Making REDD work

A practitioner's guide for successful implementation of REDD
(Reducing Emissions from Deforestation and Forest Degradation)

gtz

On behalf of
Federal Ministry
for Economic Cooperation
and Development

MAKING REDD WORK

A practitioner's guide for successful implementation of REDD (Reducing Emissions from Deforestation and Forest Degradation)

Team of Authors:
Silvestrum, www.silvestrum.com

ACKNOWLEDGEMENTS

The content of this brochure draws upon a wide range of literature, as well as the expertise of various actors, and would not have been possible to produce without the valuable contributions of a number of people.

I would like to thank the team of Silvestrum: Igino Emmer, Camille Rebelo and Eveline Trines, for preparing the main draft.

I further would like to thank Johannes Scholl (GTZ Brazil), Joerg Seifert Granzin (CIM Bolivia), Georg Buchholz (GTZ Indonesia), Stefanie von Scheliha (GTZ Germany), and Michael Huettner (Max Planck Institute, Jena, Germany) for their valuable inputs.

Finally, I would like to thank Rosemarie Benndorf (UBA), Giacomo Grassi (JRC), Martin Herold (GOFC GOLD), Björn Hecht, and Peter Saile (both GTZ) for their helpful comments and suggestions.

Reinhard Wolf
GTZ Expert 'Forest and Climate'

BOXES

FOREWORD

Land use and land use change are estimated to contribute around 20 per cent of global CO_2 emissions. A large share of this results the destruction of tropical forests. It is essential to find incentives to halt this process and sustain the various globally relevant functions of these forests, ranging from protecting biodiversity to maintaining a healthy climate.

A proposal by the Coalition for Rainforest Nations in 2005 to address deforestation as part of the international climate regime was therefore welcomed by a large number of countries. Reducing emissions from deforestation in developing countries would not only address a major source of greenhouse gas emissions but would also pave the way for developing countries to play an active part in emission reduction efforts under the international climate regime.

The idea of promoting incentives for forest conservation in the climate regime is almost universally praised as an important and substantial contribution to international climate policy. The real challenge, however, is to find credible ways of implementing the concept. This is made difficult on the one hand by the complexity of the underlying causes of worldwide forest destruction and on the other by the methodological challenges associated with it.

At the 2007 climate conference in Bali, countries were encouraged to carry out pilot activities in the field of reducing emissions from deforestation and forest degradation – otherwise known as REDD.

The German Ministry for Economic Cooperation and Development (BMZ) is supporting a number of REDD programmes, which range from a pilot project in Madagascar, carried out jointly with the Swiss Development Cooperation, to the support being given in the Congo Basin through: (1) South-South cooperation involving Cameroon and Bolivia, (2) assistance provided to the Central African Forest Commission and (3) the promotion of the Congo Basin Forest Partnership (CBFP).

Moreover, during its G8 presidency, Germany was instrumental in establishing the Forest Carbon Partnership Facility (FCPF), launched in December 2007 during the climate conference in Bali. REDD has become an important part of German Development Cooperation in Indonesia, Laos, Central America and Brazil (contribution to the Amazon fund).

Experiences from these programmes have been integrated into this document. We hope it will be useful both for decision makers in developing countries as well as practitioners involved in making REDD work in practice.

Dr. Lorenz Petersen

Head, Climate Protection Programme (GTZ)

Herbert Christ

Head, International Forest Policy Programme (GTZ)

EXECUTIVE SUMMARY

Land use change accounts for around 20 per cent of global CO_2 emissions, with deforestation being the major force behind these emissions. The inadequate treatment of this sector during the first commitment period of the Kyoto Protocol and its flexible mechanisms have become a focus of international discussions. The concept of 'reduced emissions from deforestation and degradation' or REDD has played a major role in these discussions. Since it was first proposed to the UNFCCC at its 11th Conference of the Parties in Montreal in 2005, the growing understanding of the importance of reducing deforestation has increased the momentum of support for the REDD concept, as well as its complexity. Since then, a number of proposals have been put forward to suggest how a REDD mechanism could work. The economic and financial structures underlying the different proposals differentiate between a fund-based and a market-based mechanism.

Understanding the drivers behind global deforestation is key to creating a mechanism that offers long-term financial alternatives. The integration of deforestation into other sectors, such as agriculture, land planning and urban expansion, means that a multi-sectoral approach is required. A REDD mechanism will inherently involve many stakeholders working at different levels, from international and national, down to sub-national, regional and local levels. At national, regional and local levels, there is a significant need to spread knowledge and build capacities prior to implementation. Good governance in both the forestry sector and the relevant institutions is an important prerequisite. Initiatives such as the World Bank's Forest Carbon Partnership Facility (FCPF) and UN REDD, as well as the work being carried out by numerous NGOs and other institutions, are the first steps to preparing developing countries for a REDD mechanism.

Implementation of a REDD mechanism requires a legal framework in which to construct the mechanism. The ownership of carbon resources must be clearly defined and the assignment of property titles for emission reductions understood. Furthermore, competent public authorities must be empowered to act. Many countries, such as Indonesia and Brazil, have made significant steps towards achieving both the legal framework and the surrounding policies necessary to ensure the long-term integrity of the system.

For a long time, technical issues, such as monitoring, reporting and verification, were at the heart of the discussions. Emission reductions from deforestation or forest degradation are considered additional if they would not have occurred in the respective area, had no REDD activities been undertaken. However, the manner in which reference levels are defined, and the time frame in which they are updated, is still under discussion.

Alongside the technical issues, there are concerns over equity and the role of the forest-dependent communities. Turning forest carbon into a commodity has huge potential for inequity. Therefore, a scheme to avoid deforestation must not only address the climate benefits, but also ensure the improvement of livelihoods of forest-dependent communities. Pilot projects at both sub-regional and regional levels are providing benchmarks, and critical lessons can be learned from them. These projects and the various standards that have developed and which continue to evolve in the voluntary market have helped to shape the nature of the negotiations.

This brochure aims to provide an overview and understanding of the REDD concept, the current proposals and the issues under negotiation. The recommendations made for further reading and the references to other available resources are intended to enhance broader participation and the full engagement of both governments and practitioners in the REDD debate.

ONE

INTRODUCTION

1.1 Forests and climate change

In the fourth assessment report of the Intergovernmental Panel on Climate Change (IPCC) (Parry et al. 2007), scientists confirm that global temperature rise must be limited to 2°C if we are to prevent the potentially catastrophic effects of climate change. To achieve this, the IPCC recommends that, by 2020, industrialised countries should reduce their emissions by as much as 40 per cent from 1990 levels. However, following the first commitment period of the Kyoto Protocol, if global targets are to be met, it is no longer an option to disregard the activities of developing countries. Developing countries must also take action and reduce their projected rate of increase of greenhouse gas emissions. Furthermore, although emission reduction efforts to date have focused on the energy sector, future targets cannot be achieved unless forests and land use change are incorporated comprehensively into progressive climate change regimes, and adequate incentive schemes are realised.

Trees and other vegetation play a critical role in the global carbon cycle. Growing forests actively sequester carbon dioxide from the atmosphere, and through the process of photosynthesis convert this into biomass. The result of this cycle is that mature forests store large amounts of carbon, locking it up in the trees and other vegetation as biomass, both above and below ground. Carbon contained in the soil of forest ecosystems is also an important store, particularly in the case of peat forests. As whole trees or parts of them die and fall to the forest floor, much of the biomass is incorporated into the soil as organic soil carbon. Although all vegetation actively sequesters and stores carbon, forests represent the most significant store. The total volume of carbon locked up in forests is currently greater than that held in the atmosphere (Stern 2006). As much as 77 per cent of global terrestrial carbon is contained in the world's forest ecosystems (Parry et al. 2007). The importance of tropical forest ecosystems as carbon stores is particularly great, due to a number of factors. The proliferation of woody material and the high density of the woody biomass, the slow decomposition of wood compared to other vegetation tissue, and the ideal climatic conditions for constant, year round growth all contribute to tropical forests' considerably higher carbon sequestration and storage capacity compared to other types of ecosystem. The 2001 IPCC report (IPCC 2001) indicates that on average the carbon stored by tropical forests amounts to 1,000tCO_2/ha. Only the boreal forests exceed this, with an average of 1,200tCO_2/ha, which is due to the high carbon content of the soil. By contrast, tropical grasslands have an average capacity of less than 500tCO_2/ha and croplands even less at around 300tCO_2/ha. Consequently, the world's remaining tropical forests in Latin America, Africa and Southeast Asia, play an important role, both in moderating the global climate and preventing the release of large quantities of the greenhouse gas carbon dioxide into the atmosphere.

However, the rate of deforestation and degradation of tropical forests is high. The demand for land for agriculture and infrastructure development and the rising demand for timber are placing increasing pressure on the remaining forest areas. When land use change occurs, including the clearing of forests and burning of biomass, the carbon stored within the forests and the soil below them is released into the atmosphere, directly contributing to climate change. The extent of this release of greenhouse gas from land use change is the second largest source of global greenhouse gas (GHG) emissions, contributing 20 to 25 per cent of global emissions. Only the burning of fossil fuels for energy production accounts for a higher

share. Deforestation is taking place predominantly in tropical and subtropical nations. Some 13 million hectares of tropical forest are being cleared each year (FAO 2006). The extent of tropical deforestation also means that land use change is the largest source of emissions in developing, or non-Annex 1 countries (Houghton 2005). If GHG emissions from land use, land use change and forestry (LULUCF) are considered, Indonesia becomes the third biggest emitter worldwide. The devastating forest fires in Indonesia in 1998 and 1999 are believed to have released up to 40 per cent of the total anthropogenic GHG emissions worldwide during those years.

