



## Reducing Emissions from Deforestation and Degradation in non Annex 1 countries

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# **About the 'Breaking the Climate Deadlock' Initiative**

'Breaking the Climate Deadlock' is an initiative of former UK Prime Minister Tony Blair and independent not-for-profit organisation, The Climate Group. Its objective is to build decisive political support for a post-2012 international climate change agreement in the lead up to the 2009 UN Climate Change Conference in Copenhagen. Its particular focus is on the political and business leaders from the world's largest economies, particularly the G8 and the major developing countries. The initiative builds on Mr Blair's international leadership and advocacy of climate change action while in office, and The Climate Group's expertise in building climate action programmes amongst business and political communities.

This briefing paper and its companions were commissioned by the Office of Tony Blair and The Climate Group to support the first Breaking the Climate Deadlock Report – 'A Global Deal for Our Low Carbon Future' – launched in Tokyo on June 27<sup>th</sup> 2008. Written by renowned international experts and widely reviewed, the papers' purpose is to inform the ongoing initiative itself and provide detailed but accessible overviews of the main issues and themes underpinning negotiations towards a comprehensive post-2012 international climate change agreement. They are an important and accessible resource for political and business leaders, climate change professionals, and anyone wanting to understand more fully, the key issues shaping the international climate change debate today.

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# Executive Summary

- Deforestation and forest degradation in non Annex 1 countries contribute to approximately 20 percent of global carbon emissions.
- Reducing these emissions is deemed necessary in order to achieve significant mitigation globally. Moreover, these reductions are assumed to be relatively low cost in many cases.
- The REDD (Reduced Emissions from Deforestation and Degradation) mechanism is being negotiated in the run-up to COP15 in Copenhagen, and would be charged with organizing financial transfers from Annex 1 countries to support such emissions reduction efforts in non Annex 1 countries.
- Several approaches are possible to support virtuous endeavours in developing countries. They range from rewards to governments in proportion to demonstrated quantified reductions against an agreed reference, to sponsorship of broad policies and measures against deforestation.
- While technologies to measure carbon emissions from deforestation and degradation are improving constantly, the estimation of emissions reductions necessarily relies on the setting of a reference level. However, various methodological challenges make it difficult to set this reference level with accuracy.
- Whatever the selected methodologies to estimate reference levels and the selected approaches to support virtuous endeavours in developing countries, it will be necessary to take into account the national circumstances of each participating country. Indeed deforestation patterns vary widely among the major countries.
- REDD is seen as a powerful means to raise unprecedented financial resources in Annex 1 countries (“carbon finance”). These resources can be raised in various ways, including carbon trading, auctioning of allowances, proceeds from taxation, binding financial contributions, and others.
- A hybrid mechanism could help finance both appropriate long term policies and measures, and urgent local actions. On the one hand public funds from Annex 1 countries would be available to support and finance reforms and the desirable long term policies and measures deemed able to counter deforestation dynamics. On the other hand private funds would be directed to urgent action with measurable impacts on GHG emissions from deforestation and forest degradation.
- REDD has the potential to provide global environmental benefits that other mitigation efforts cannot (e.g. biodiversity conservation), which is a strong argument to support its implementation.
- Equity outcomes are a concern if REDD is applied at a large scale. Inappropriate financial compensations to local agents of deforestation that bear opportunity costs, is a risk that depends on domestic redistribution systems.
- Technical assistance and conditionalities would help ensure that policies and measures in host countries obey to minimal standards in terms of social impacts, acknowledgment of indigenous rights, fair compensations to stakeholders who lose livelihoods opportunities
- Readiness is a major and necessary component for any REDD strategy to counter deforestation and forest degradation in the tropics. This encompasses institutional, technical and political measures.

## Recommendations

- Inclusion of REDD in post-2012 agreements should be part of a global climate deal with more ambitious targets for emissions reductions overall. Rather than relying on REDD to meet existing commitments at a lower cost, the Annex 1 countries should preferably use REDD for negotiating deeper targets.
- The fungibility of REDD with other carbon markets should be viewed with caution, at least until global markets are sufficiently mature. Two main risks are associated with fungibility: destabilisation of markets, and lack of environmental integrity if credits do not relate to real emission reductions.
- The fungibility of REDD with other carbon markets, if and when it happens, should result in more stringent GHG commitments for Annex 1 countries as suggested by the European Union (20% target might become 30% if a global deal is achieved), in order to secure additional global emissions reductions.

- A shift of paradigm would be useful regarding carbon finance. Efforts have been focused so far on the ways to solve barriers to carbon trading and fungibility of REDD with global carbon markets. Efforts could expand to alternative and innovative schemes that also generate carbon finance and provide incentives to achieve performance.
- The European Union could take the lead in proposing and testing innovative funding schemes based on the EU ETS market. The option of using proceeds from auctioning of emission allowances is promising.
- Early action for readiness is a prerequisite whatever the future decisions regarding the design of REDD. It encompasses institutional, technical and political measures that might improve the capacity of the developing countries to participate in the mechanism.

