REDD-PLUS AND BIODIVERSITY

Measures to reduce emissions from deforestation and forest degradation in developing countries[1] are being discussed under the United Nations Framework Convention on Climate Change under the rubric "REDD-plus" (with REDD standing for "reducing emissions from deforestation and forest degradation"). While REDD-plus is first and foremost being developed as a means of mitigating climate change, it is expected to generate considerable biodiversity benefits and also has the potential to generate benefits for indigenous and local communities. Achieving and optimizing these so called "co-benefits" (or multiple benefits) of REDD-plus will require policy coherence and close coordination between key actors at the local, national and international levels.

The opportunities for synergies are immense

Tropical forests are home to an amazing diversity of life. The Amazon rainforest alone hosts about a quarter of the world's terrestrial species (Malhi et al., 2008). Effective efforts under the United Nations Framework Convention on Climate Change to curb deforestation and forest degradation could provide considerable benefits for biodiversity, in particular through conservation of primary forests (SCBD, 2009). In forests that are already degraded, effective forest landscape restoration can be beneficial for biodiversity. Tropical forests can regain up to 80 per cent of their original biodiversity in as little as 50 years, although some vulnerable and highly specialized species might not recover from forest degradation (Dent & Wright, 2009; Sberze et al., 2010). Harnessing the full potential of biodiversity benefits would boost forest ecosystem services, which have been estimated to be worth on average $6,120 per hectare per year in intact tropical forests (TEEB, 2009).

Stable storage of carbon depends on stable and resilient forests

There is a strong correlation between biodiversity, ecological processes and forest carbon stocks (Strassburg et al., 2010; Diaz et al., 2009). Primary tropical forests are generally the most carbon-dense forests and are highly resilient (more able to withstand and recover from disturbance), making it more likely that carbon will be stored over long periods of time in forests of high biodiversity (permanence). Natural, diverse forests are better able to withstand pressure from invasive alien species and other pests and disturbances such as forest fires and storms, and recover more quickly following such disturbances. A recent synthesis of more than 400 scientific studies on forest resilience concluded that long-term stability of forest carbon stock against disturbance rests on forest ecosystem resilience, which in turn rests on biodiversity on multiple scales (Thompson et al., 2009).

Biodiversity benefits can easily be optimized

Recent studies suggest that a focus on areas of high biodiversity and endemic species could double the biodiversity benefits of REDD-plus and increase the availability of ecosystem services. The most threatened areas of high biodiversity should be prioritized, while leakage should be avoided (see the section on mitigating risks, below). Targeted funding for biodiversity conservation could in turn contribute to and increase REDD-plus effectiveness (Venter et al., 2009; Diaz et al., 2009).

Different landscape contexts require different REDD-plus approaches

Primary tropical forests are the richest forests in terms of biodiversity and carbon stock; conserving them will yield a double dividend for climate change mitigation and biodiversity and provide ecosystem services at the local, national and global levels. In primary forests and other naturally regenerated forests, the total ecosystem carbon stock (in plants and soil) is on average 28 per cent higher than in plantations (Liao et al., 2010). The replacement of natural forests with plantations decreases carbon stocks and harms biodiversity (Liao et al., 2010; Koh and Wilcove, 2008) and should therefore be excluded from any REDD-plus efforts. It is questionable whether forest plantations can contribute effectively to carbon storage in the long term (SCBD, 2009).

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Forest restoration (enhancement of forest carbon stocks) can provide biodiversity benefits

Environmentally sensitive restoration of degraded forest and agricultural lands can provide biodiversity and climate benefits (SCBD, 2009). Over the long term, natural succession is generally more effective than tree planting for carbon sequestration (Liao et al., 2010) and provides more biodiversity benefits if the factors that caused forest degradation can be effectively controlled (Sayer et al., 2004). Afforestation and reforestation activities in the context of REDD-plus could enhance ecological connectivity (see figure 1 and box 2, below), which is essential to the adaptation of ecosystems and species to climate change.

A long-term and holistic approach is needed for the success of REDD-plus

Forest restoration, management and conservation measures need to be planned on the appropriate spatial scale to ensure biodiversity benefits (Thompson et al., 2009). Such measures should also harness the benefits of biodiversity for carbon storage (Diaz et al., 2009). This requires spatial planning at the landscape, regional, or national level, and even in a transboundary context where necessary. Figure 2 shows how spatial biodiversity information could inform REDD-plus design and planning to improve ecological connectivity in protected area networks and to optimize biodiversity benefits. The national ecological gap analysis shown in figure 2 was carried out with stakeholder involvement based on the best available biodiversity data. Early involvement of biodiversity experts at the national and local levels, including holders of traditional knowledge, is essential for REDD-plus planning (SCBD, 2009).