Current atmospheric levels of carbon dioxide equivalent (CO_2e) stand at around 430 ppm. Scientists believe that to prevent the disastrous effects of climate change it is important to stabilise the atmospheric concentration of GHG between 450 and 550 ppm. The Eliasch Review concludes that, unless considerable mitigation action is taken, predicted emissions from the forestry sector alone would increase atmospheric carbon stock by 30 ppm by 2100. Therefore, if targets are to be realised and the global climate stabilised, it is crucial that developing countries and the forestry sector are both included in any future climate change regime. To achieve the targets, forest nations should aim to halve deforestation by 2020 and make the global forest sector carbon neutral by 2030. This will require support from the international community (Eliasch 2008).

Further introductory reading

The IPCC 4th Assessment Report, which provides the scientific background to climate change, can be found at ***http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm***

The section of the report detailing forests can be found at ***www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter9.pdf****. For information specific to the United Nations Framework Convention on Climate Change:* ***www.unfccc.int***

A number of additional studies have assessed the role of forests and the options for their greater inclusion in a future climate regime. Further and more detailed information can be found in the following documents:

The Stern Review ***http://www.sternreview.org.uk*** *and the Eliasch Review* ***http://www.occ.gov.uk/activities/eliasch.htm*** *are British governmental documents prepared to guide decision making. The Stern Review focuses on the economics of climate change, while the Eliasch Review addresses the financing of forests within the climate change agenda. Governments of developing countries, climate change negotiators and potential project developers attempting to enter the carbon forestry arena should make use of the introductory sections of these documents to put the issues under discussion in context.*

A number of organisations have set up specific units to deal with the issue of climate change. Examples include the FAO, whose climate-specific programme can be accessed at ***http://www.fao.org/climatechange/home/en/*** *and the World Bank's carbon finance unit* ***http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTCARBONFINANCE/0,,menuPK:4125909~pagePK:64168427~piPK:64168435~theSitePK:4125853,00.html.***

1.2 Drivers of deforestation

The drivers of deforestation are complex. They include both natural and anthropogenic elements. Anthropogenic drivers often span a wide number of sectors, beyond those operating purely at the forest level. We can cluster the drivers of deforestation into four different classes (expanded upon from Geist & Lambin 2002, Kaimowitz & Angelsen 1998 and ONF 2008):

- **Direct drivers:** A direct driver is the land use that substitutes or replaces a forest. This is usually an economic-based activity, such as agriculture, cattle ranching or logging. It is the most obvious reason for which the forest is chopped down.

- **Enabling drivers:** Enabling drivers are those which grant access for agents to forested lands. Without access, there can be no direct driver. Examples of enabling drivers include infrastructure (roads or rivers) that open up remote areas for settlers or loggers, or unclear land tenure that allows the occupation of forested lands.

- **Underlying drivers:** Underlying drivers are those that influence the decisions of the agents with access to forests to apply the direct drivers of deforestation (agriculture, cattle ranching, etc.). Examples include population pressures that motivate agents to migrate into the forests, price incentives from international markets for meat or palm oil, and weak legal frameworks or poor law enforcement, which allow illegal deforestation to go unpunished.

- **Other factors:** disasters, forest fires, hurricanes, the impacts of climate change, etc.

Within this classification, the drivers of deforestation are context-specific, depending largely on the availability of markets for forest products, national policies and their enforcement, geographic location and ecosystem accessibility. Although the overarching driver of deforestation may be identified in terms of its geographical context, in individual locations or geographic regions the underlying drivers are often intricately linked, and it may not be sufficient to address one factor alone. For example, forested land is often cleared by logging, with the sale of the logs providing the initial investment for future palm oil production or other large-scale agriculture. Logging roads gradually provide access to previously inaccessible parts of the forest, which, although not cleared, are subsequently subjected to increased rates of deforestation and degradation as settlements grow and human influence infiltrates.

The below table, based on Chomitz (2007), indicates the major drivers of deforestation within different geographic locations. Although simplified, this shows the different influences existing in different parts of the tropical world, and relates them to differing market pressures and social contexts.

In addition to direct exploitation for timber and conversion to agriculture, illegal logging, political instability and the lack of governmental control over infrastructure often contribute to increasing levels of uncontrolled deforestation and degradation. Another contributing factor in many parts of the developing world is the lack of clear land tenure, which results in increasing rates of exploitation and little long term interest in maintaining the forest resource. This, in turn, allows easy, uncontrolled access. 'Open-access' land in abandoned logging concessions encourages illegal logging and the conversion of forests to other land use; inadequate resources and law enforcement prevent successful monitoring and control of these areas. High immediate though short-term financial gains from

Major drivers of deforestation, based on Chomitz (2007)

Latin America	Africa	Asia-Pacific
Large-scale farming to supply international markets, logging, mining and clearance for subsistence agriculture	Logging, mining, shifting cultivation, harvesting for firewood and expanding populations	Conversion to oil palm, and logging of indigenous hardwoods

Controlling deforestation drivers in Brazil

The Brazilian government's 2003 Action Plan for the Prevention and Control of Deforestation (PPCDAM) summarises the complexity of deforestation drivers in the Brazilian Amazon. While cattle ranching is highlighted as the primary direct driver of deforestation (80 per cent), several enabling and underlying drivers also contribute to deforestation. Infrastructure enables access: 75 per cent of deforestation observed between 1978 and 1994 took place within 50 km of paved roads. Poor definition of land titles fuels land grabbing, which results in the illegal occupation of forest land. Most deforestation in the Brazilian Amazon is illegal – only 8.7 per cent of deforestation in 2000 was authorised by the Environmental Agency (Ibama). Deforestation rates are increasingly responsive to price signals from the international meat and soy markets (Nepstad et al. 2006). The surge in deforestation in Brazil between 1998 and 2004 correlates with an expansion of cattle herds and soy exports. The fact that an estimated 25 per cent of the total deforested area in the Amazon is abandoned, indicates a lack of incentives to invest in adequate technology for the long-term use of pastures in the region. Instead of intensifying ranching on existing pastures, agents often open up new plots, abandoning older ones. In answer to the complexity of deforestation drivers, the Brazilian Government is addressing the problem with a multi-policy approach.

Source: Presidência da República 2003

uncontrolled forest clearance provide perverse incentives for bad governance, resulting in high rates of logging, and create little desire for governments to ensure adequate law enforcement. Kaimowitz & Angelsen (1998) concluded that more roads, higher agricultural prices, lower wages and a shortage of off-farm employment generally led to higher rates of deforestation.

While on a global scale the loss of forest ecosystems contributes to climate change, there are many additional negative effects on a regional and local scale. Changes in micro-climate, loss of biodiversity, irregularities in water regimes, soil erosion and impacts on forest-dependent communities are all triggered by large-scale deforestation. Degraded ecosystems lose their capacity to provide important ecosystem benefits to dependent communities. The loss of biodiversity leads to decreased ecosystem stability and higher levels of vulnerability. This means that even small changes in regional climates are likely to have a greater than normal effect on the forest ecosystem. Addressing the underlying causes of deforestation will therefore bring considerable additional benefits. While in the short term, large-scale deforestation leads to gross economic benefit, these benefits only reach a select number of stakeholders and do not compensate for the massive economic losses associated with climatic change and lost biodiversity.

Further reading on drivers of deforestation

In addition to the references listed above, Chapter 3 of the Eliasch Review examines the drivers of deforestation in detail.

In 2008, Prince Charles of the United Kingdom created an organisation called the Prince's Rainforest Project. The website of this organisation provides detailed information on the drivers of deforestation. It can be found at: http://www.princesrainforestsproject.org/whats-happening-to-them/drivers-of-deforestation

The FAO publishes a biannual report on the 'State of the World's Forests' which examines changes of forest area and the growing stock, consumption and trade of timber and timber products at the national level. It also reports on major regional-level influences, social and environmental forest services and political trends. These reports are available at: http://www.fao.org/forestry/49666/en/

Vanclay, J.K., 2005. Deforestation: correlations, possible causes and some implications. International Forestry Review 7(4):278-293. Accessible at: http://espace.library.uq.edu.au/eserv/UQ:8362/R098_ifr_pp.pdf

1.3 What is REDD?

REDD is the acronym for Reducing Emissions from Deforestation and Forest Degradation. It is a concept currently being developed and negotiated as part of the United Nations Framework Convention on Climate Change (UNFCCC).

The negotiations for REDD centred on the provision of incentives to developing countries to reduce the level of their forest losses, and at the same time to promote environmental, economic and social benefits, while protecting the rights of indigenous peoples and other forest-dependent communities. Starting as RED with a single D for deforestation, the second D for forest degradation was added later. More recently, during the climate talks in Ghana in August 2008, the term 'REDD Plus' was coined. This includes 'conservation, sustainable management of forests, and the enhancement of forest carbon stocks', aspects which are already contained in the Bali REDD decision. Therefore, throughout this document, all references to REDD also include REDD plus.

Currently, REDD refers to a set of objectives rather than a clearly delimited set of actions or activities (Angelsen 2008). Once the approach to achieve these objectives through precise actions has been finalised, REDD should involve a financing mechanism to compensate developing countries for reduced deforestation and degradation of their tropical forest resources.

One of the factors limiting negotiations to date has been the lack of consensus, even within the forest community, on what a REDD mechanism should look like. Issues of scale, scope, reference levels, financing and the institutional and capacity requirements under each proposal have been at the forefront of the discussions. To understand the different components under discussion, and to enable countries to understand what opportunities exist, Parker et al. (2008) and Angelsen et al. (2008) split the overarching framework for the mechanism into the following categories:

- **Scope:** What should be included in the framework? This refers to the activities, the carbon pools to be measured, and the countries eligible for participation in the mechanism.