# Reducing Emissions from Deforestation and Degradation in non Annex 1 countries

Forests cover a third of the world's land surface. They store 50-100 percent more carbon than is currently in the atmosphere, and – together with other terrestrial ecosystems – absorb 3 billion tonnes of carbon annually<sup>1</sup>. They are also sensitive to climate change.

Forests offer four main opportunities to mitigate climate change: increased forest land; increased carbon density of existing forests; substitution of fossil fuels and other carbon-intensive products by sustainably produced forest products; and reduced emissions from deforestation and forest degradation. The last of these has the greatest potential to make a big difference quickly – deforestation and degradation account for 15 – 20 percent of human-induced greenhouse gas emissions. The vast majority of these emissions occur in the tropics. Recent NASA data apportion responsibility for deforestation emissions in the humid tropics between 2000 and 2005 as follows: roughly 60 percent in the Americas (especially Brazil), 34 percent in Asia (especially Indonesia) and 5 percent in Africa<sup>2</sup>.

The Stern Review points to reduced deforestation and degradation as an opportunity to cut global emissions significantly, quickly, and relatively inexpensively. The UN Framework Convention on Climate Change (UNFCCC), following its annual meeting in Bali in December 2007, is now considering how to develop a mechanism for Reduced Emissions from Deforestation and Degradation (REDD). The opportunity is great, but the technical and political issues that need to be addressed are challenging.

This paper presents the options and challenges in reducing emissions from deforestation and forest degradation in non Annex 1 countries, with a focus on several core issues that are awaiting political decisions at Copenhagen. The paper is structured as follows:

- The rationale and process for REDD
- Basic facts and figures on deforestation and climate change
- Methodological update
- Key issues for negotiations
- Costs to reduce emissions from deforestation and degradation
- The equity issue
- Recommendations – guiding principles

## The rationale and process for REDD

The rationale of REDD is to finance forest-related emission reductions in developing countries at a large scale. The principle of REDD was officially adopted into the UN negotiating process at the Climate Conference in Bali. There, countries decided that during the two years until the December 2009 Conference in Copenhagen (and possibly after), demonstration activities would take place in a number of developing countries, with their approval. Pending methodological issues are being debated amongst countries under the UNFCCC's scientific and technical subsidiary body. Based on outputs from this entire process, decisions will eventually be made concerning the design, scope and period for application of REDD.

A decade ago, negotiations around the Kyoto Protocol's Clean Development Mechanism (CDM) failed to include "avoided deforestation" in the CDM's scope, in particular because of significant risks of "leakage" (the risk that emissions reductions within the project boundaries would generate more emissions elsewhere). Nonetheless, when Papua New Guinea and Costa Rica proposed to put tropical deforestation on the climate agenda again in 2005, it was widely agreed that emissions from such deforestation had to be addressed in order to stabilise the climate; REDD was then tackled as a technical issue.

Over the past two years, all categories of stakeholders (including countries, research centres, think tanks and Non-Government Organisations (NGOs)) have drafted and disseminated a variety of proposals on REDD. Such brainstorming has been immensely useful. This paper focuses on several issues that we view as the most important in the debate, and that require political decisions in the run-up to Copenhagen.

## **Basic facts and figures on deforestation and climate change**

### **Forest ecosystems interact closely with climate change**

On the one hand higher temperatures, droughts, floods, and other climate events affect forest health and composition, with resulting needs for adaptation measures. On the other hand changes in forest cover lead to carbon emissions or removals. Forest plantations established on lands without forest cover are carbon sinks because they sequester net amounts of carbon<sup>3</sup>. Undisturbed mature forests emit about as much carbon as they absorb. Forest degradation, through commercial timber production for instance, generates carbon emissions whose magnitude depends on the forest management systems<sup>4</sup>. Lastly, forest conversion for alternative land uses generates the greatest amounts of carbon emissions – overall, as well as per hectare.

### **Tropical deforestation is responsible for one fifth of current global emissions**

Latest official figures released by the Intergovernmental Panel on Climate Change<sup>5</sup> (IPCC), indicate that land use change contributed to more than 20 percent of global carbon dioxide emissions, of which tropical deforestation very likely makes the largest part. A 2005 study<sup>6</sup> estimates that forest conversion, forest degradation and shifting cultivation altogether were responsible for carbon emissions equivalent to 15 – 35 percent of fossil fuel emissions in the 1990s. While these figures have a large degree of uncertainty, they stress the relevance of including efforts to combat deforestation in climate negotiations.

