Reducing Emissions from Deforestation: global mechanisms, conservation and livelihoods

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Introduction

This briefing considers the implications for biodiversity conservation and local people's livelihoods of the current discussion on reducing emissions from deforestation in developing countries (RED-DC, henceforth RED) under the UN Framework Convention on Climate Change (UNFCCC). The potential for RED to deliver multiple benefits for biodiversity conservation, livelihoods and other ecosystem services is well documented (UNEP-WCMC 2007). But it is important to note that RED could also have negative impacts on biodiversity and local livelihoods, for example as a result of the displacement of deforestation.

The UNFCCC is concerned with *stabilizing greenhouse gas concentrations* in the atmosphere at a level that prevents dangerous interference with the climate system[1]. Decisions made under UNFCCC can therefore be expected to focus on stabilizing emissions, and not necessarily to make explicit provision for delivering other benefits of reduced deforestation. Parties' national sovereignty over their own resources is a fundamental principle of the Convention, and may limit the extent to which prescriptive methods for RED may be described. However, most Parties to the Convention have made commitments on conserving and restoring the non-carbon values of forest under other environmental agreements. It is therefore important that in phrasing any decision on RED, Parties take the implications for multiple benefits into account, and consider the decision's effects on other forest values. Similarly, care needs to be taken in the formulation of guidance for the implementation of any decision, including any future update of the *IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry* (Penman *et al.* 2003) and *Guidelines for National Greenhouse Gas Inventories* (IPCC 2006).

The form of any decision and associated guidance will strongly influence the total area, geographical spread, conservation status and types of forest retained as a result of RED, with consequent implications for the number and location of people gaining or losing. Whilst a given reduction of emissions from deforestation will have the same climate change mitigation impact regardless of location, the spatial distribution of avoided deforestation will have a strong influence on the other benefits (and losses) resulting. In biodiversity terms, an outcome that conserves a more heterogeneous mix of different forest types over a wider area is likely to deliver greater conservation gains for the same climate benefits.

National-scale decisions will determine the scale of RED within each participating country, and the actions undertaken at a national to local scale will influence the degree to which multiple benefits are attained. Unless preventative steps are taken, non-forest ecosystems and their carbon stores are likely to be negatively affected as pressures shift to new locations (UNEP-WCMC 2007). Suggestions from some Parties that the RED pilots established prior to the 2012 period are evaluated in terms of their co-benefits as well as in terms of carbon success are welcome; if this evaluation is extended to impacts on other ecosystems, a more complete picture of the carbon and other benefits of pilots would be obtained.

But the overall scale and impact of RED depends upon agreements made between Parties. The total finance, of whatever form, available for RED will set the upper limit on the area of threatened forest (and therefore the number of forest-dependent people) that can benefit,

[1] within a time frame sufficient to allow ecosystems to adapt, ensure that food production is not threatened, and enable sustainable economic development.

whilst any decision text and guidance adopted will determine the type and condition of eligible forests.

Influences on the scope and co-benefits of RED

Incentives for early action

Deforestation and forest degradation usually result from the exploitation or conversion of forests for financial or other gains. Given that measures to reduce the rate of deforestation are being seriously discussed, there is a strong incentive for those who benefit from deforestation to step up the pace before barriers come into place. This would be especially true if a national RED programme was expected to reward those actors who have been recently deforesting, for refraining from future deforestation. This type of response to anticipated regulation has been observed in the heightened trade in endangered species in the run-up to Convention on Trade in Endangered Species (CITES) uplisting (Rivalan *et al.* 2007), and in cases of increased forest exploitation in response to the possibility of protected area designation (Infield & McNamara 2001, Xu & Melick 2007).

However, early action to reduce deforestation rates, including through pilot projects, is likely to help participating countries to benefit from the first available RED funds in the post-2012 period. If RED credits were also made available to cover reduced emissions during the early action period, as some Parties propose, this would help to counter the incentive to deforest now. There is some precedent in the Clean Development Mechanism, in which credits were allowed to accrue from 2000 against the 2008-2012 commitment period.

Scale of financial mechanism

The total finance available in the system for RED credits will place an upper limit on the area of threatened forest that can benefit from RED. If an international RED market were developed as originally proposed by the Coalition of Rainforest Nations, more stringent caps on greenhouse gas emissions by Annex I Parties would be necessary. This would have a dual benefit for biodiversity and ecosystem services, both increasing the area of forest conserved and decreasing the rate of global warming. If a fund rather than a market is established, many Parties feel that it may be difficult to negotiate substantial and replenished payments. Other Parties feel that the deforestation avoided through a fund mechanism would provide additional carbon benefits to those committed to by Annex I Parties, and that the risks associated with reducing emissions from deforestation would not be linked to emission reduction targets.