- **Reference Level:** For emission reductions to be effective in combating climate change, they must be real, quantifiable and verifiable. The reference level is therefore key to the success of emission reductions within a REDD mechanism. But should this be a historic, current or projected baseline, and how should it be measured?

- **Distribution of incentives:** Once emissions have been reduced, who will benefit from the potential revenue flows, and what capacity is required to ensure that emission reductions are long term and that they will generate additional environmental and social benefits? How will issues such as equity, poverty alleviation and socioeconomic factors be addressed?

- **Financing:** There are three main options for the source of financing for a REDD mechanism: (i) a direct market approach, (ii) the creation of a voluntary fund, or (iii) a hybrid approach. With regard to a direct market approach, a key issue is how the REDD created credits will be paid for: (a) a fungible mechanism; where REDD is fully integrated into existing and future carbon markets or (b) separate markets for REDD and non REDD credits?

Each category includes great scope for discussion, with the different stakeholders having different objectives and therefore different requirements for the institutionalisation of REDD.

Key concepts of REDD

Additionality:

The concept that GHG emission reductions resulting from an intervention would not have occurred anyway in the absence of the intervention.

Reference level:

Reference levels (RL) provide a hypothetical 'business as usual' scenario against which carbon stock changes are measured. In this document, the term RL includes the more specific reference emission levels (REL), which focus on emissions reduction. In terms of the so-called REDD Plus, RL have a wider scope, including conservation, sustainable management of forests, and enhancement of forest carbon stocks.

Leakage/displacement:

Any increase in GHG emissions outside the project boundary as a result of project activities or displacement of pre-project activities. Leakage is complex to judge when considering individual projects. For this reason, with regards to REDD, a national system is preferred, which accounts for the shifting of activities and subsequent leakage emissions.

Permanence:

The permanence issue pertains to the risk of future release of the stored or sequestered carbon. It is of particular concern for REDD, due to the risk of the trees succumbing to disease, fire, unsustainable logging, or increased conversion of forested land. It can be addressed first and foremost by the proper design of REDD mechanisms and also through approaches such as risk pooling, and the use of buffers or banking of a certain percentage of credits as risk insurance.

Further reading on REDD

The Little REDD Book (Parker et al 2008). This contains a comparative analysis of key proposals on REDD made by countries, NGOs and the scientific community. It aims to help the broad audience of forest stakeholders participating in or observing the UNFCCC process. It is available online at http://www.globalcanopy.org/themedia/file/PDFs/LRB_lowres/lrb_en.pdf

Meridian Institute (2009). REDD - An Options Assessment Report (www.REDD-OAR.org)

Eliasch J. (2008). Eliasch Review: Climate Change - financing global forests

The UNFCCC REDD information sharing web platform (http://unfccc.int/methods_science/redd/items/4531.php) where Parties, relevant organisations and stakeholders are encouraged to submit information relating to REDD. It contains the following sections:

- ***Technical assistance (TA)**, including both North-South and South-South cooperation initiatives in different areas of work, remote sensing methodology and ground-based inventories, as well as the associated infrastructure that is necessary in order to guarantee the implementation of adequate monitoring systems; Subsections: data collection, training activities, other TA,*
- ***Demonstration activities**,*
- ***Country-specific information** and*
- ***Methods and tools** to estimate and monitor changes in forest cover and associated carbon stocks and GHG emissions, to measure incremental changes arising from the sustainable management of forests, and to assess the reduction of emissions from deforestation and forest degradation. Subsections: IPCC guidance; remote sensing, ground-based inventories, and other methods and tools.*

1.4 A brief history of REDD

When the Kyoto Protocol was agreed upon in 1997, the issue of deforestation in developing countries did not feature in the decisions made. While negotiators agreed that afforestation and reforestation activities, which directly sequester carbon from the atmosphere, could be included in the Clean Development Mechanism (CDM), one of the flexible mechanisms of the Protocol, many nations were opposed to the inclusion of measures aimed at maintaining standing forests.

The idea of 'compensated reductions' became a focal point at the 11th Conference of the Parties (COP) of the UNFCCC in Montreal, in 2005. During this meeting, the governments of Papua New Guinea and Costa Rica tabled a proposal for developing countries to be compensated for reducing deforestation, and thereby reducing global emissions of greenhouse gases. This initial proposal, which has since been reworked (see previous chapter), attempted to establish an international incentive mechanism by which industrialised countries would pay developing forest nations to reduce their deforestation rates. This proposal has the additional potential benefit of integrating developing countries into a post-2012 agreement. With China, Brazil and Indonesia now counting among the top five global emitters of greenhouse gases, such inclusion is even more important if the necessary global reductions in emissions are to be achieved.

Since that meeting, significant progress has been made in reaching an international agreement in which REDD will be included in a post-Kyoto climate change framework. The political climate for REDD has improved significantly, and countries such as Brazil and Indonesia are now backing the inclusion of a REDD mechanism. During the 2007 COP 13 in Bali, Indonesia, Parties agreed to consider the inclusion of REDD in the post-Kyoto agreement, with these negotiations expected to be finalised during COP 15 in Copenhagen, in December 2009. The results of the REDD negotiations in Bali were incorporated into the Bali Action Plan. This stated that a process would be launched to ensure long-term cooperative action using policy approaches and positive incentives on issues related to the reduction of emissions from deforestation and forest degradation in developing countries, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks (FCCC/CP/2007/6/Add.1). This plan encourages forest nations to take early action in the form of pilot projects.

UNFCCC's Subsidiary Body for Scientific and Technological Advice (SBSTA) has indicated that, to address issues such as reference levels, permanence and leakage effectively, a national rather than a project-based accounting framework is preferable. However, countries are encouraged to undertake project-based activities as a preparatory phase, and to report on the results of all pilot projects.

The Bali REDD decision (FCCC/SBSTA/2007/L.23/Add.1) includes degradation as a relevant source of emissions. Demonstration activities are being considered at national and sub-national levels, with sub-national approaches to be followed as a step towards a national approach. These will also be assessed for any associated displacement of emissions. The Bali conclusions consider the revised IPCC Inventory Guidelines 1996 and the LULUCF Good Practice Guidance 2003 to be the relevant methodological basis. Within this framework emission reductions or increases should be based on historical emissions, taking into account national circumstances. The conclusions also encourage independent expert review.

The draft conclusions of SBSTA 29 (FCCC/SBSTA/2008/L.23) in Poznan call for the full and effective participation of indigenous people and local communities. Furthermore, they expand the scope of activities. The more comprehensive view considers the role and contribution of conservation, sustainable management of forests, changes in forest cover and associated carbon stocks and greenhouse gas emissions, as well as the enhancement

of forest carbon stocks (REDD plus).

These conclusions refer to the IPCC 1996 and 2003 reports as the relevant methodological framework, although the more comprehensive IPCC 2006 GHG Inventory Guidelines are already available. This is because the COP has not yet approved these guidelines. Nevertheless, it might be reasonable to consider the 2006 report as a methodological basis, too, as it offers comprehensive guidance to account for all relevant land use changes.

Further decisions are expected at COP 15 in Copenhagen, but the elaboration of detailed implementation rules will take some years more to achieve. A good example in this respect is the process of AR (afforestation/reforestation) in the CDM. While the principle decision was taken during COP 3 in Kyoto in 1997, the detailed rules were passed only six years later during COP 9 in 2003 in Milan.

Further reading on the history of REDD and ongoing REDD negotiations

UNFCCC has established a special website for REDD, the so-called REDD web platform:
http://unfccc.int/methods_science/redd/items/4531.php

For detailed information about discussions related to REDD within the COPs, in particular the Bali Action Plan, visit:
http://unfccc.int/files/meetings/cop_13/application/pdf/cp_bali_action.pdf

The Government of Norway provides information on their Climate and Forest Initiative, including UN-REDD: ***http://www.regjeringen.no/en/dep/md/Selected-topics/klima/why-a-climate-and-forest-initiative.html?id=526489***

The Global Canopy Programme (www.globalcanopy.org) is a research, education and conservation alliance of 37 scientific institutions in 19 countries. The Little REDD Book published by this group provides an overview of all the different proposals on the table, breaking each one down into several compartments. This book is available online at:
http://unfccc.int/files/methods_science/redd/application/pdf/the_little_redd_book_dec_08.pdf

The Coalition for Rainforest Nations can be accessed at: ***http://www.rainforestcoalition.org/eng/****. This website provides useful information on the countries involved, as well as recent and upcoming events associated with REDD.*

The German Umweltbundesamt has published a detailed report entitled Emissions and Removals of Greenhouse gases through Land-use, Land-use-change and Forestry Activities in a post-Kyoto Regime - A quantitative analysis of a framework for reducing deforestation. This publication is available at: ***http://www.umweltdaten.de/publikationen/fpdf-l/3672.pdf***

Over the past few years, numerous NGOs and civil society organisations have focused on the development of REDD. One example is the REDD monitor, which acts as a critical watchdog on the evolution of REDD, paying particular attention to the rights of indigenous peoples: ***http://www.redd-monitor.org***

GETTING READY FOR REDD

2.1. Capacity building

For most sectors involved in emission reduction targets, the CDM provided a learning and preparatory phase, and the discussions are now focused on the post 2012 period. As a new topic for the climate change negotiations, REDD requires a similar preparatory phase. For REDD to be successful, it must provide emission reductions or carbon stock gains that are measurable, reportable and verifiable. These three terms became popular under the acronym MRV during COP 13 in Bali, Indonesia. In addition, REDD must effectively address issues of concern such as reference levels, leakage and permanence. The expected REDD mechanism will also differ from previous actions as it is likely to combine sub-national or project-level implementation with a national-level accounting and monitoring system. The scale at which REDD occurs is therefore also innately different to previous climate change mechanisms. While the national level will be crucial for measuring the emission reductions and contributing to international negotiations, concrete actions will often be taken at the local level. Therefore, besides political will and coherence, creating a REDD mechanism involves complex legal, technical and institutional capabilities as well as significant financial resources. There are few past experiences to learn from on such a scale. Rather, capacity building and pilot projects to test available methodologies are the first steps required in this initial preparatory phase leading up to 2012. The World Bank, with its Forest Carbon Partnership Facility (FCPF), as well as UN REDD and actors such as the governments of Germany, Norway and Australia through their specified initiatives, are playing an important role in kick-starting this preparatory phase and developing the field for REDD credits.