### **Tropical countries show contrasted patterns: deforestation rates and carbon stocks**

While deforestation is a concern in most tropical countries, historic deforestation rates show disparities. Asia includes countries with up to 2 percent annual net deforestation (Indonesia) and countries with a net increase in forest cover (China, India). The Amazon Basin is a hotspot for deforestation and Brazil alone lost more than 3 million hectares annually in recent years (about 40 percent of the net loss of forest cover in the world). The Congo Basin countries show relatively low rates of deforestation (less than 0.5 percent), but might contribute increasingly to tropical deforestation overall due to the very large remaining forest areas in Central Africa and the development dynamics in the region.

Tropical forests generally contain large carbon stocks per hectare, yet with disparities between forest biomes. According to the UN's Food and Agriculture Organisation (FAO)<sup>7</sup> carbon in living biomass amounts on average to 110 tC/ha in South America, 77 tC/ha in South and South East Asia, and 155 tC/ha in South and Central Africa.

### **Tropical deforestation is not expected to decrease significantly in the coming years**

Deforestation rates might increase in Central and Western Africa when the political context and better infrastructure provide a more attractive environment for massive investments in the forestry and agricultural sectors. So far deforestation has been limited by several factors that might partially disappear in the future. Yet forest degradation is a major issue in this region, as reflected by the fact that Central African countries pushed for its inclusion in the REDD agenda<sup>8</sup>.

In the Amazon Basin and South East Asia, pressures on natural forests are far from fading, with growing investments in the timber and agricultural sectors. Brazil sends contradictory signals: on the one hand it has launched ambitious initiatives to counter illegal logging activities (such as "Operation Arc of Fire"); on the other it provides undisputed political support for the establishment of various types of plantations (soy, sugarcane) and extensive cattle ranching. In Indonesia clear-cutting of natural forests, to enable expansion of the pulp and paper and biofuel industries to support development goals, is tolerated.

Overall carbon emissions from deforestation and degradation could possibly remain at current yearly levels, although any prediction is highly debatable. Two forces are likely to push in opposite directions. First, forest transitions leading to lower deforestation, either caused by the scarcity factor (less forest to access) or the development factor (Environmental Kuznets Curve) are observed in a number of countries<sup>9</sup>. Second, structural factors leading to more deforestation are likely to strengthen: population growth, road infrastructures, agricultural commodity prices, and so on<sup>10</sup>.

## **Methodological update**

### **Technologies are assumed available to provide estimations of emissions from deforestation**

Technologies will provide accurate estimates of deforestation in a given country, once definitions of “forests” and “deforestation” are agreed upon (e.g. specific thresholds for deforestation). It will be feasible, mostly with remote sensing imagery, to monitor the gross deforestation (i.e. not including reforestation, afforestation or natural regeneration) which is the first best measure for REDD.

Emission factors for a given deforested area can be obtained at different levels, or Tiers, of detail and accuracy: Tier 1 relies on default values (e.g. those provided by the IPCC); Tier 2 on country-specific data; and Tier 3 on complete national inventories with repeated measurements. A trade-off is required between the costs of obtaining the data (prohibitive for Tier 3) and the necessity to provide reliable estimates. The Tier 2 approach will certainly be preferred, using measurements of carbon stocks in a number of forest biomes for each participating country.

### **The setting of reference levels is controversial**

Any estimation of emissions reductions requires comparison of actual emissions with a reference level, which typically refers to what would have happened in a world without REDD (“business-as-usual scenarios”). In other words, reductions of deforestation rates must be assessed additional to the reference scenario in order to be eligible for recognition by REDD. This is necessary both to preserve the environmental integrity of the mechanism, and to achieve a higher level of efficiency and equity among participating countries.

This additionality requirement is the weakest link in approximating the performance achieved by host countries and in assessing the payments they deserve for their initiatives to combat domestic deforestation. State of the art technologies to monitor actual carbon emissions are of no use if they are not based on a relevant setting of reference levels. Yet tropical deforestation reacts to numerous stimuli, involves many agents, results from human and natural causes, and thus appears difficult to model and predict. It is hard to state qualitatively the impacts of policies and incentives on deforestation, let alone quantify these impacts.

In order to bypass this major impediment to the determination of baselines, and thus to reliable estimations of emission reductions, a commonly proposed alternative is to consider historical deforestation rates. This option is controversial: some countries have had highly fluctuating rates, thus making it difficult to choose the appropriate reference period (Brazil); some have had very low rates compared to likely future trajectories, thus making it hard to gain anything with REDD (Democratic Republic of Congo); and others have had very high rates that will diminish in any circumstance (Malaysia).

