological challenges, and an agreement has been reached on several points from the different proposals that have been submitted after Montreal. For example, there is consensus on the need for pilot activities, capacity building and the need for continuous, predictable and long-term funding for REDD. In addition, an agreement on the importance of tropical forest degradation abatement as a means to reduce GHG emissions was reached in Bonn in 2007 (FCCC/SBSTA/2007/L.10). Agreement has also been reached on the need for appropriate and consistent methodologies to evaluate REDD as well as on the fact that REDD activities will not issue carbon credits for the first Kyoto commitment period (UNFCCC/FCCC/ SBSTA/2007/3, 17 April 2007). The need to take into account different national situations and particular deforestation circumstances was also recognized

by most conference participants to ensure the successful integration of developing countries (FCCC/ SBSTA/2007/L.10, 17 May 2007).

However, there remain several points of disagreement which reflect the controversy of the debate and the challenge to accommodate the interests of all parties. While there seems to be coherence among the proposals by COMIFAC, the PNG/Rainforest Coalition, and the Latin American countries[16]; Brazil's position, at least within the official negotiations, appears to be the most contrasting.[17] The main differences refer to the financing system, the appropriate framework, and whether or not to also consider emission reductions from degradation. This section will address selected open questions in the REDD debate.

Financing REDD - mandatory markets or voluntary funds?

Probably one of the key questions in the international debate on REDD is the issue of how to finance REDD. Most parties to the UNFCCC support in principle the idea of using a mandatory market approach to finance REDD. Mandatory markets, such as the EU-ETS, are often preferred because they would assure long-term, continuous and predictable flows of finance for REDD projects, in contrast to voluntary funding.

However, some consider that directly linking REDD into existing carbon markets would be risky, because the potential arrival of cheap REDD credits could ultimately undermine the price signal function (i.e. investors may prefer to pay for REDD credits rather than investing in more expensive clean technologies). Consequently, such a move could be counterproductive and destabilizing for the entire system. Furthermore, REDD finance via mandatory markets may involve robust carbon accounting systems, higher performance requirements and higher carbon prices per ton compared to voluntary markets (UNFCCC, FCCC/ SBSTA/2007/L.10). Countries with weak legal, institutional and governance structures may not necessarily be in the position to assure

TABLE 2

Overview of the main proposals on REDD (Source: adapted from Dutschke and Wolf, 2007)

Most relevant proposals					**Other important actors and their positions**		
	Papua New Guinea (Rainforest Coalition)	**Brazil**	**Central Africa (Comifac)**	**Latin American countries**	**Indonesia**	**India/China**	**European Union**
Scope	Deforestation and Degradation	Deforestation	Deforestation and Degradation	Deforestation and Degradation	**Deforestation and Degradation**	**Compensated Conservation**	**Deforestation and Degradation**
Framework	Open, preferably within Kyoto	Separate Protocol, but within UNFCCC	open	Kyoto Protocol	**Open, favors Kyoto**	**Kyoto Protocol, UNFCCC**	**Open, but deforestation will play a role in post-Kyoto arrangement**
Reference Level[18]	Historical with a development adjustment factor	Strictly Historical (about 10 years)[19]	Historical (> 5 years) with a development adjustment factor	Historical (> 5 years) with a development adjustment factor and taking past efforts into account	**Historical and present circumstances**	**Historical**	**Open**
Liability	Banking and Borrowing [20]	Commitments transferred to subsequent periods					**Mixed[21]**
Finance	Market-based[22]	Voluntary fund	Mixed financing, market and fund based	Mixed financing: market and fund based	**Market-based**		**Favors incentive-based financial mechanism, supports FCPF**
Fungibility	Tradable credits for Annex I countries' reductions	No, REDD credits are non-substitutable for Annex I countries' reductions	Tradable credits for Annex I countries' reductions	Tradable credits for Annex I countries' reductions			
Price formation	Open	Fixed Price per tCO_2 (periodically reviewed)					
Early Action	Compensated	Compensated	Compensated	Compensated		**Compensated**	**Compensated**
Additional funds	Stabilization and enabling funds	Capacity building and technology transfer	Stabilization and enabling funds	Stabilization and enabling funds			
Spatial Scale	National	National	Open: national or local, depending on country circumstances	Open: national, local or sectors-specific, depending on country circumstances	**National**	**National**	**Open**

long-term compliance with the requirements of a mandatory market mechanism.