The FCPF and UN REDD programmes

The FCPF and the UN REDD programmes were set up with the dual objectives of building capacity for REDD in developing countries, and testing a programme of performance-based incentive payments in some pilot countries. The latter is being done on a relatively small scale, and should set the stage for a much larger system of positive incentives and financing flows in the future (FCPF 2009).

The FCPF includes two mechanisms to help more than 30 developing countries with REDD preparation:

The Readiness Mechanism is aimed at enabling countries to carry out an inventory of their forest carbon stocks, their current rates of deforestation and the respective drivers. It will thus establish a reference scenario based upon past and potential future emissions. This capacity building effort includes the development of the necessary in-country institutional arrangements to implement and manage a REDD programme effectively at the national and sub-national levels.

A smaller number of countries, once they have achieved readiness, can benefit from the Carbon finance mechanism, which is intended to compensate countries for accomplished and verified emission reductions. Current discussions within the FCPF address the potential for a percentage of payments to be delivered upfront, as futures for verified reductions.

To be included in the programme countries must submit a Readiness Plan Idea Note (R-PIN). Further information on the participating countries, their R-PINs, etc. can be found on the FCPF website.

The UN-REDD Programme, mainly financed by Norway, was launched as a collaborative initiative be-

tween the UN Environment Programme (UNEP), the UN Development Programme (UNDP) and the Food and Agriculture Organisation of the United Nations (FAO). The Programme's main aim is to contribute to the development of in-country capacity to implement REDD and to support the international dialogue for the inclusion of a REDD mechanism in a post-2012 climate regime. The UN-REDD programme will initially run until March 2010. UN REDD is working in nine countries: Bolivia, Democratic Republic of Congo, Indonesia, Panama, Papua New Guinea , Paraguay, Tanzania, Vietnam and Zambia. All of them, except Zambia, are also pilot countries of FCPF.

UN REDD consists of two programmes:

1. Country actions: Country actions will assist developing countries to prepare and implement national REDD strategies and mechanisms. The actions will serve the double purpose of developing the necessary capacity to implement REDD strategies and providing practical experiences and lessons learned to inform the international dialogue on a post-2012 REDD mechanism.

2. International support function: The prime objective of the international support function is to stimulate and contribute to international discussions on a post-2012 REDD regime. The support functions will seek to increase international confidence and understanding about the feasibility and options for including a REDD mechanism in a post-2012 regime.

Further reading on Capacity Building, FCPF and UN REDD

Full information on the World Bank's Forest Carbon Partnership Facility can be accessed at: http://go.worldbank.org/57X9QKTON0

The UN REDD programme can be found online at: http://www.un-redd.net/

See also the website of the Government of Norway's Climate and Forest Initiative: http://www.regjeringen.no/en/dep/md/Selected-topics/klima/why-a-climate-and-forest-initiative.html?id=526489

A collaborative effort by CCBA, TNC, WWF, CI, GTZ and the Rainforest Alliance has recently launched training and resource manuals for practitioners wanting to learn more about REDD. These are available online as follows:

Participant resource manual: *http://unfccc.int/files/methods_science/redd/application/pdf/training_manual_final_2.pdf*

The manual contains basic information on various aspects of REDD, including the role of forests in climate change, the drivers of deforestation, strategies to reduce deforestation, REDD technical elements, the international policy context, social considerations, biodiversity and ecosystem considerations, national-level activities, project standards, and project development. It was created to support training workshops that our organisations are implementing in various countries. However, it can also serve as a source of background information for those new to REDD.

Training manual: *http://unfccc.int/files/methods_science/redd/application/pdf/participant_resource_manual_final_2.pdf*

This manual contains suggestions for interactive ways to present basic information on REDD to a wide variety of audiences

The Woods Hole Research Centre has created a 'Forum on Readiness for REDD'. This is a multi-stakeholder forum focused on practical approaches to building REDD readiness through cross-stakeholder dialogue, South-South collaboration, and the linking of local expertise with regional readiness efforts. It includes information on current pilot projects and is available at: http://whrc.org/reddready

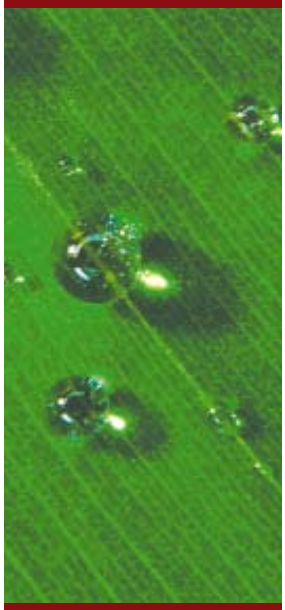
2.2. Reference Levels

A central issue in the REDD debate is the assessment of additionality of emission reductions or carbon stock gains, which is crucial to determine the performance of REDD. Emission reductions from deforestation or degradation are considered additional if they would not have occurred in the respective area without any REDD actions being taken. Experiences from the flexible mechanisms in the Kyoto Protocol suggest, however, that proving additionality is often difficult and ineffective. Therefore, many scholars and policy makers argue against a strict interpretation of the term 'additionality' for REDD, and rather opt for setting robust benchmarks to evaluate the success of deforestation reductions. This is measured using the so-called reference levels (RLs). As already mentioned in chapter 1.3, the term RL in this document covers the more specific reference emission levels (REL), which focus on emission reduction, while for REDD Plus, RL has a wider scope including the conservation and sustainable management of forests, and the enhancement of forest carbon stocks.

The RL describes the amount of GHG emissions expected from deforestation and degradation for a hypothetical 'business as usual' scenario, without REDD activities. This RL can then be compared with the real reductions in GHG emissions in the commitment period. The difference between the two will determine the emission reduction performance of REDD. The setting of the RL thus crucially influences the amount of financial benefits gained from a REDD mechanism. The RL can be based on historical trends, future projections or a mixture of both.

Historical RLs use information on changes in forest cover from a past reference period (e.g. from satellite and/or inventory data). While Annex-1 countries use a base year against which to measure their GHG emission reductions, the high annual fluctuations of deforestation rates require the use of a longer reference period for REDD. From this data, linear trends of deforestation emissions are extrapolated for a future commitment period. While such an RL technique is comparatively easy to implement, it has several shortcomings. The most crucial aspects are the potential over or underestimation of real emissions in the commitment period due to the often non-linear behaviour of deforestation drivers. Countries with high deforestation in the past might move towards a forest transition (Kerr et al. 1999; Rudel et al. 2005) without the influence of REDD, resulting in 'hot air crediting'. Examples include countries such as Costa Rica, China and India, where deforestation has been significantly reduced or even halted, and where forest cover is now increasing. Countries with low deforestation rates in the past would have low reference levels and thus receive little financial incentive to protect their existing forests. A mechanism must be put in place to ensure that these countries are rewarded for positive and early action.

Because of the potential environmental and financial inefficiency historical RLs incur, and their inability to account for non-linear forest area change and specific country circumstances, some scholars advocate the use of modelling to determine reference levels. Models of deforestation trends primarily use general equilibrium approaches, agent-based modelling, spatially-explicit land use models, simple regressions or a mixture of these methods. In all cases, such models are based on land use driver projections, often in combination with historic deforestation trend data. Although model-based RLs can help avoid the risks associated with purely historical reference levels, they are also open to abuse if artificial driver assumptions are made in the model, thus inflating the reference emission projections. It is therefore important to use conservative and transparent RLs to avoid most of these misconceptions. Most Parties decide against modelled reference levels, however groups such as the Coalition for Rainforest Nations (CfRN) propose the use of so-called 'development adjustment factors' when using historical reference levels. This would take into account national circumstances, histori-



cally low rates of deforestation and forest degradation, developmental divergence and respective capabilities and capacities (Papua New Guinea 2009). Such factors could indeed build upon prospective modelling of deforestation drivers to account for country-specific circumstances.

Sophisticated approaches such as the spatially-explicit dynamic modelling of deforestation might not be a feasible option for setting reference levels, as they require high technical capacity and data availability. Nevertheless, advanced tropical countries might use them for the implementation phase of REDD to locate and quantify the future deforestation driver dynamics and to test the effects of planned policy interventions.

The Eliasch Review suggests that RLs should not only take into account historical and future trends, but should also be dynamic, with periodical adjustment to provide sustained incentives for action. The review cites two options for achieving this flexibility: Parties can either meet periodically to renegotiate RLs, or the established REDD mechanism can include an automated adjustment based on a previously agreed course.