Ecological tipping points or thresholds could endanger REDD-plus efforts

REDD-plus could be instrumental in safeguarding the Amazon basin and other major tropical forest regions. Several modeling studies, however, suggest that there is a significant risk that the loss of as little as 20 per cent of the Amazon rainforest could push much of Amazonia into a permanently drier climate regime and that reaching such a tipping point becomes more likely with temperature increases of more than 2°C (SCBD, 2010; Leadley et al., 2010). Currently, Amazon deforestation stands at around 17 per cent. Large-scale Amazon dieback and other possible major biodiversity tipping points must be considered in the context of overall climate change mitigation efforts, including REDD-plus.

Key tools for enhancing multiple benefits exist but need further research and development

The Secretariat of the Convention on Biological Diversity has developed, through its LifeWeb Initiative and jointly with the United Nations Environment Programme World Conservation Monitoring Centre, an online carbon and biodiversity mapping tool that could help to inform decision makers about synergies (cf. www.carbon-biodiversity.net). The tool is presently being further developed by including the national ecological gap analyses that have been completed or are in the process of being completed in many developing countries, including most REDD pilot countries (see figure 2), under the auspices of the Convention. With regard to the monitoring of biodiversity benefits, a joint initiative of the 14 members of the Collaborative Partnership on Forests to monitor forest degradation, and other initiatives in which the CBD secretariat is involved, can contribute to measuring the success of REDD-plus and its multiple benefits.

Indigenous and local communities are key to the success of REDD-plus

More than 300 million members of indigenous and local communities depend mainly on forests for their livelihoods (MEA, 2005), and indigenous peoples have been effective stewards of forests for millennia. In the Brazilian Amazon, for example, the average probability of deforestation was found to be 7 to 11 times lower within indigenous lands and other protected areas than in surrounding areas (Ricketts et al., 2010). Equity and the full and effective participation of indigenous and local communities are enabling conditions for REDD-plus, as its long-term success will stand or fall with local ownership and support (Agrawal and Angelsen, 2009). The Convention on Biological Diversity Ad Hoc Technical Expert Group recommends that the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) should be the basis for full and effective participation (SCBD, 2009).

Mitigating the risks of REDD-plus

Potential risks of poorly designed REDD-plus efforts include:

- the conversion of natural forests to plantations and other land uses of low biodiversity value; and the introduction of growing of biofuel crops;
- displacement of deforestation and forest degradation to areas of lower carbon value and high biodiversity value;
- increased pressure on non-forest ecosystems with high biodiversity value;



- afforestation in areas of high biodiversity value;.
- lack of tangible livelihood benefits to indigenous and local communities and lack of equitable benefit sharing; and the loss of traditional territories and restriction of land and natural resource rights; and
- Recentralization of forest governance, threatening recent successes gained by empowering local stakeholders to manage forests sustainably.

These risks can be mitigated in a number of ways: first, through appropriate safeguards (for example, against the conversion of natural forests); second, by ensuring that REDD-plus takes a holistic approach to forest-based carbon storage (and possibly by considering all terrestrial ecosystem-based carbon); third, by setting appropriate baselines and reference scenarios; and, fourth, by monitoring the biodiversity impacts of REDD-plus efforts, for example in the context of reporting under the Convention on Biological Diversity. In the context of baselines and monitoring, the question of whether to use gross or net deforestation rates is particularly important. The use of net rates[2] could hide the loss of mature forests and their replacement, in situ or elsewhere, with plantations. The conversion of natural forests to plantations has negative impacts on carbon stocks and on biodiversity, and should therefore not be eligible for REDD-plus or other climate-change funding.

REDD-plus efforts could have both positive and negative impacts on biodiversity, while biodiversity in turn plays an important role in the effective and long-term storage of carbon in forests. It is therefore crucial that biodiversity be appropriately considered in the development and implementation of REDD-plus. The potential to address the biodiversity crisis and climate change simultaneously is unprecedented, while poorly designed REDD-plus efforts could damage forest biodiversity and in the process threaten the continued provision of ecosystem services for human well-being. The Convention on Biological Diversity has been supporting its parties and key actors and stakeholders to ensure that biodiversity benefits are at the forefront of the

Box 1: The Convention on Biological Diversity and REDD

The Conference of the Parties to the Convention on Biological Diversity has invited Parties, other Governments and relevant organizations to ensure that actions to reduce emissions from deforestation and forest degradation do not run counter to the objectives of the Convention and the implementation of its programme of work on forest biodiversity and that they instead support the implementation of the programme of work. REDD efforts should provide benefits for forest biodiversity, and, where possible, also provide benefits for indigenous and local communities and respect their rights (cf. decision IX/5, para. 2 (a)).