Voluntary markets or funds have been discussed as an alternative means to finance REDD (e.g. Bayon et al. 2007). Voluntary carbon markets are expanding rapidly and have the potential to offer important markets for forest carbon in the future. One advantage of voluntary markets or specialized funds is that they are not limited to account for "carbon tons" but can use other measurement units such as "per ha" which may be more suitable for REDD projects (Stern 2006). Sources of funding are seen in voluntary private sector engagement, ODA or tax revenues, such as for example, the taxation of carbon market transactions or carbon intensive sectors in Annex I countries. However, while long-term specialized deforestation funds can present certain advantages as they allow for more targeted action at lower costs, they may not be able to generate sufficient and sustainable flows of resources (Stern 2006). ODA for instance has progressively decreasing trends of funds, especially with regard to assistance for forestry action (El Lakani et al. 2007). This suggests that relying soley on such aids and multilateral funds is unrealistic in the long-term.

One could argue that any scheme that allows REDD finance in the tropics would be beneficial for the global climate, whether based on mandatory markets or voluntary funds, and the most promising way forward is perhaps a combination of both. Mandatory markets seem to be the best way to effectively provide continuous and sustained financial flows, assuring permanence of efforts. However, when considering the aforementioned potential risks, it may be prudent to avoid the situation where REDD finance relies solely on existing carbon markets, at least not in the short-term. The question is then whether a mandatory parallel market – inside or outside of the Kyoto Protocol – for REDD can be created, that will ensure sufficient demand and effectively induce emission reductions from deforestation and degradation (see discussion below). The alternative to mandatory markets - voluntary funds and ODA - can hardly present a long-term solution to ensure constant REDD finance but are adequate for financing early REDD action, pilot activities or stabilization funds, such as proposed by COMIFAC and Latin American countries.

Most parties agree on these principles, except for Brazil which currently prefers fund-based long-term REDD finance. Brazil's position is relevant as it is a powerful stakeholder in the debate. Furthermore, the participation of Brazil in a REDD system is crucial as it has one of the world's highest absolute rates of deforestation. One potential solution to overcome the disagreement on long-term REDD finance may be the creation of a global fund to act as an intermediary between buyers and providers of REDD credits (similar to many payment systems for ecosystem services). The generated REDD credits could be used by Annex I countries to comply with Kyoto commitments, yet only in a highly regulated manner (e.g. proportion of emission reduction commitment, similar to current forestry CDM credits). In essence, this concept is similar to the FCPF model. Although not necessarily the best solution from an economic perspective, REDD finance via voluntary funds currently appears to be among the more feasible political solutions.

Implementation of REDD - inside or outside of the post-2012 Kyoto framework?

The debate on how to finance REDD will largely define the institutional framework in which a future REDD mechanism is embedded. While voluntary markets – with potential links to mandatory carbon markets – are always an option for financing REDD, politically institutionalized platforms or markets, in connection with binding commitments, as exists in the Kyoto Protocol or the EU-ETS, may have greater impact. Advocates of REDD, therefore, tend to argue in favor of exploring ways to incorporate REDD into an official commitment (e.g. Chomitz et al. 2006).

There is an apparent consensus on placing REDD within the framework of the UNFCCC, but there is much discussion as to whether this implies its integration into the existing Kyoto Protocol (i.e. in the post-2012 arrangement periods) or into a separate Protocol. This is a crucial question since the way REDD is instituted at the international level affects the level of commitment of participating countries – of potentially both the demand side (Annex I or equivalent countries group) and supply side (forest rich tropical countries).