### **Inclusion of forest degradation might be an incentive for more conservation**

Inclusion of forest degradation into the REDD mechanism, in addition to deforestation, is an outstanding issue that poses considerable challenges in terms of measurements. This has mostly been advocated by proponents of sustainable forest management in the Congo Basin countries, based on the assumption that forest management plans allow timber companies to reduce emissions compared to conventional logging techniques. In fact, it is yet to be proven that these reductions are significant, and even Reduced Impact Logging techniques might yield marginal gains. The debate has therefore shifted from sustainable logging versus conventional logging, to conservation versus logging. REDD might therefore provide an incentive to stop any kind of logging.

## [Key issues for negotiations](#)

Among the numerous points addressed in discussions about such a complex mechanism, there are three outstanding issues whose outcomes are likely to shape REDD.

### [How to support virtuous endeavours in developing countries?](#)

Assuming Annex 1 countries are willing to finance forest-related emissions reductions in developing countries<sup>11</sup>, there is much debate on how to allocate these financial resources. There are essentially two ways, with considerable possibilities for combinations: governments are rewarded on the basis of demonstrated quantified reductions against an agreed reference, or they are sponsored for implementing relevant policies and measures.

#### **Rewards based on demonstrated quantified reductions**

Debates on REDD in public fora, in the grey literature and in academic journals have been giving priority to the reward of quantified emissions reductions from deforestation and degradation against a reference level. This orientation is clearly connected to the rise of payments for environmental services, on the condition that such services are delivered effectively. Furthermore, this approach has been promoted in parallel with the rise of global carbon markets that require verified emission reductions as a tradable commodity. A third factor is that past experiences with development assistance and programmes aimed at curbing tropical deforestation have yielded poor results.

Proponents of this approach argue that it should ideally be applied at a national level, i.e. with national accounting of emissions reductions, in order to minimise risks of leakage (whereby emissions are displaced rather than suppressed). There are similarities with a cap-and-trade approach in the sense that participant countries would be free to reduce emissions by any means once there is agreement on the reference value (the “cap”). As a consequence, though, this might imply less monitoring by third parties of the actions eventually undertaken by participant countries: some would be concerned that this would allow undesirable or inequitable policies to be put in place in order to capture REDD rewards. On the other hand, of course, others would argue that such autonomy of policy making is unavoidable, or even desirable, for reasons of sovereignty.

Concerns with this approach also stem from the fact that quantifications of emissions reductions from deforestation and degradation require reference levels to be set, which is a controversial matter (see “Methodological Update” above). It is likely that reference levels will eventually be an outcome of negotiations with representatives of participant countries. This process was observed in the past, when forest crediting caps were adjusted for some Annex I parties in the Marrakech Accords<sup>12</sup>. Yet in the case of REDD, participant countries might not have binding targets with associated sanctions. Rewards would only be distributed for emissions reductions, and these rewards would be based on real reductions for the sake of environmental integrity and the optimal allocation of scarce financial resources. While the participation of the major tropical countries should be secured to the extent possible, it is critical that reference levels are not set too high in order to avoid “hot-air”<sup>13</sup> situations that have plagued the first commitment period of both the Kyoto Protocol and the European Union Emission Trading Scheme. Furthermore, in the case of REDD, lax objectives risk providing incentives for not doing much against deforestation if the stipulated reductions are too easily achievable.

#### **Sponsoring relevant policies and measures**

An alternative approach would consist in supporting (rather than rewarding) activities deemed able to counter deforestation. This approach could be labelled “successful efforts-based”, in the sense that efforts are supported as long as beneficiaries demonstrate performance to some extent (qualitatively rather than quantitatively).

With financial support that does not attempt to be proportional to an assumed quantification of emissions reductions, it would be easier to finance policies and measures whose impacts are hardly measurable, especially in the short term. While it is difficult to impute volumes of emissions reductions to specific policies and measures, it might be possible to assess whether these initiatives have a positive impact on deforestation dynamics overall. Financial support could be provided for land reform, land use planning and identification of lands without forest cover, technical and

financial assistance to agriculture intensification, and control and monitoring of illegal logging –as long as scientific assessments confirm the positive outcomes of these actions. A recent study provided methodological options for such assessments<sup>14</sup>.

Although this is debatable, we argue that making rewards proportional to quantified emissions reductions would bring more constraints than benefits to the REDD mechanism. Rather, allowing proposals to go beyond a strict performance-based approach would allow the mechanism to capture the advantages of both approaches: the incentive to achieve results, and the flexibility to launch ambitious (while not immediately measurable) activities against deforestation.

### **How to raise financial resources?**

REDD is seen as a powerful means to access unprecedented sources of money to combat deforestation for climate change. The beauty of carbon finance is that it provides many ways to raise funds, as it encompasses all financing schemes that converge towards carbon emissions reductions in the forestry sector, including sales of credits, auctioning of emissions allowances, loans and taxes.