To meet the methodological and practical challenges related to the establishment and adjustment of reference levels, a considerable amount of capacity development will be needed in most non Annex-1 countries. Data on the quantity, pace and location of deforestation, as well as the more complex data on forest degradation, and the related GHG emissions is still insufficient in many countries. The minimum data required include time series for changes in forest area, and the associated carbon stock data for a period of at least a decade, as well as the corresponding levels of uncertainty (Karousakis & Corfee-Morlot 2007). In many developing countries, deforestation rates are highly volatile, and correlate strongly with structural or external factors (ONF 2008). Therefore, much research is required at the country level to determine such factors and their interrelationship with the rates of deforestation.

To establish, interpret and manage reference levels, staff and institutions will need training in monitoring and reporting as well as solid integration in functioning governance systems. This process requires an iterative learning process and will thus take time. Therefore, technically and institutionally demanding RL methodologies, such as projection models of dynamic land use, might only be feasible for a few advanced, non Annex-1 countries in the next commitment period. For other countries participating in REDD, different methods such as historic RL and negotiated or regressed development adjustment factors provide intermediate solutions. To preserve the environmental integrity of such a gradual RL approach, the conservativeness principle (Grassi et al. 2008) should be applied (see also next chapter).

Further reading on reference levels

The Eliasch Review covers the issue of RLs in detail:
http://www.official-documents.gov.uk/document/other/9780108507632/9780108507632.pdf

For an introduction to dynamic baseline application look at Brown et al. (2005):
http://ies.lbl.gov/iespubs/61456.pdf

A comprehensive summary of data and capacity requirements for historical reference levels is provided by Olander et al. (2008):
http://www.iop.org/EJ/abstract/1748-9326/3/2/025011/

Chapter 3 of Meridian Institute (2009) REDD - An Options Assessment Report: www.REDD-OAR.org

2.3. Monitoring

For an emission reduction programme to be effective, there must be a clear and transparent system to monitor, report and account for changes in emissions or carbon stocks. This must be consistent and allow comparative assessments between countries and over time. Attempts to include the monitoring and reporting of emissions and emission reductions arising from the land use sector in the UNFCCC requirements for Parties are severely hampered by the lack of clear definitions. Even widely used terms, such as 'forest' 'deforestation' and 'forest degradation' are not clearly defined in a global context, and they differ considerably between the various countries and regions. Agreeing on the definitions of such key terms is one of the first steps in the further development of a global REDD mechanism. It is likely that the result will not be a set of common global definitions but rather that countries will devise their own definitions, within the limits of the Marrakech Accords and the IPCC LULUCF definition of forest land. There may not be a need to define the concept 'degradation' beyond noting that it covers any actions that result in a loss of carbon stocks in existing forests. The new concepts of increasing the carbon stock and forest conservation (REDD+) are growing in importance. These are currently less well defined and need to be better understood.

The monitoring of forest carbon is a key aspect of implementing a REDD mechanism. Although they are expanding, the scientific knowledge and understanding of the carbon storage and sequestration capacities, as well as the available technology for more accurate measurement and monitoring of forests, are still developing. The cost of high-resolution spatial, temporal and spectral data for satellite-based measuring and monitoring, as well as to the cost of determining appropriate emission factors, currently pose major barriers. However, these costs are expected to diminish as improvements are made in remote sensing and satellite technology, and cost-effective inventory methods are developed. Such tools may enable the REDD mechanism to be scaled up, allowing for larger areas to be monitored with relative ease once initial ground measurements have been acquired.

During the first commitment period of the Kyoto Protocol, the IPCC monitoring guidelines differentiate between the different levels (tiers) of methodological complexity in acquiring activity data and assessing corresponding emission factors, and for assessing the types of activity that lead to changes in land use.

For tier 1, IPCC 2003 and 2006 provide all relevant default values, assumptions, and methods. Therefore, although tier 1 offers the easiest way to calculate emissions, these calculations will also contain the highest degree of uncertainty. If using tier 2, a country may combine default assumptions and methods with national data, which might lead to more realistic emission calculations, building on national measurement and monitoring activities (i.e. forest inventories and monitoring of deforestation). Tier 3 is the most complex level and requires detailed country-specific assumptions, methods, and data. Currently, only a few countries have the necessary information to reach this level. In practice, a country might combine different tiers to establish their emission accounting schemes cost-effectively.

The IPCC (2003) LULUCF GPG identifies three possible approaches for estimating area changes to provide activity data:

- **Approach 1** identifies the total area for each category of land - typically based on non-spatial country statistics - but does not provide information on the nature and area of conversions between land uses, in other words, it only provides 'net' area changes (i.e. deforestation minus afforestation) and thus is not suitable for REDD.

- **Approach 2** involves tracking land conversions between categories, resulting in a non-spatially explicit land use conversion matrix.

Approach 3 extends Approach 2 by using spatially explicit land conversion information, derived from sampling or wall-to-wall mapping techniques. As with the current requirements of the Kyoto Protocol, it is likely that under a REDD mechanism land use changes will have to be identifiable and traceable in the future, so it is likely that only Approach 3 can be used for REDD implementation. Only Approach 3 allows an estimation of gross-net changes within a category to detect trajectories, i.e. deforestation followed by afforestation. This is not possible with Approach 2 unless detailed supplementary information is provided (GOFC-GOLD, 2008).

GOFC-GOLD (2008) suggests that only the third approach leads to an understanding of the changes within a category. It argues that this would be the only valid approach during the implementation of a monitoring scheme for REDD. Approach 3 meets the requirements for effective measurement of emissions of forest carbon as it is able to allocate certain levels of carbon stocks to different forest types.

Forest degradation is a particularly complex issue for monitoring and accounting. GOFC-GOLD states that the lack of a clear definition of degradation, or even the lack of any definition, makes it difficult to design a monitoring system.

The GOFC-GOLD report describes the potential causes of degradation, and emphasises that before a monitoring system can be created, the impact of each form of degradation on carbon stocks needs to be assessed and quantified. Often the initial causes of degradation produce a trigger effect and feedback cycle, leading to further degradation and preventing the natural regeneration of the forest. Examples of such degradation that need to be better understood include the impacts of legal and illegal selective logging, forest fires, exploitation for fuel wood and exploitation for non-timber forest products. Although at a global level considerable research is being carried out to develop adequate monitoring systems at an affordable cost for developing countries, at the country level institutional capacity and knowledge still need to be developed in order to understand and work these systems accurately.

2.4 Reporting and accounting

An important aspect of the first commitment period of the Kyoto Protocol has been the reporting of national emissions. This provides a link between the climate change scientists on the ground, the policy makers at a national level, and the negotiators at an international level. Accurate reporting of the current status of emissions not only forms the basis on which emission reduction targets

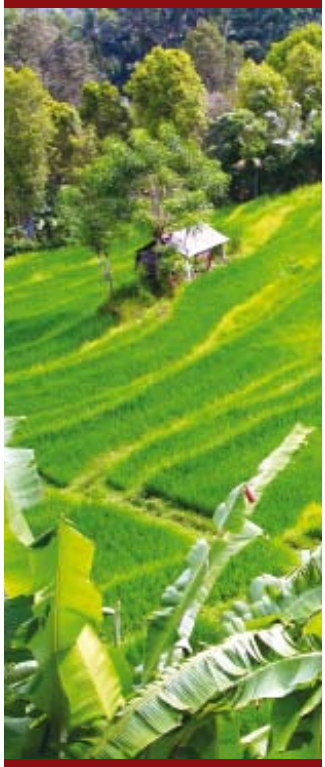
are set, but also the reference scenario for incentives to reward future action.

Under the UNFCCC, all countries (not just those with emission reduction targets) are required to report information on greenhouse gas emissions. Whereas Annex 1 Parties are required to report detailed data on an annual basis, subject to in-depth review by teams of independent experts, non-Annex 1 Parties currently report less often and in less detail, through national communications. The UNFCCC has set out five principles to define the reporting requirements: transparency, consistency, comparability, completeness and accuracy. The type and the accuracy of emission reporting varies for different Parties, but for all involved, reporting on both sources and sinks of emissions follows a set of guidelines created by the framework convention. In this way transparent and reliable data can be gathered.

The gathering of data can be divided into two main categories: reporting tables and inventory reports. For more information and explanations of the requirements see Chapter 6 of GOFC-GOLD (2008). A monitoring system for REDD is likely to fulfil the same or similar reporting requirements as those currently applied to Annex 1 Parties.

A large part of the REDD debate has focused on establishing the scale at which deforestation should be measured: at project, regional, sub-national or national scale. In the political debate most actors demand a national accounting framework to minimise the threat of activity shifting. Using a project or sub-national approach it is possible that deforestation activities simply move from one area to another without being accounted for, as the deforestation drivers are displaced. A national accounting system would allow monitoring of the overall forest change in a country, and reduce the threat of leakage due to activity shifting. This would ensure that carbon payments are only made for real and verifiable reductions in deforestation and degradation. However, even in a national accounting framework, to keep an internal check on leakage and non-permanence, governments (and project managers) will have to control the success of REDD projects at the sub-national or regional level (especially if they are subcontracted to private companies). The monitoring of activity shifting remains an important issue that must be addressed and resolved for each country. To avoid international leakage, a REDD mechanism would need to ensure broad levels of participation across developing countries.