The main arguments put forward in favor of integrating REDD into future commitment periods of the Kyoto Protocol are of a pragmatic nature, referring to the existing framework and demand for carbon credits. This argument is supported by the perception that the creation of an independent protocol for REDD may face the risk of insufficient demand. It may also prove unfeasible as the creation of a separate protocol for the forest sector would take too long to be agreed and implemented (e.g. Dut-

schke and Wolf 2007). Indeed, the creation of an international regime for forests (e.g. UNFF) with binding commitments has remained an unsolved endeavor since Rio 1992.

Skeptics of the proposal to integrate REDD into the post-2012 Kyoto regime fear that such action may weaken the entire system. Reasons cited in support of this viewpoint include concerns that it could cause a repeat of the tedious negotiation process that took place prior to the establishment of the Kyoto Protocol and, more importantly, the fear that the arrival of cheap forest carbon credits (from REDD) on mandatory carbon markets may lower the carbon price and thus discourage actions towards climate change mitigation. However, this second point can be offset by the argument that for the carbon price to remain strong and stable under the integration of REDD, it is necessary to assure a sufficiently high demand, e.g. by adopting more ambitious emission reduction targets (Chomitz *et al.* 2006, Stern 2006). This issue remains of concern especially for potential buyers (Annex I countries) such as the EU.

The establishment of parallel markets may be one way to include REDD into the existing Kyoto Protocol without threatening the current Kyoto carbon market regime. Ogonowski *et al.* (2007) for example argue in favor of a 'dual markets approach' for the post-2012 Kyoto regime in which a new market for REDD would exist in parallel to a global carbon market, with only partial fungibility between the two. Under this configuration, developed countries would commit a percentage of their post-2012 target to come from the REDD market. This reduces the risks of disruption of the global post-2012 carbon market while allowing for the development of a new parallel market which, once mature, may be connected more directly to the carbon market. However, although attractive in theory, it should be acknowledged that in practice one cannot control every circumstance. Consequently, even in supposedly non-fungible parallel markets, there may be loopholes that allow arbitrageurs to exploit the system, which brings back the risks and fears associated with the direct integration of REDD into the existing carbon market. Accepting this possibility, rather than a discussion on the allocation of time and money for the design of complex parallel market systems, it may be considered that the primary focus should be on how to limit the risks associated with direct integration of REDD into existing Kyoto carbon markets. Despite these concerns, a parallel market solution (as proposed in the 'dual markets' approach by Ogonowski et al.) remains highly attractive, offering a politically more feasible solution than direct integration of REDD into the carbon market.

An alternative concept could involve the creation of a separate arrangement or protocol for REDD. The appeal of this idea is that it allows disconnection from Kyoto-specific commitments, which may increase the political acceptability for crucial stakeholders in the debate, notably the EU and Brazil. It may also allow for greater coherence with other actions that may interact with REDD measures, such as the promotion of renewable energies (agro-fuels) and sustainable agriculture. A separate protocol for REDD may also be seen as a chance to overcome obstacles that have long prevented binding agreements within an international forest regime (e.g. UNFF). Yet, the important arguments in favor of a separate protocol should not lead to an underestimation of the aforementioned challenges of ensuring constant long-term REDD finance and of potentially substantial costs (in terms of time and money) associated with the establishment of such a protocol.

Ultimately, what seems most important is the need to recognize the relevance of REDD as part of the global effort to combat climate change, and to adopt a pragmatic approach to establishing a REDD system. Whether this involves the integration of REDD into the future Kyoto framework, either directly or via a parallel market, or the establishment of a separate protocol will ultimately remain a political decision.