International displacement and countries with low deforestation rates at present

The more non-Annex I Parties participate in RED, the lower the likelihood of displacement (leakage) of deforestation pressures to a non-participant country. Displacement of deforestation has clear adverse consequences for conservation and for carbon storage. However, the magnitude and distribution of these consequences may vary because carbon value and the biodiversity value of individual areas of forest are not necessarily related. The biodiversity value includes the forest's relative uniqueness and rarity in comparison with the suite of other forests still in existence; there is no equivalent consideration for carbon. From a biodiversity perspective, the spatial distribution of displacement could be more critical than from a carbon perspective; for example, if displaced pressures are concentrated in low-carbon forests, a distinct set of species and ecosystem services will be affected.

Certain methods of distributing credits for successful RED on the basis of changes in global deforestation rather than national rates alone have been proposed (Mollicone *et al.* 2007, Strassburg *et al.* in prep.). The aim is to increase equity and to limit international displacement of deforestation. The principle here is that in addition to rewarding non-Annex I

Parties for decreasing their deforestation rates, those non-Annex I Parties with existing low deforestation rates would be rewarded for continuing to have low emissions. Payments would factor in the area of forest remaining. These precise ideas have not been adopted by any Parties to date; but there are proposals for a separate fund-based mechanism to compensate for conservation. Some Parties have suggested that this could be financed through a tax on the RED market, others that it be sourced from voluntary contributions from Annex I Parties.

Accounting for 'undisturbed' forest

The *IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry* (Penman *et al.* 2003) and *Guidelines for National Greenhouse Gas Inventories* (IPCC 2006) indicate that countries may define specific areas of forest either as managed or undisturbed. Forest lands, including protected areas, are defined as 'managed' if practices for stewardship and use have been planned and implemented. This definition can change between years if forests are brought into or removed from management. Only emissions from managed forest need be reported.

> "*Natural, undisturbed forests should not be considered either an anthropogenic source or sink and are excluded from national inventory estimation*". (Penman *et al.* 2003)

With perfect knowledge of national land cover change, deforestation within 'undisturbed' areas would not be an issue for RED reporting, as the *Good Practice Guidance* also indicates that all deforested areas should be reported. However, if a Party chooses to designate an area as 'undisturbed' and therefore does not monitor emissions from this area, there is a risk of unrecorded anthropogenic carbon losses, such as those resulting from illegal logging or land clearance.

It may therefore be necessary to revisit the *Good Practice Guidance* and inventory guidelines prior to the launch of any RED mechanism, with the aim of ensuring that all deforested areas are captured. The anticipated pilot phase from 2008 to 2012 offers an opportunity to assess the effectiveness of the current guidance in this new context.

Emissions estimation

It is likely that RED payments through the fund or market mechanism will be made on the basis of estimated avoided greenhouse gas emissions from deforestation, rather than avoided deforestation itself. Thus the unit of measure is carbon dioxide-equivalent emissions, rather than hectares of forest loss. Forests and other ecosystems vary in both the amount of carbon per hectare they store in their biomass (carbon density), and the carbon immobilised in other parts of the ecosystem, such as the soils (FAO 2006). Therefore, the type of forest and method of deforestation have a strong influence on the total amount and the rate of carbon loss resulting.

Two major questions on emissions estimation are relevant in understanding the likely scale of cobenefits from RED: whether forest degradation is also included (often referred to as Reducing Emissions from Deforestation and Degradation, or REDD); and how changes in soil carbon are accounted. In principle, both these issues are tractable, but there are some concerns about the availability of historical and future data to support relevant estimates. The *Good Practice Guidance* does provide methods for estimating emissions from fire, felling, fuelwood gathering, and other impacts on forest carbon storage short of deforestation; and for carbon losses from different broad forest types and from mineral and organic soils.

Large carbon emissions can be generated from forests by tree removal and other degradation processes that do not cause them to pass the forest definition thresholds used at a national scale or within FAO reporting (FAO 2006, Mollicone *et al.* 2007). The likely impact of these

pressures on forest integrity and emissions is clearly higher under a RED than a REDD agreement. From a climate and a conservation perspective, it would be beneficial to account for and reduce emissions from these sources; however, from a livelihoods perspective, it is often crucial to maintain sustainable access to forest products. Landscape-scale planning approaches can help to balance climate change, conservation and livelihoods needs.

The accounting of soil carbon is most relevant to forest on organic soils, although mineral soils can also hold substantial biomass. In particular, if emissions from deforestation of peatlands are not well understood, then the full value of avoided deforestation may be underestimated. The *Good Practice Guidance* offers default values for estimation of soil carbon content to 30 cm depth, for use where no national data are available. These will certainly underestimate soil carbon content in tropical swamp forests, where the peat depth can be up to 20 m (Page *et al.* 2002). Losses resulting from drainage or fire could therefore be substantially greater than the default values would indicate. It would be advantageous for countries seeking to control deforestation on peatlands to measure baseline and ongoing emissions from their soils as accurately as possible.