As no certainty exists about which avenue carbon finance will eventually take, we set out some alternatives below, without judging their relevance or practicability: we prefer not to oppose market to non-market financing mechanisms, as combinations of both are likely to optimise outcomes. We should note also that markets are not limited to the trade of carbon credits, and that candidate countries will compete for any allocation of funds.

### **The purchase of carbon credits by Annex 1 countries**

Carbon credits would be issued for carbon emissions reductions against an agreed reference value. These credits could be traded on carbon markets and used by Annex 1 countries to meet their GHG commitments, in the same vein as the flexibility mechanisms created by the Kyoto Protocol. As an option, trading could be limited to a separate market during a preliminary phase (“dual-market approach”) with either separate commitments by industrialised nations to purchase certain amounts of REDD credits, or a global cooperative trust fund that would buy back REDD credits.

This alternative is based entirely on the trading of carbon credits, which has two important consequences for the incentives to take action in the tropical forested nations:

- Financial resources would logically be raised according to the payment-upon-delivery principle, which impedes initial investments by host countries and increases risk
- The proceeds from REDD credit sales would remain uncertain until reductions are assessed and sales concluded.

These barriers seriously limit REDD’s potential in candidate host countries. However, donor agencies and the banking/insurance industry would certainly propose products to overcome these barriers based on expert forecasts of REDD credits volume and value. In addition to increases in transaction costs, these remedies might play a role in the negotiation process for setting reference values that reduce risks of insolvency (i.e. lax reference values).

### **Proceeds from auctioning of GHG emissions allowances to Annex I parties under Kyoto Protocol and/or industrial companies under national cap-and-trade schemes**

Emissions allowances are either allocated free of charge to industrial companies according to the “grandfathering” approach, or auctioned. The latter case is increasingly being considered and the domestic emission trading schemes are moving in this direction in both Europe and North America. Allocating a fraction of the proceeds of these allowance auctions would ensure sustainable and significant carbon finance to support REDD activities. It is worth noting that raising funds through the auctioning of allowances (instead of issuance of carbon credits) is a way to avoid any interference with existing carbon markets. This would enhance the stability and effective functioning of these markets.

### **Binding financial contributions by Annex 1 countries**

Current negotiations on post-2012 emission commitments for the industrialised world will certainly lead to more severe targets and higher mitigation costs. REDD is part of the negotiations on a global climate deal, of which one objective is to achieve global reductions at the lowest possible cost. Annex 1 countries would more easily accept deeper emission reduction commitments if they could achieve these at a reasonable cost. Assuming that emissions reductions from deforestation are relatively low cost, there might be agreement on a system that allows Annex 1 countries to carve out x percent of their domestic commitments, which would be monetised and deposited in a Fund for REDD.

### **Proceeds from taxation**

This is a variation on the previous option, still based on the principle that deeper commitments in Annex 1 countries will generate new costs to be borne in these countries. A new tax might be set up internationally or restricted to a number of parties, and focused on specific sectors or applied to a broad range of production activities, in order to provide incentives for domestic industries to lower emissions. Proceeds from these taxes could be used in various ways, one of which would be to contribute to reductions abroad through financing of activities against deforestation in developing countries. The most prominent options are a carbon tax and an aviation tax.

### **Creation of a levy on transactions among Parties in the international carbon market**

This system builds on the existing levy on CDM projects (2 percent) that flows to a Fund for adaptation to climate change in developing countries, and finances administrative costs associated with the operation of the CDM Executive Board. The rationale is to capture part of the “benefit” that accrues to industrialised countries when, to achieve their commitments at lower cost, they use the Kyoto Protocol’s flexibility mechanisms to externalise emissions reductions.

### **Voluntary contributions by donors**

This alternative would entail the scaling up of existing initiatives by States, international organizations, NGOs, and other bodies that finance capacity building or projects for forest conservation. Except for Trust Funds that secure long term financial flows, these voluntary contributions are commonly criticised for not ensuring sustainable financing and thus for achieving mixed results.

### **Should REDD be fungible with international carbon markets?**

Fungibility would mean that Annex 1 countries can achieve a part of their commitments with the purchase of carbon credits from REDD. Two main arguments have been advanced in promoting fungibility: first, that carbon credits markets will ensure sustainable and significant amounts of carbon finance; and second, that they will increase efficiency in the use of available financial resources. These arguments were questioned in the two previous sections: there are in fact several ways to access carbon finance in Annex 1 countries in a sustainable way, just as there are several ways to support virtuous endeavours in developing countries.