What seems clear is that the post-2012 climate regime will not be able to ignore the role of deforestation-related emissions, an acknowledgement that is accompanied by an increasing demand for the post-2012 discussion to go beyond the notion of "north-south" compensations. In its place, following the principle of common but mutually differentiated responsibilities, it is being suggested that developing countries, especially emerging countries, also agree to progressively adopt ambitious emission reduction targets (e.g. Colombier et al. 2006). This could occur in the form of a "global deal", as suggested by Stern and Tubiana (2007), in which tropical forest countries, especially emerging countries, agree to their own emission reduction efforts – via REDD and taking national circumstances into consideration – while developed countries agree to significantly support and finance these efforts. Such a global deal is expected to help overcome some of the issues that currently hinder developed countries in their advancement of the

post-Kyoto debate (Stern and Tubiana 2007). The EU at least appears committed to the idea of global participation in emission reduction efforts (e.g. EU 2007). Although politically ambitious, such a global deal may help to address some of the obstacles that currently prevent an agreement on the integration of REDD into a future climate regime.

How should reference levels (baselines) be established?

The views expressed by parties to the UNFCCC appear to show a preference for the use of static historical baselines. However, self-made national baselines, as proposed by PNG, can hardly be incentive compatible, since any country would have a tangible financial incentive to raise the baseline, and inflate its performance and credits.

Moreover, the widely preferred static extrapolated baselines may be unfair in cases where low deforestation rates or significant forest conservation efforts have occurred in the past. Therefore, some countries – including Costa Rica, China and India – argue that past efforts to reduce deforestation should be taken into account when drawing baselines, thus accounting for previous conservation efforts.

The exclusion of countries with low deforestation rates from REDD finance may provoke international leakage: deforestation activity may be displaced from countries with currently high deforestation rates to countries with currently low deforestation rates, i.e. induce new deforestation and associated emissions in these countries. One solution to this problem may be the use of a reference emission rate, indexed to the global deforestation rate, for countries with little or no historic deforestation (Mollicone et al. 2007), and the establishment of "preventive credits" to allow countries with high forest cover and low deforestation rates to be compensated for not releasing emissions from new deforestation (Fonseca et al. 2007). Nonetheless, the risk of international leakage may depend on where a country is on the forest transition curve. It seems unlikely that countries with high labour costs (India or Costa Rica) will reinvest in massive agricultural expansion because of rising agricultural commodity prices.

To allow for future deforestation for development purposes, COMIFAC, Latin American countries, the CfRN and the EU agree on an additional adjustment factor or 'growth cap'. Adding a growth cap to the reference scenario may not only allow to take national development objectives into account, but also respond to the UNFCCC principle of 'common but differentiated responsibility' in the efforts to mitigate climate change. On a practical level, to account for diverse national circumstances, including differing levels of development, the introduction of separate – at least voluntary – targets for separate sectors has been suggested, including a 'no-lose' target whereby emission allowances can be sold only if the target is reached (IPCC 2007). The concept of no-lose targets may also be attractive from a potential buyer's perspective (Annex I countries), since they require previous efforts by developing countries to reduce emissions from deforestation before any emission reductions can be sold which goes in the direction of a "global participation" in REDD.

Should emissions from forest degradation be included?

The idea of integrating 'emission reductions from degradation' has been introduced by African countries (COMIFAC proposal). Central Africa is the third most important tropical forest biome in the world, which has so far been threatened more by degradation than deforestation. Although recent studies indicate that deforestation may become a considerable threat to Central African forests in the future (e.g. Laporte *et al.* 2007), forest degradation is estimated to threaten about 60% of the productive lands in the Congo Basin (UNFCCC/ FCCC/ SBSTA/2007/MISC.14, 2007).

Emissions from forest degradation, occurring not only in Africa, but also in Latin America and South-East Asia, are now recognized as an important contributor to climate change. Asner et al. (2005) for example found that degradation from selective logging adds 25% to gross emissions in the Brazilian Amazon. In turn, compensating emission reductions from degradation is efficient for two reasons: firstly to deliver greater GHG emission reductions than could be achieved with deforestation-related emission abatement only; and secondly, to avoid setting conflicting incentives by encouraging deforestation in forest areas that are primarily threatened by degradation (and where substantial efforts in sustainable forest management (SFM) have occurred to combat degradation), to thus benefit from RED finance. In addition, and despite some critical voices (e.g. Griffiths 2007), REDD finance could also provide new economic opportunities to local land users and thus entail spin-off social benefits such as poverty reduction. Indonesia

for example has expressed particular interest in exploring the opportunities of REDD for poverty reduction (Reuters, 29 June 2007).