Box 2: Afforestation and reforestation

Afforestation, and the restoration of degraded forest lands, can benefit biodiversity substantially; they can also, however, impact biodiversity negatively if not carried out properly. The Convention on Biological Diversity recommends that afforestation and reforestation activities include native tree species; aim for diverse, multi-strata canopies; result in minimal disturbance; consider the invasiveness of non-native species; and be strategically located within landscapes to enhance connectivity (SCBD, 2003).

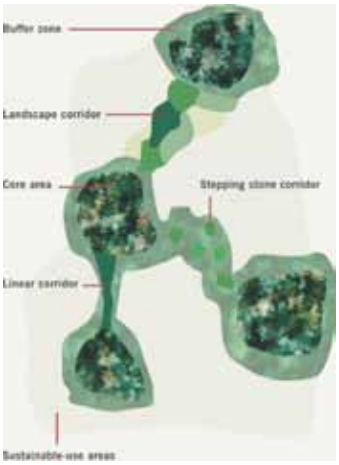

Figure 1: The concept of ecological connectivity is important in the context of climate change adaptation. It could be enhanced at the landscape level through REDD-plus activities, including afforestation and reforestation.

Source: Bennett, G.(2004). Linkages in Practice: A Review of their Conservation Value. Gland/ Cambridge:IUCN/Syzygy.

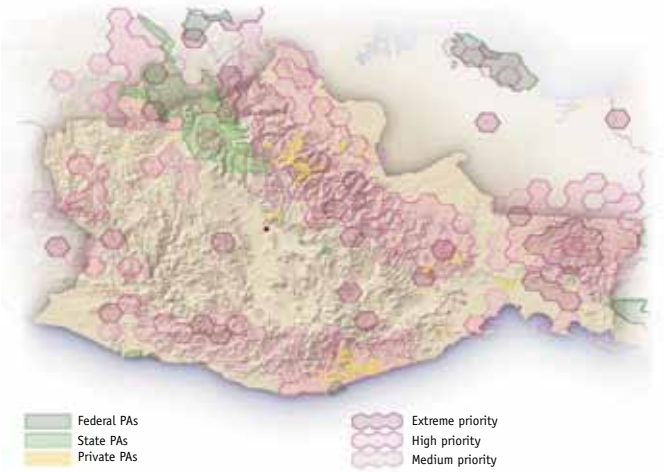

Figure 2: Protected area and biodiversity priorities in the state of Oaxaca, Mexico, as part of the national "Spaces and Species" assessment under the Convention on Biological Diversity programme of work on protected areas. Similar national ecological gap analyses have been carried out under the auspices of the Convention in over 40 developing countries. These assessments can help to achieve multiple benefits of REDD-plus by identifying areas of high biodiversity that are under threat.

Further reading

Biodiversity Scenarios: Projections of 21st Century Change in Biodiversity and Associated Ecosystem Services. CBD Technical Series No. 50. 2010.

Forest Resilience, Biodiversity, and Climate Change. A Synthesis of the Biodiversity/Resilience/Stability Relationship in Forest Ecosystems. CBD Technical Series No. 43. 2009.

Review of the Literature on the Links between Biodiversity and Climate Change: Impacts, Adaptation and Mitigation. CBD Technical Series No. 42. 2008.

Connecting Biodiversity and Climate Change Mitigation and Adaptation: Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change. CBD Technical Series No. 41. 2009.

Biodiversity and Livelihoods: REDD Benefits. Brochure by the Secretariat of the Convention on Biological Diversity and the German Development Cooperation Agency (GTZ). 2009.

All publications are available for download at: *http://www.cbd.int/forest.*

Copies can be ordered free of charge at secretariat@cbd.int.

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1. With reference to decision 5/CP.15 of the United Nations Framework Convention on Climate Change (UNFCCC), REDD-plus refers to "policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries". The acronyms REDD and REDD-plus are used in the present paper for convenience only, without any intention to preempt current or future negotiations under the Framework Convention on Climate Change.

2 Net deforestation (net loss of forest area) is defined in the 2005 Global Forest Resources Assessment carried out by the Food and Agriculture Organization of the United Nations as overall deforestation minus changes in forest area due to forest planting, landscape restoration and natural expansion of forests.

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