Negotiators might be cautious about fungibility for a number of reasons. Some of these are specific to REDD, while others apply to any premature extension of existing carbon markets to developing countries outside Annex 1:

### **Risk of market destabilisation**

The costs and magnitude of achievable emissions reductions from deforestation and degradation in developing countries are unknown. Consequently, destabilisation of markets is a risk, and safeguards are necessary to at least minimise this risk. On the one hand, market flooding and a drop in the price of carbon credits might occur if reference values are lax (as discussed above in “Rewards based on demonstrated quantified reductions”) or if deforestation rates are significantly reduced. This might result in low incentives for Annex 1 countries to reduce emissions domestically, and for developing countries to pursue voluntary efforts. On the other hand, carbon credits would be scarce if deforestation rates remained close to or higher than reference levels, in which case Annex 1 countries would face problems in achieving tougher commitments that had been negotiated with the expectation that REDD would function as a flexible mechanism.

## Barriers to accurate estimations of emissions reductions

The barriers to accurate estimations of forest-related emissions reductions in developing countries are a major concern. Indeed, the compensation provided by REDD carbon credits for higher emissions in Annex 1 countries must be assessed accurately in order to ensure environmental integrity at a global level. On the other hand, the provision of limited compensation under a conservative approach might significantly reduce the financial rewards eventually delivered to developing countries. Negotiators should therefore carefully balance the costs and benefits of following the fungibility path.

## Costs to reduce emissions from deforestation and degradation

Costs to reduce emissions from deforestation are made up of the costs of strengthening host countries' capacity to participate to REDD ("readiness"); administration costs; and opportunity costs when forests are not earmarked for timber production or conversion into alternative land uses.

The Stern Review<sup>15</sup> on the economics of climate change addressed the opportunity costs<sup>16</sup> of avoiding deforestation, which is viewed as a promising option in global mitigation efforts:

*"A substantial body of evidence suggests that action to prevent further deforestation would be relatively cheap compared to other types of mitigation".*

The rest of the statement is of importance, as it stresses the need to "[put in place] *the right institutional structures*" and therefore goes beyond the scope of payments for protected areas. The report estimates opportunity costs to avoid deforestation, in eight countries responsible for 70 percent of global emissions from land use, to be approximately \$5 billion per year. This figure is built on calculations of net present values per hectare in 30 years for land uses that take place after forest conversion. As the authors acknowledge, estimations of costs at such a scale must rely on over-simplistic assumptions such as zero leakage, full additionality, and scaling up of costs per hectare for a handful of land uses.

While most studies consider the concept of "opportunity costs", few of them share a common methodology to make calculations. In particular, these opportunity costs are sometimes assumed equal to profits generated per hectare, but in other cases the costs include all expenses that an activity generates. This creates huge differences in value for a given location and land use. Much depends on the scale of the opportunity cost estimation – individual, local or national – because capital is scarce and might move to other sectors or locations if investments cannot take place in forested areas. For instance, preventing the establishment of a pulpwood plantation after conversion of a natural forest in Indonesia could lead either to displacement of the plantation into nearby bare land, to investments in other sectors of the Indonesian economy, or to investments abroad. Outcomes in terms of foregone revenues, profits, employment, can be contrasted at the local and national levels<sup>17</sup>.

Another problem with calculations of opportunity costs as available in the literature is their static stance. Most analyses do not consider the increasing pressure on high-carbon-density land as the world needs to produce more and more food, fibre and fuel over the next decades. Not only is global population projected to increase dramatically, but consumption patterns associated with higher living standards will provide strong incentives to convert forests into pastures or agricultural fields.

To summarize, opportunity costs to reduce emissions from deforestation and degradation could be anywhere within a broad range of values (\$/tCO<sub>2</sub>). The lower end of this range would apply to cultivation by smallholders (e.g. cassava, rice fallow), and the higher end to large-scale industrial agriculture and plantations (e.g. oil palm, soy, cattle ranching).

It is also debatable whether the costs of conservation equal the opportunity costs. Indeed, local agents of deforestation, especially when they are villagers living in or nearby the forest, might not stop their usual livelihoods and activities once they received compensation. Additional action is required, such as supervision, control, or the

provision of alternative economic activities, in order to ensure forest conservation in the long term. Moreover, it is unlikely to be feasible to make regular adjustments on compensation (with the associated transaction costs) to reduce the risk of compensated people becoming trapped in poverty. In other words, the search for low-cost sources of emission reductions from deforestation generates risks of social inequity at the global level. We address this issue in the next section.

## The equity issue

The main forested developing countries might have an incentive to conserve additional millions of hectares, and might be able to gain billions of dollars from REDD over five-year periods (see Exhibit 1). It is thus legitimate to question the consequences in terms of equity. Indeed, any land use change generates gains and losses for various agents, and forest conservation might enrich countries through the financial transfers from REDD but simultaneously impoverish groups of agents because of lost opportunities. In other words, REDD is likely to generate significant and contrasting economic impacts on the domestic agents in tropical forested countries.