Hence, although initially received hesitantly, mainly for methodological reasons, there is now a political agreement among the parties to the UNFCCC on the efficiency argument to also consider emission abatement from forest degradation (FCCC/SBSTA/2007/ L.10). Indeed, apart from technical difficulties, there is no reason why emission reductions from forest degradation should not be recognized as a climate change response measure.

Implementation of REDD efforts at a local or national scale?

Whether REDD finance should be established at a national- or project-level scale is the subject of much debate. National-level approaches are preferred to facilitate monitoring of emission reductions and reduce the risk of leakage. Most proposals agree on this point, although several Latin American countries argue that a national scale may not be favorable in the context of weak governance. Specifically, they fear that financial compensations for REDD may not reach the ultimate providers of the REDD services (land managers) due to weak public governance. However, payments from REDD do not necessarily have to go to individuals on the ground. They could also go, for instance, into systems to resolve land and forest tenure disputes. Hence, although a national-level approach seems more appropriate for REDD, a certain flexibility for project-level methodologies will probably remain, at least initially.

Conclusions

So why are we seeing "REDD"? Although the international debate on REDD has been showing complex and numerous areas of disagreement, the idea of REDD has never been discussed more seriously by all relevant stakeholders. The recognition of the potential of REDD as a means to mitigate climate change has had several drivers. On the academic side, the idea has been advocated by several experts, with the contributions by Chomitz et al. (2006), Stern (2006) and the IPCC (2007) probably being the most decisive. On the political side, the idea was already (re-)introduced by the CfRN in 2005, presented by Papua New Guinea and Costa Rica at COP-11 to the UNFCCC in Montreal. This in turn induced the establishment of a two-year examination process within the climate convention that so far has received great attention and participation – not only for its climate benefits, but also for its potential social and ecological spin-off benefits, including poverty reduction and biodiversity conservation.

The future of REDD within the UNFCCC will be shaped significantly by the outcome of the COP in Bali in December 2007. The preceding international discussions have led to a consensus on the need to move from talk to action. REDD will certainly play a role in the post-2012 Kyoto negotiations, although the discussions will have to go beyond the notion of pure north-south compensations, taking into account the perceived risks associated with the direct integration of REDD into existing carbon markets, and considering the opportunities (and constraints) of establishing a separate protocol for REDD.

Ultimately, it seems that the decision on how REDD will be financed (via mandatory markets or voluntary funds) will determine the framework in which REDD will be placed.

A number of technical and political issues remain unsolved, and a precautionary approach seems appropriate to reduce the risks of adverse effects. To further advance on the design and architecture of REDD, early action and pilot activities are required. A first step in this direction may entail the FCPF, which will be dedicated to REDD and expected to be operational in 2008.

The intensity of the REDD debate within climate negotiations is remarkable, especially when considering the tediously slow development of the advancement of international governance of tropical forests. The current climate-driven debate on REDD should reflect on the reasons why previous efforts to combat deforestation and to reach an international forest agreement have had limited success (e.g. weak local-level institutions and governance structures, incoherent policies, political-economic interests etc.). It may also be worthwhile exploring the extent to which the current REDD discussions will actually contribute to overcoming some of the challenges of international forest negotiations. In addition, to maximize the potential of REDD the forestry community needs to become much more active in the debate than has so far been the case.