Whilst attaching a higher carbon value to peatland forests offers clear climate benefits, the biodiversity implications are more complex. If some forests are valued much more highly than others for their high carbon content, then they may attract the lion's share of RED finance. This indicates an even greater need to direct conservation finance towards forests with lower carbon content, such as tropical dry forest (Miles & Kapos, in prep).

Tackling deforestation

Whilst the UNFCCC discussions relate to an international fund or emissions market for reducing overall deforestation in developing countries at a national scale, implementation will inevitably involve site-scale land-use decisions. Concerns have been raised that RED could have negative as well as positive impacts on biodiversity conservation and livelihoods (UNEP-WCMC 2007; Griffiths 2007). Changes in national land use policy and associated restrictions could affect the livelihoods both of peoples dependent upon forests and upon the conversion of forest. Involvement of local people in planning and implementation of RED, and ensuring sharing of the benefits from RED finance is likely to result in a more sustainable long-term solution to deforestation, providing the necessary positive incentives at local scale (Clark *et al.* in prep, Coad & Campbell in prep).

The success of RED will also be influenced by the scale of the pressures exerted upon forests. In the period up to 2050, the demand for arable crops is projected to double. This is a combined result of the increasing global population, which is projected to reach around 9 billion people by 2050 (UN 2007), and the increasing proportion of grain-fed meat in the average diet (Comprehensive Assessment of Water Management in Agriculture 2007). Meanwhile, the global proportion of road-transport energy supplied by biofuels has been projected to increase by 2030 from the current 1% to between 4% and 7% (IEA 2006). This trend is already stimulating conversion of carbon-rich peatland forest in Southeast Asia (Hooijer *et al.* 2006). Whilst some crop yield improvements are feasible, these pressures combined will substantially increase the demand to convert forests and other native ecosystems into arable fields or plantations. The extent to which this demand can be countered by RED is dependent upon the funds available, the unit price placed upon carbon, the capacity of countries to implement RED, and the ability to increase agricultural efficiency in the face of a slowly changing climate.

Protected area policy

Protected areas could have a role to play in reducing national-scale deforestation, through strengthening forest protection within existing parks and reserves, and/or declaring new forest areas. Conversely, protected areas could be ruled ineligible for support under the mechanism,

if it were argued that as existing national commitments to protect forests, their lands would not meet an additionality criterion. This could result in a perverse incentive for conservation, reducing protected area designation and even resulting in de-listing of existing areas. As some Parties refer directly to protected area designation as a mechanism for decreasing deforestation, and others are calling for compensation for existing forest conservation efforts, the outlook is generally positive for protected areas in participating countries. However, countries not participating in the mechanism may find that external pressures on their forest protected areas increase, with a resulting increase in the cost of effective management.

Temperate and boreal forest conservation

If a RED mechanism will only financially support measures by non-Annex I Parties, mainly those in tropical regions with high carbon forests, forests outside these regions could come under additional pressures. The risk that some deforestation and forest degradation pressure will be displaced to temperate and boreal forests is compounded by some uncertainty over the net climate benefits of retaining these forests. Whilst a recent large-scale modelling exercise has indicated that boreal forests have a net climate warming effect (Bala *et al.* 2007), the model does not account for the major carbon storage function of forested boreal peatlands. The certification of sustainably managed forests in these biomes will become even more important in a RED world.

Key considerations for pilot projects and future negotiations

Based on the findings described above on the different factors influencing the potential cobenefits derived from a RED mechanism, the following points are highlighted:

- Credit for early action could decrease perverse incentives for deforestation prior to 2012, though any programme would need to be managed carefully to ensure net climate benefits.
- The *IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry* and *Guidelines for National Greenhouse Gas Inventories* provide an agreed basis for monitoring emissions. Such standardised guidance is essential. The lack of a requirement to report carbon stock changes in 'undisturbed' forests is a major concern, because of the risk of unrecorded forest loss.
- Estimating and accounting for emissions from both forest degradation and soil carbon losses could substantially increase payments to implementing countries.
- In testing the implementation of RED at a national to site scale, pilot projects could explicitly aim to supply evidence to allow an evaluation of the *Good Practice Guidance* and inventory guidelines, and any need for revision. This could help to ensure complete coverage of deforestation in both managed and unmanaged forests, and better estimation of emissions from forest degradation and soil carbon losses.
- Achievement of co-benefits from RED for biodiversity, local livelihoods and other values can be increased by planning for them from the start of pilots, by including clear environmental and social safeguards, and especially through the active involvement of local communities and other forest stakeholders. Efforts should be made to avoid and monitor displacement of pressures.
- Monitoring of co-benefits in pilot projects, for example using a standard assessment framework, would help to establish which implementation methods were most efficient at delivering these cobenefits. An added advantage would be that Parties could demonstrate their achievement of goals committed to under other international agreements.

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