For a REDD mechanism to be effective and credible in the reporting and accounting phase, the principle of conservativeness could be adopted whenever adequate levels of accuracy and completeness can not be achieved (Grassi et al. 2008). This might be most appropriate during the early phase, when a country's measurement and estimation systems are evolving and becoming more robust, in particular with respect to historical forest changes. In the REDD context, conservativeness means that the reduction of emissions should not be overestimated, or at least that the risk of overestimation should be minimised (GOFC-GOLD 2008). For example, if it is demonstrated that a lack of information about the soil carbon pool yields a lower estimate of emission reductions, in a conservative approach the resulting estimate should nevertheless be accepted, even if it is incomplete (Grassi et al. 2008). On the other hand, experience gained from the CDM has shown that when an estimate is characterised by high uncertainty (e.g. when a tier 1 method is used), using the lower end of a confidence interval (e.g. 50 or 95 per cent) in the accounting phase discounts the volumes of claimable carbon, thereby giving a conservative estimate. It is assumed that any REDD mechanism will apply a similar approach wherever accurate and complete data cannot be obtained. Although conservativeness is not explicitly stated as an IPCC principle, in the REDD context it may serve to boost the credibility of the mechanism, while also providing an economic incentive to increase the accuracy and completeness of data estimates (the more accurate the estimate, the fewer claimable emission reductions will be discounted). Furthermore, the conservativeness principle



will allow for a broader participation by countries that are unable to provide accurate data on all required variables, and will thereby reduce the magnitude of international leakage.

To enhance its liability and accountability it might be necessary for a REDD system to include provisions for dealing with cases of non-compliance. How this would work would depend on the design of the REDD mechanism itself. Karousakis (2007) suggests the following possible approaches:

- Introduction of a reserve (similar to the commitment period reserve under the Kyoto Protocol) and
- Buffer systems for carbon credits.

Monitoring techniques currently being developed rely heavily on probability sampling designs and the availability of suitable reference data from satellite and remote sensing imagery. The latter might not be available in many developing countries, particularly for the assessment of historical changes. Therefore, the implementation of a monitoring system for REDD should be accompanied by a continuous process of capacity building. Countries may already have useful forest data and capacities they can use to build a carbon monitoring system. However, in the long-term, many countries need further investment in capacity development alongside the establishment and maintenance of a national carbon monitoring system. These limitations on reliable monitoring and reporting of changes in forest cover and composition represent a challenge to the implementation of a REDD mechanism, but they should not be considered a barrier.

Further reading on monitoring and reporting

The most relevant document is the IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry. These guidelines can be accessed at: http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_contents.html

The requirements and procedures for measuring, monitoring and reporting emission reductions under a REDD mechanism are laid out in the GOFC-GOLD sourcebook, available at: www.gofc-gold.uni-jena.de/redd

In addition, lessons can be learnt from earlier experiences gained from afforestation and reforestation projects. The LULUCF Sourcebook, located at http://www.winrock.org/Ecosystems/files/Winrock-BioCarbon_Fund_Sourcebook-compressed.pdf is designed to enable stakeholders to understand the process of project development and the various requirements. Many similar guidelines exist, including those established by the Voluntary Carbon Standard, accessible at: http://www.v-c-s.org/afl.html

The German Umweltbundesamt (UBA) report entitled 'Emissions and removals from land-use, land use change and forestry activities in a post-Kyoto regime - quantitative analysis of a framework for reducing deforestation' contains informative sections on RLs, monitoring and reporting. This publication is available at: http://www.umweltdaten.de/publikationen/fpdf-l/3672.pdf

Chapter 4 of Meridian Institute (2009). REDD - An Options Assessment Report: www.REDD-OAR.org

2.5 Legal framework

For REDD work in practice there at least two fundamental legal prerequisites: the assignment of property titles for emission reductions and the empowerment of competent public authorities to act. As one of the tropical countries most advanced in terms of its readiness, Brazil provides interesting insights into the challenges associated with the legal framework for REDD.

Ownership of carbon emission reductions

In some countries, decisions on land use are subject to legal restrictions. In the Brazilian Amazon, for example, landowners may only cut down 20 per cent of their forests. Due to this regulation, most forests on private land are already partially protected by law. Thus, any REDD payments to farmers for not cutting down these protected forests would be controversial. Should landowners be paid for compliance with the law? The fact that most deforestation is illegal also raises concerns about the ownership of emission reductions in the country. How can somebody obtain the right to sell emission reductions if he or she did not even have the right to emit in the first place? If countries opt for a market mechanism for REDD, establishing the legal basis of carbon emission reductions is crucial.

While carbon stocks are intimately linked to territories, emission reductions are usually not. By establishing protected areas, the standing forest in these areas (the carbon stocks) can be effectively protected from devastation. Nevertheless, if agents of deforestation are mobile, like the professional and organised land grabbers of the Brazilian Amazon, they might simply turn to other, unprotected swathes of forest. Carbon emissions are not reduced, they are merely displaced - the phenomenon of activity shifting leakage. But should landowners committed to conservation be punished for the general lack of governance that causes leakage?

Legal empowerment for the State to act

In democracies governed by the rule of law, the state is only allowed to act if it is empowered explicitly by law to do so. Depending on the existing laws in the country, new laws or decrees may be required to establish the institutions it needs to host the national or sub-national financial mechanisms, build up monitoring systems or hold the rights to sell state-owned environmental services.

An additional layer of complexity is added in highly decentralised countries, such as Brazil. Here, there are currently two REDD mechanisms in place: one at federal level (the Fundo Amazônia) and one at state level, in the federal state of Amazonas (the Fundação Amazonas Sustentável). Both capture funds for REDD, the Fundo Amazônia from conditional donations, the Fundação Amazonas Sustentável from voluntary markets. Both of these funds needed a legal basis to become operational. In the case of the Fundo Amazônia it was a presidential decree, while a state law was enacted for the Fundação Amazonas Sustentável. It is not yet clear how the two will interact. There is both a risk of contradiction (for they handle the same emission reductions) and an opportunity for them to complement one another (both, horizontally in capturing funds or vertically in the execution of funds).

Developing a legal framework for REDD in Indonesia

Since 1999, Indonesia forest governance has been revamped. It is becoming increasingly community based and has made steps to recognise indigenous rights. Besides framework policies for ecosystem services, which include carbon, supporting regulations are also being developed.

Indonesia has been progressively reforming its forestry and forest management. A key piece of legislation was the government regulation 6/2007 on forest arrangements, forest management plans and forest utilisation, which also acknowledges the use of forests to deliver emission reductions. This was reaffirmed prior to and during COP 13.

Prior to COP 13, in partnership with major donors, Indonesia initiated the IFCA (Indonesian Forest Climate Alliance) process to assess the potential for REDD in Indonesia. Alongside awareness building measures, studies were carried out to investigate various policy options for Indonesia to participate in the proposed REDD mechanism. The IFCA process created the momentum for a multi-stakeholder process to discuss the complex policy and legal issues related to REDD implementation. In July 2008, the first draft of a ministerial decree was presented in a wide national public consultation event. Ministries, civil society and local governments were encouraged to air their views and make inputs. The draft addressed issues such as definitions, preconditions for REDD, the application procedure, rights and responsibilities of participants, verification and certification, reference emissions, accounting, monitoring and reporting, and payment distribution and liabilities.

The consensus building process within Indonesia to produce a comprehensive legal framework for REDD has not yet been finalised. Following the first consultation process only a ministerial decree was issued. This clarifies the Indonesian procedures for implementing 'demonstration activities' and creates a working group at the ministerial level for overseeing them. The demonstration activities are intended to test methodologies, technology and the institution of sustainable forest management aimed at reducing carbon emissions. Further regulations will be issued to establish the legal framework for implementing REDD.

Furthermore, Indonesia has committed itself to develop a market-based approach, as laid out in the Indonesian-Australian 'roadmap for access to carbon markets'. The REDD architecture will most likely involve national monitoring, but implementation will occur at the sub-national or regional level. Provisions have been made for local people and communities to participate in the scheme, as well as government-run forest management units (FMU), if the Ministry of Forestry has officially endorsed them.

THREE

HOW TO MAKE AN IMPACT

3.1 Policies

Whereas most mitigation activities affect a single economic or industrial sector, the reduction of emissions from deforestation and forest degradation involves multiple sectors (including the departments of forestry, environment, planning and agriculture). There is therefore a need for coordination between multiple levels of government. A REDD mechanism will inherently involve stakeholders at many levels, from the international and national levels, to sub-national regional and local levels. This multi-sectoral approach to addressing the underlying factors of deforestation and degradation, and thus reduce their levels, is a key challenge to successful REDD implementation. REDD must be incorporated into the forest policies of the countries involved, and become a mainstream factor of regional development policies. Landowners, communities and regional governments will have to take action (at the local level) to reduce emissions. Incentives for these emission reductions may be provided by country-level intermediaries who in turn will receive payments from international buyers (or contributors, in the case of funds) as part of either voluntary or compliance carbon markets.

While implementing a REDD strategy at national level or project level, a number of policies must be put in place and enforced during the preparatory phase. These are intended not only to ensure the success of efforts to reduce deforestation and degradation, but also to meet the growing demand for timber resources through the sustainable production and management of both natural and plantation forests. Policies are also needed that provide for capacity building among the populations affected by the changing uses of forest resources and their fair and equitable distribution. This is usually stressed by funding agencies.

Clearly defined land tenure is a key to successful REDD implementation. In many developing countries, poorly defined land tenure may lead to perverse incentives for accelerated and inequitable use of forest resources, or it might at least create a disincentive from sustainable land use

If policies related to the commercial interests in natural forests are unclear, and if they do not take into consideration payments for environmental services such as carbon, they encourage the continued unsustainable removal of timber resources. Such policies often contradict and hamper conservation because of the considerable revenues that accrue from commercial logging. However, such policies only stimulate short-term revenues, so they often provide perverse incentives for the rapid removal of forest resources, which reduces the likelihood of natural re-growth and shortens the period during which the forest can be economically productive. To contribute to a national REDD strategy, policies must be enacted which ensure that only sustainable harvesting occurs. This means that a certain volume of harvesting of timber resources may occur in the short term if the continued long-term productivity of the forest can be guaranteed. The adequate enforcement of policies for sustainable forest management and forest conservation will play a major role in implementing REDD effectively at national level.