It should be remembered, however, that REDD is only one of several paths to biological climate change mitigation. Further climate benefits from ecosystems have yet to be extensively explored for their technical and political feasibility as methods to mitigate climate

change. Potential avenues include the valuation of soil conservation services (or reduced emissions from land degradation), biodiversity conservation services (as a method to enable healthy ecosystems to mitigate climate change or impacts from climate change), or carbon sequestration services from wetlands and peatlands. More research is needed for a better understanding on how other biological climate change mitigation measures can be formed. Still, the methodological and political insights gained from the REDD debate may present a significant contribution to this endeavor. ■

NOTES

1 Temporary Certified Emission Reductions (tCER) are issued for a 5 year period; they can be renewed but will have to be substituted by permanent CER (pCER). Long-term Certified Emission Reductions are non-permanent, issued for three-times 20 or one-times 30 years (Gardette and Locatelli 2007).

2 Note, however, that measures to be taken by project developers to guarantee the permanence of the carbon stock, in particular for the replacement of tCERs, may be costly. Ultimately, the low price of CDM credits reflects the risks associated with the risk of non-permanence (Matthieu Wemaere, op. citation).

3 Note, however, that, despite the calls from Member States in March and June Environment Councils, the European Commission seems very reluctant to include links to credits in the EU-ETS for the post-2012 trading periods. The Commission will table its proposal for a Directive reviewing the EU-ETS by the end of 2007 (Matthieu Wemaere, op. citation).

4 Each year, between 2008 and 2012, an Annex I country can only buy less than 1% of its emissions total in 1990 (the reference year), and less than 5% of 1990 emissions for the whole period (Gardette and Locatelli 2007).

5 Voluntary markets represent between 2% and 11% of the total forestry CO_2 volumes and between 2% and 5% of exchanged values (Gardette and Locatelli 2007).

6 Some see the prime objective is to reduce deforestation-related emissions to mitigate climate change, not to preserve existing carbon stocks in forests (i.e. forest conservation). Still, an important side-effect of REDD consists in mobilizing additional financial means for the conservation of natural forests and biodiversity.

7 The methods used for calculating baselines in reforestation/afforestation CDM projects for example are usually highly conservative and, to reduce the risk of overestimation, only account for the amount of carbon sequestration for which proven methods exist.

8 We thank Olivier Bouyer for pointing out this line of thought.

9 In 1990, Bolivia's GHG emissions were equivalent to 0.1% of global emissions, 80% originating from the LULUCF sector. 52% of the Bolivian territory is covered by forests that face large deforestation rates (FCCC/SBSTA/2006/MISC.5).

10 Reduced emissions were estimated to be 989.622 tons of CO_2 between 1997 and 2005. Leakages have been taken into account.

11 In 2005 only 1% of CDM projects were A/R activities, and only 2% of that total was located in Africa – mostly in the 'Maghreb', in South Africa, and in Egypt-(Gardette and Locatelli 2007).

12 The presented positions originate from a literature review and a thorough revision of UNFCCC documents and submitted country proposals up until September 2007. Many other countries have submitted opinions, however, most (if not all) relevant issues for the debate are contained in the four proposals presented here. A table below complements these proposals with other relevant country information. It is important to note that presentation of proposals has taken into account the first submission of most parties in Rome 2006, and the second after the Cairns workshop, at Bonn SBSTA-26 in 2007, as well as those submitted in August 2007 ahead of COP-13 in Bali in December 2007.

13 Initially, the PNG proposal only referred to deforestation; however, Congo basin countries joined the CfRN and Latin American countries in several workshops and pushed for the inclusion of degradation. This is why we refer to REDD.

14 As mentioned before, the Kyoto CDM instituted tCERs to deal with the problem of non-permanence. The validity of CERs is linked to the existence of A/R carbon stocks. The beneficiary of carbon credits would be liable to replace them when they expired or when losses were verified at the end of the commitment period. The value of tCERs depends on the expected mitigation costs for future periods. With constant carbon prices, the value of a temporary CER with a 5 year validity was between 5 and 20% of a permanent CER (Gardette and Locatelli 2007). Investor confidence on market and price stability is extremely important to overcome the lower value and higher transaction costs of tCERs (Stern 2006).