### Exhibit 1

#### Order of magnitude for potential land use changes and financial transfers over one five-year crediting period

Source FAO 2006	Total forest loss 2000–2005 (1,000 ha)	With 10% reduction deforestation and \$5/tC		With 30% reduction deforestation and \$10/tC (million \$)		With 50% reduction deforestation and \$20/tC (million \$)	
		Forest conservation (1,000 ha)	Financial transfer (million \$)	Forest conservation (1,000 ha)	Financial transfer (million \$)	Forest conservation (1,000 ha)	Financial transfer (million \$)
Brazil	15,515	1,551	853	4,654	5,120	7,757	17,066
Indonesia	9,355	935	360	2,806	2,161	4,677	7,203
DR Congo	1,595	159	124	478	742	797	2,472

With respect to REDD, the national authorities in forested developing countries will have a dual role. They will sell “avoided deforestation” through REDD and access carbon finance; and they will buy “avoided deforestation” by compensating (or not) impoverished agents. Depending on which policies and measures are implemented, they will buy before selling, through incentivisation and Payment for Environmental Services (PES) schemes; or they will sell before buying, through regulations with or without compensation.

Equity outcomes will depend both on which policies and measures, and which redistribution mechanisms, are implemented in participant countries. Redistribution mechanisms contain three dimensions, which in combinations will likely yield contrasting results in terms of equity outcomes:

#### Redistribution principle (nature of fund utilization)

The choice here is between individual (including corporate) compensation; and development activities at a higher level (local to national). While individual compensations are presumably better designed for ensuring equity of redistribution, the welfare of impoverished agents could benefit more from development projects, provided these required empowerment and traceability of funds.

#### Institutional arrangement (fund collection and allocation decisions)

The choice here is between the management of a special fund under an independent authority, whether at local, regional or national level; and the inclusion of REDD payments in the state budget. Factors such as the power of the Parliament and the capacity of the independent authority in charge of a special fund, are key to the equitable use of REDD payments.

#### Level of devolution (implementation and spending of payments)

Essentially, final users of REDD payments can be split between national, regional and local levels. Intuitively, it can be assumed that the deeper the devolution (and the longer the chain to the final users), the greater the opportunities for embezzlement and illicit capture.

## Political landscape

The issues presented in this Briefing Paper shape a political landscape with contrasting stances among Parties both in the developing and industrialized worlds. In particular there are opposing views on the role that the fungibility and carbon markets should play.

The most prominent advocate of the global market option is Papua New Guinea (PNG) whose position is influenced by the Coalition for Rainforest Nations. Countries that share PNG's view include Guyana, and Indonesia as well as others from the Congo Basin and Central America. These countries argue that cap-and-trade market instruments would provide useful incentives for conservation. According to the rationale of any market approach, it provides host countries with opportunities to capture net financial gains with forest conservation if opportunity costs are less than the selling price of carbon credits.

Brazil favors the creation of a Fund supported by contributions from industrialized countries as part of their binding GHG emission reduction commitments. Brazil rejects the notion that developing countries should share a significant part of the global mitigation burden, and opposes proposals that would allow Annex 1 countries to replace domestic reductions of GHG with carbon credits issued through REDD. Sovereignty is said to be another argument for such an approach, because host countries would not have to report emissions reductions or to allow external monitoring and verification on the ground. In fact, it could be the reverse if conditionalities are associated to the financial support to policies and measures.

The Commission for the Forests of Central Africa (COMIFAC) gives special support to the inclusion of forest degradation in the REDD mechanism. These Congo Basin countries, backed by France, argue that Forest Management Plans should be rewarded against conventional logging.



# Further Reading

- Griffiths, T.O, 2007:  
*Seeing ‘RED’? ‘Avoided Deforestation’ and the rights of Indigenous Peoples and local communities,*  
Forest Peoples Programme.
- Kanninen, M., Murdiyarto, D., Seymour, F., Angelsen, A., Wunder, S.  
et L. German, 2008:  
*Do trees grow on money? The implications of deforestation research for policies to promote REDD,*  
Forest Perspectives 4, CIFOR, Indonesia.
- Pirard, R. and A. Karsenty, 2009 (forthcoming):  
*Climate change mitigation: Should “avoided deforestation” (REDD) be rewarded?*  
Journal of Sustainable Forestry, Vol 28 (3-4).
- Rubio Alverado, X. and S. Wertz-Kanounnikoff:  
*Why are we seeing “REDD”? An analysis of the international debate on reducing emissions from deforestation and degradation in developing countries,*  
Collection Analyses, Iddri, Paris.