A REDD mechanism requires that actions be taken at the national level to establish reference levels and methodologies, and to deal with international actors. It is therefore important to differentiate between the responsibilities incurred by the national level for setting the measurement and reference levels, and those at the local level where activities will actually occur. A REDD mechanism must involve a combination of local and national level activities or projects, the sum of which, together with ongoing deforestation and degradation, will yield a positive or

negative overall national performance. Options currently exist for a project-based approach in the voluntary market. Such pilot projects enable direct transactions between international buyers and sub-national project developers. They play an important role in testing both the prototype methodologies and the institutional capacity of the countries involved. However, they will have to be included in the national accounting once REDD is formally in place, since a carbon credit may not be sold twice. A national approach also recognises the large-scale policy changes that are required at both the national and sub-national levels in order to reduce the underlying drivers of deforestation effectively. Implementation must take place at the sub-national or local level, but the sum of the local-level activities should add up to a positive result at the national level.

Countries can target the drivers of deforestation while at the same time maintaining their revenue from the forestry sector by encouraging investment in the development of sustainably managed forests. From 2005 to 2006, only seven per cent of tropical timber originated from sustainably managed forest resources (ITTO 2006). Such forests have the potential to meet the future growing demand for high quality timber, and by doing so can reduce the pressure on the remaining natural forests. Moreover, growing new forests has the additional benefit of carbon sequestration. By ensuring that these plantations meet the highest standards of environmental integrity, through certification schemes such as the Forest Stewardship Council (FSC), the impacts of forest degradation will be reduced.

At the national level, governments will then implement systems for monitoring, reporting and verification. They will also be individually responsible for the implementation of policies and measures to address context-specific deforestation. Where appropriate, these policies and measures will then include systems to provide credits or financial incentives to local communities at the sub-national level (Angelsen 2008).

In some cases, simply introducing or enforcing policies such as those described here will contribute significantly to reduced rates of deforestation. In other cases, it will be necessary to combine the policy with a financing mechanism.

Further reading

The documentation of pilot projects provides a useful benchmark for future project development. Pilot projects conforming to the Community, Conservation & Biodiversity Standards can be viewed at: www.climate-standards.org

Examples of projects that have been set up at the sub-national level include the Noel Kempff Climate Action Project http://www.fan-bo.org/en/cambio-climatico-proyectos-pacnk.php, the Ulu Masen REDD Project in Indonesia http://www.fauna-flora.org/news_ulumasen2.php and the Juma REDD project Brazil http://www.fas-amazonas.org/en/index.cfm?fuseaction=noticia&id=58

The Centre for International Forestry Research (CIFOR) has numerous publications on REDD and the implications it has for policy makers: http://www.cifor.cgiar.org/Events/COP-Forests+and+Climate+Change/cifor_redd_paper.htm

Different stakeholders have different objectives for and requirements of a REDD mechanism. The Forests Dialogue (www.theforestsdialogue.org) has convened a diverse group of more than 250 stakeholders from all aspects of the forest community, and has agreed upon a set of key messages. These messages have been made available on the TFD website and form a set of guiding principles.

3.2 Good governance

Deforestation is a complex issue that is strongly defined by its specific context. It has a multitude of economic, socio-political, demographic and environmental causes. As well as regulating the global climate, forests also provide ecosystem services, such as the regulation of local

and regional rainfall patterns, the provision of forest foods and non-timber forest products, and the harbouring of high levels of global biodiversity. More than 350 million people live in and are dependent on tropical forests. The Millennium Ecosystem Assessment classifies forest services into resources, social services, ecological services, amenities and biosphere services (MEA 2005). More than 90 per cent of the world's population that currently survives on less than USD 1 per day are dependent on forests for their livelihoods, using resources such as firewood, food, medicinal plants and shelter.

Turning forest carbon into a commodity has huge potential for inequity. In some cases, it discriminates against communities who previously had free access to a forest's resources. Therefore, a deforestation avoidance scheme must not only address the climate benefits, but also ensure the improvement of livelihoods of these forest-dependent communities. Often, such communities cannot afford to buy forest products or alternatives when access to the forest resource is restricted, especially where land rights are unclear (Ravels 2008). A major concern during the discussions about REDD has been that by ascribing a monetary value to forest carbon, even if the vegetation is conserved, the rights to land and to the use of resources previously enjoyed by indigenous people may be forfeited, or that the forest communities may not receive an equitable share of financial flows (Hare & Macey 2008). Furthermore, if decision-making remains top-down, new conflicts could arise among indigenous and local communities, and between them and the state.

Nonetheless, if the right infrastructure is put into place in advance, with financial benefits flowing down to stakeholders at all levels, then carbon forestry activities can provide significant co-benefits in addition to their climate (mitigation) benefits. Common issues from recent decades for forest-dependent communities can be addressed, such as alleviating poverty while protecting biodiversity and high conservation value forests. Standards, such as those proposed by the Climate, Conservation, Biodiversity Alliance (CCBA), have already evolved to measure these co-benefits of emission reduction projects (CCBA 2009). Measurement of them must be built into a REDD mechanism.

Therefore, for a REDD mechanism to be successful, good governance and transparent financial mechanisms are required of the stakeholders at every level. This includes maintaining systems to ensure:

- recognition of land tenure and forest user rights, including the rights of indigenous peoples and local communities,
- provision of alternatives for sustainable economic development,
- promotion of sustainable forest management practices and certification,
- better enforcement of regulations within protected areas,
- integration of REDD schemes into sector-wide approaches and processes such as national forest programmes and
- compatibility with overarching government strategies and policies, including poverty reduction and biodiversity conservation.

Working with the Juma Sustainable Development Reserve, a pilot REDD project in the federal state of Amazonas, the Brazilian Bolsa Floresta programme has set up a system to secure the flow of payments. It has also established management plans and frameworks, within which investments can be made at the local level. This Brazilian example highlights the need for such systems to be put in place,

from the top down, while also remaining responsive to the needs of people on the ground. This should form a considerable part of any country's REDD preparations before it may become involved.

Further reading

The role of forest dependent people is comprehensively assessed in Peskett et al. (2008):

http://www.odi.org.uk/ccef/resources/reports/s0179_redd-_final_report.pdf

3.3 Incentive payments

The creation of a system for incentive payments can be based on lessons learnt elsewhere in the environmental field. The carbon potential in the forestry sector will depend largely on the degree to which climate protection and ancillary benefits are aligned. The scale of this potential will increase as carbon prices rise, driven by ambitious emission reduction targets, and buoyed by the political will to include forestry activities in mitigation portfolios. The mechanisms by which the payments and the associated benefits are distributed remain a major concern.

The distribution of payments from either a fund or a market-based REDD mechanism to the various actors involved requires institutional capacity inside the host country. Ideally, REDD payments should be made directly to the forest owners. However, in many countries forest resources are owned by the state. Therefore, although REDD payments could be made directly to governments, there must be a transparent and equitable instrument to ensure that forest-dependent communities benefit directly from the maintenance of their resources.

As well as learning from pilot projects in the forest sector, much can be gained from the experiences of projects involved in the payment of environmental services (PES), which also involves the distribution of financial incentives. Karousakis (2007) suggests that any REDD mechanism should learn from the valuable lessons provided by PES case studies, which have undertaken the direct compensation of landowners for the maintenance of their forest resources. Initial experiences with PES in Indonesia have shown that incentives have the potential to change the behaviour of the actors and agents who are jointly responsible for the 'business as usual' scenario (Suyanto et al. 2005). Incentives will work only if formal and indigenous rights remain relevant, and where they can induce actions that bring benefits for (or prevent others from harming) current or future generations. Thus, to deliver goods and services derived from the landscape, incentives may interact with current contests over rights and local interests to exploit resources. The expectation of incentives might either increase conflict or become the basis for a 'new deal' that provides net benefits to all over the contested status quo. Such a 'new deal' can only work if all the agents of 'business as usual' feel there is sufficient reason to change their behaviour: driven by a changed economic rationale, voluntarily, or through the enforcement of new standards and rules.

The issue of permanence has been a major concern amongst REDD negotiators. Entering into a REDD agreement requires forest landowners to commit to a time period to maintain their standing forests and thus the carbon stored within them. Even a short-term commitment to avoid emissions would provide a timeframe in which to develop low carbon economies and alternative technologies (buying time). To ensure there is permanence, the underlying factors of deforestation must be addressed. In areas where forest-dependent communities play a key role,

incentive schemes must be created that ensure sustainable economic development can be achieved without a reliance on over-exploitation of the forest resource.

It has been recognised that even as a short to medium-term strategy (e.g. 30 years), REDD has the potential to contribute significantly to reducing the threats of climate change, and that it can provide a bridging mechanism while the world moves into a low carbon economy. However, due to the dangers of non permanence, and the difficulty of payment distribution, the issue of risk and liability has been a strong theme throughout the REDD discussions. Forests are under threat from both natural and anthropogenic influences. While a financial incentive scheme has the potential to curb anthropogenic pressures, such as infrastructure development, conversion to agriculture, and illegal logging, natural threats such as pest outbreaks, disease and fire have the potential to release the carbon stored in the forest reserves. Under a bilateral agreement between the host country and the buyer of the stored carbon, it is very important to decide who bears the risk of such events.