15 The first one was supported by Colombia, Costa Rica, Ecuador, Mexico, Nicaragua, Panama, and Peru. The second one came from Central America, specifically: Panama, Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. Finally, a common submission was made in February 2007, supported by all countries, except for Colombia. And a separate proposal was made by Argentina, Chili, Colombia, Paraguay, and Mexico (Gardette and Locatelli 2007).

16 The CfRN contributed to the other two proposals during several seminars organized throughout 2006.

17 Note that the perspective and interest on REDD is highly diverse within the country. Substantial pro-active interest on REDD has been shown at the state level. The initiative "Zero Deforestation" was recently launched by nine NGOs and supported by several Amazonian State Governors (Amazonia.org.br, 2 October 2007).

18 Baselines determined at the beginning of each commitment period.

19 The Baseline or Reference Level would be historical and recalculated every three years. The new re-calculated baseline would be adopted only if they are below the previous deforestation baseline (FCCC/SBSTA/2007/MISC.2)

20 The PNG proposal also considers temporary credits and commercial insurance as a means of addressing permanence/liability issues of emission reductions.

21 The European Community proposes to deal with liability through several approaches: temporary credits, carry-on to subsequent periods of emissions above the agreed level, bank credits and debits from one period to the other, and mandatory banking of a share of the emission reductions (FCCC/SBSTA/2007/MISC.2)

22 Compensated reductions through carbon credits

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Annex: Interviewees and interview questions

The following experts were interviewed during the conduct of the study between April and June 2007:

- Dimitri Kanounnikoff, French Development Agency (AFD)
- Katia Karousakis, Organisation for Economic Cooperation and Development (OECD)
- Marc Letrilliart, French Ministry of Foreign Affairs (MAE)
- Marianne Rubio, French National Forestry Office (ONF)
- Olivier Bouyer, French Ministry of Agriculture and Fisheries (MAP)
- Valérie Merckx, European Commission – Environment Directorate
- Valentin Bellassen, Caisse des depots & formerly Environmental Defense.

The interviews were conducted using semi-structured, non-standardized questionnaires. The questions were as follows:

I. Introduction

- *Why do we talk about tropical forests in the debate on climate change?*
- *How do we analyze this topic?*
- *Where are we now in international climate negotiations?*

II. General climate policy

- *What is the role of climate change in your organization?*
- *How do you explain the role of forests before and after it became part of the CDM?*
- *Why does the EU ETS and the Kyoto CDM exclude forestry credits?*

III. Role of tropical forests in climate change

- *What is the role of tropical forests regarding climate change mitigation?*
- *How would you explain the evolution of forest's role in the UNFCCC?*
- *How can we explain today's popularity of tropical forests?*

IV. Role of REDD in the international climate negotiations

- *What is the view of your organization on the role of REDD in the climate debate?*
- *How can we explain the evolution of the role of forests in the UNFCCC framework?*
- *What are the most controversial points of the REDD debate?*
- *What is your perception towards the Forest Carbon Partnership Facility?*
- *What is your perception of a post-2012 Kyoto regime with regard to REDD?*
- *What would be the best way to finance emission reduction compensations?*
- *What are the main difficulties to overcome?*
- *What is your perception of the EU, USA, and Brazilian positions?*

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Why are we seeing "REDD"?

An analysis of the international debate on reducing emissions from deforestation and degradation in developing countries

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Reducing emissions from tropical deforestation and forest degradation (REDD) in developing countries has emerged as new potential to complement ongoing climate policies. The idea consists in providing financial compensations for the reduction of greenhouse gas (GHG) emissions from deforestation and forest degradation.

Based on the main country proposals, this paper examines the current debate on REDD and discusses some of the main remaining controversies within the debate, notably the REDD financing mechanism (mandatory markets versus voluntary funds) and the institutional framework for REDD (inside or outside the post-2012 Kyoto regime). In doing so, this paper contributes to an improved understanding of the scientific, economic and political aspects associated with the debate.

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