# Glossary of Terms

<b>Annex 1:</b>	List of developed or industrialised countries with binding commitments under the Kyoto Protocol
<b>CDM:</b>	Clean Development Mechanism
<b>CO<sub>2</sub>:</b>	Carbon dioxide
<b>COP:</b>	Conference of the Parties
<b>EU ETS:</b>	European Union Emission Trading Scheme
<b>FAO:</b>	Food and Agriculture Organization
<b>FCPF:</b>	Forest Carbon Partnership Facility
<b>GHG:</b>	Greenhouse Gas
<b>IPCC:</b>	Intergovernmental Panel on Climate Change
<b>PES:</b>	Payment for Environmental Services
<b>REDD:</b>	Reduced Emissions from Deforestation and Degradation
<b>UNFCCC:</b>	United Nations Framework Convention on Climate Change



# Endnotes

- <sup>1</sup> Forests are the terrestrial carbon sink's main component. J. Canadell & M. Raupach 'Managing Forests for Climate Change Mitigation' *Science*, 13 June 2008, Vol 320
- <sup>2</sup> Matthew C. Hansen et al. (2008). Humid tropical forest clearing from 2000 to 2005 quantified by using multitemporal and multiresolution remotely sensed data. *PNAS* July 8, 2008 vol. 105 no. 27 9439-9444.
- <sup>3</sup> Forest plantations might not sequester net amounts of carbon when established on lands with forest cover. Indonesia is the perfect example, where the establishment of Acacia plantations on peatland forests has generated net emissions overall.
- <sup>4</sup> Shifting cultivation is a specific case that may be considered as degradation or deforestation: in the tropics shifting cultivation leads to rapid vegetation regrowth once cultivators move to another plot.
- <sup>5</sup> Denman, K.L., Brasseur, G., Chidthaisong, A., Ciais, P., Cox, P.M., Dickinson, R.E., Hauglustaine, C., Heinze, E., Holland, D., Jacob, U., Lohmann, S., Ramachandran, P.L., da Silva Dias, D., Wofsy, S.C. and Zhang, X. 2007. Couplings Between Changes in the Climate System and Biogeochemistry. In: Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K.B., Tignorand, M. and Miller, H.L. (eds.) *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the IPCC*.
- <sup>6</sup> Houghton, R.A., (2005). Tropical deforestation as a source of GHG emissions. In: Moutinho, P., Schwartzman, S. (Eds.), *Tropical Deforestation and Climate Change. Amazon Institute for Environmental Research and Environmental Defense, Belém, Brazil*, pp. 13–22.
- <sup>7</sup> FAO, (2006). *Global Forest Resources Assessment 2005. Progress towards sustainable forest management. FAO Forestry Paper*, vol. 147. Food and Agriculture Organization, Rome.
- <sup>8</sup> See, e.g., the report *The forests of the Congo Basin: State of the forest 2006*, available on <http://carpe.umd.edu/2006-state-of-the-forests-report> for information on forest dynamics in the region.
- <sup>9</sup> For example, see : Rudel, T.K., Coomes, T.K., Moran, E., Archard, F., Angelsen, A., Xu, J., Lambin, E., (2005). Forest transitions: towards a global understanding of global land use change. *Global Environmental Change* 15, 23–31.
- <sup>10</sup> For a review of the causes of deforestation see: Geist, H.J., Lambin, E.F., 2001. *What drives tropical deforestation? LUCC Report Series*, vol. 4. University of Louvain.
- <sup>11</sup> By “developing countries” we mean non Annex 1 countries. We are aware that countries like Brazil or China would better qualify as “emerging countries”.
- <sup>12</sup> The Marrakech Accords were agreed by Kyoto Protocol Parties in 2001. They established and defined the rules arising out of the basic principles set out in the Protocol.
- <sup>13</sup> ‘Hot air’ referred originally to the concern that some countries would be able to meet their targets for greenhouse-gas emissions under the Kyoto Protocol with minimal effort and could then flood the market with emissions credits, reducing the incentive for other countries to cut their own domestic emissions.
- <sup>14</sup> Combes Motel, P., Pirard, R. and Combes, J-L, 2008, A methodology to estimate impacts of domestic policies on deforestation: Compensated Successful Efforts for “avoided deforestation” (REDD), *Ecological Economics*, In Press.
- <sup>15</sup> Stern, N. 2006. *Stern review on the economics of climate change. UK Government Economic Service. London*, [www.sternreview.org.uk](http://www.sternreview.org.uk).
- <sup>16</sup> Administration costs were roughly estimated in the range \$4 to \$15/ha for existing projects and not taking account economies of scale.
- <sup>17</sup> Pirard, R., 2008, *Estimating opportunity costs of Avoided Deforestation (REDD): Application of a flexible stepwise approach to the Indonesian pulp sector, International Forestry Review*, In press.



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