Further reading

The inclusion of indigenous people, issues of equity and aspects of sustainable development have caused significant concern during the REDD discussions. As a result, a number of forums are now dedicated to this topic: http://www.ias.unu.edu/sub_page.aspx?catID=732&ddlID=731, http://www.climatefrontlines.org/en-GB, http://www.redd-monitor.org

Poverty Environment Partnership (PEP); Making REDD work for the poor: http://www.povertyenvironment.net/pep/?q=making_redd_work_for_the_poor_october_2008_draft

Many NGOs and organisations traditionally working in the social sector have also become involved in REDD. Many documents link sustainable development objectives to a REDD framework. Chapter 11 of Brown, Seymour and Peskett's Moving Ahead with REDD: Issues, options and implications, entitled 'How do we achieve REDD co-benefits and avoid doing harm?' explains the issues that governments and project developers must address to ensure that forest-dependent communities benefit, while national objectives are met.

3.4 Current standards that matter

Forest biodiversity is sometimes seen as a 'co-benefit of REDD', which means that by avoiding deforestation the biodiversity sheltered by forests is protected as well. Forest biodiversity itself, however, can be pivotal to the sustainability of REDD measures.

Climate change is already happening, and this affects forest ecosystems. Water balances are influenced by changes in precipitation and temperature, and by extreme weather phenomena, which all have the potential to change the composition and natural range of forest ecosystems. Forests with high levels of biological diversity have the greatest potential to adapt successfully to these effects of climate change. The pool of possible adaptive measures is directly linked to the range of species and genomes available. So, how can the adaptive potential of forest biodiversity be linked to REDD measures? The answer is not easy because forests with higher biodiversity are not necessarily those with a high carbon storage capacity or the greatest climate protection impact. In principle, the selection of forest areas to be protected under a REDD regime should take into account the biodiversity of forests as an additional criterion. Here too, existing forest carbon standards, such as those maintained by the Climate, Community and Biodiversity Alliance, can be a helpful tool.

For several decades now, the promotion of sustainable forest management (SFM) has been the main field for the elaboration, refinement and implementation of an

Forest Carbon Standards

The Voluntary Carbon Standard (VCS) is designed to standardise carbon offset projects on the voluntary market, and provide them with transparency and credibility. It is intended to increase consumer confidence in the development and ownership of credits and to enhance external investment in the field. In its list of eligible project activities the VCS includes agriculture, forestry and other land uses (AFOLU), and it takes a new and unique approach to managing non-permanence risks. Currently REDD is one of four categories of eligible AFOLU project activities (VCS 2009):

Afforestation, reforestation and re-vegetation (ARR)

Agricultural land management (ALM)

Improved forest management (IFM)

Reducing emissions from deforestation and degradation (REDD)

The Climate, Community and Biodiversity Alliance (CCBA) is a partnership between leading companies, NGOs and research institutes seeking to promote integrated solutions to land management around the world. The CCBA has developed its voluntary standards to help design and identify land management projects that simultaneously minimise climate change, support sustainable development and conserve biodiversity (CCBA 2009). The CCBA standards are design standards that were evolved for use in conjunction with a carbon standard such as the VCS above. Their purpose is to ensure the transparency and credibility of additional environmental and social benefits of land use projects.

array of important measures addressing the drivers of deforestation and forest degradation. In the internationally agreed definition of SFM, as cited in the UN's non-legally-binding instrument on all types of forests (NLBI), it is stated that 'SFM as a dynamic and evolving concept, aims to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of present and future generations.' (United Nations General Assembly 2008; http://www.un.org/esa/forests/pdf/session_documents/unff7/UNFF7_NLBI_draft.pdf).

This broad concept is further detailed in the NLBI as a set of national, regional and international measures that can be applied to promote SFM. Among other, these include:

- the promotion of forest law enforcement and governance (FLEG),
- the development and implementation of national forest programmes (NFPs), which are elaborated in a participatory manner and reflect national situations and priorities,
- the development of financing strategies for achieving SFM,
- addressing threats to forest health and vitality such as forest fires, pests and diseases and
- the effective establishment of protected forest areas.

The NLBI supports the achievement of the four global objectives on forests, which are fully in line with the aim of REDD and international forest-related commitments:

Global objective 1

Reverse the loss of forest cover worldwide through sustainable forest management, including protection, restoration, afforestation and reforestation, and increase efforts to prevent forest degradation.

Global objective 2

Enhance forest-based economic, social and environmental benefits, including by improving the livelihoods of forest dependent people.

Global objective 3

Increase significantly the area of protected forests worldwide and other areas of sustainably managed forests, as well as the proportion of forest products from sustainably managed forests.

Global objective 4

Reverse the decline in official development assistance for sustainable forest management and mobilise significantly increased, new and additional financial resources from all sources for the implementation of sustainable forest management.

The promotion of SFM conforms fully with the REDD objectives of avoiding deforestation and forest degradation as a way of reducing GHG emissions. A REDD mechanism should exploit lessons learned from efforts to promote SFM, and should therefore benefit from synergies with the implementation of SFM and the NLBI.

Further reading on standards for REDD

The Voluntary Carbon Standard: www.v-c-s.org

The Climate, Community and Biodiversity Alliance: http://www.climate-standards.org/

The NLBI was negotiated at the UN Forum on Forests (UNFF) and adopted by the UN General Assembly. It also promotes the implementation of 270 Proposals for Action towards sustainable forest management agreed by the Intergovernmental Panel on Forests (IPF) and the Intergovernmental Forum on Forests (IFF). All relevant background information about the work of the Forum and the NLBI can be found here: http://www.un.org/esa/forests/about.html . COP 9 of the Convention on Biological Diversity (CBD) has decided to put more emphasis on the relationship between climate change and biodiversity to reflect their two-way influence: the impact of climate change on biodiversity, as well as the contribution biodiversity makes to climate change adaptation. The CBD-webpage contains all the relevant information: http://www.cbd.int/climate/

3.5 The economics of REDD

There is still considerable discussion as to whether a REDD mechanism should be fund-based or market-based. In the case of a fund-based mechanism, the problem lies in assessing the levels of funding required, as is reflected in the widely varying current estimates of financing needs (Karousakis & Corfee-Morlot 2007). The various drivers of deforestation will be associated with widely varying opportunity costs. In addition, there are inherent hurdles with fund management: the establishment of an international fund under UNFCCC may require years of negotiation to define terms, decide on the appropriate institution, and agree on equitable distribution. The sheer size of the required fund is also an important consideration: how can the necessary funds be sustained in the long term to secure sufficient financial flows to sustain a REDD mechanism? In contrast, a market-based mechanism would have the advantage of mobilising the private sector while ensuring that the most cost-effective emission reductions would occur first.

The direct costs of purely forest-related GHG emissions are projected to reach USD 1 trillion by 2100 (Eliasch 2008). This figure only includes costs arising from the impact of climate change; it does not include the costs of losing other ecosystem services and functions. Braat & Brink (2008) estimate that the costs of lost forest ecosystem services are more than EUR 1.35 trillion per year.

In view of these figures, REDD is an attractive option for climate change mitigation, as the associated costs of implementation are expected to be relatively low, compared to other emission reductions. For example,

Kindermann et al. (2008) estimate that the costs of achieving emission reductions from avoided deforestation would range from USD 1.47-20.56 per tCO_2e.

Although the Stern Review reports that the direct revenue per tCO_2-e of land cleared through large-scale deforestation for timber or agricultural expansion is around USD 1 in most developing countries, once export tax and other incentives are added, this value could rise to around USD 30 per tCO_2-e. The review estimates that once a system is in place, annual carbon payments for REDD could reach USD 10 billion. However, the cost of REDD will vary greatly from region to region, depending on the price of land and the opportunity costs of foregoing deforestation. The FCPF's Readiness Mechanism is designed to enable a number of developing countries to develop the capacity they need to calculate the opportunity costs of implementing a national-level REDD scheme. The results of this phase would then be used for designing an appropriate REDD strategy that takes country priorities and constraints into account (FCPF 2009). Early studies indicate that the required price per tCO_2-e to meet target reductions with REDD vary considerably depending on the region. Estimates suggest that the break-even prices are approximately EUR 10 per tCO_2-e in Africa, EUR 30 per tCO_2-e in South America and EUR 60 per tCO_2-e in Southeast Asia (Karousakis 2007). Others (e.g. Laporte et al. 2007) argue that costs in Africa may be higher because of the large number of individual beneficiaries such as small farmers. In general, the costs may depend more on alternative land use opportunities than on location. Even if regions can be categorised according to the costs and benefits of measures, the lack of readiness may be a more decisive factor.

Forestry and land use projects differ from emission reduction efforts in other sectors as they have the potential to bring additional biodiversity and social co-benefits. These benefits should be valued and given a price premium. The Climate, Community and Biodiversity Alliance (CCBA) standards were created to measure and certify these benefits.

Further reading

The Eliasch Review, Chapter 12, describes the governance and the distribution of finance of forest carbon.

In addition to the Eliasch Review, the following documents can be used for an overview of the economics and potential for REDD:

Chapter 3 'What are the costs and potentials of REDD?' by Lubowski, in Moving ahead with REDD: issues, options and implications.

The Collaborative Modelling Initiative on REDD Economics aims to provide relevant economic information to support UNFCCC negotiations on REDD. ***http://www.conservation.org/osiris/Pages/overview.aspx***

The IUCN's economic programme releases regular publications addressing payments for ecosystem services. This includes forest carbon and REDD, and can be found at: ***http://www.iucn.org/about/work/programmes/economics/***

The Union of Concerned Scientists has prepared briefing documents on the economics of REDD: ***http://www.ucsusa.org/assets/documents/clean_energy/Briefing-1-REDD-costs.pdf*** *and* ***http://www.ucsusa.org/assets/documents/global_warming/UCS-REDD-Boucher-report.pdf***

Further documents from UCS: ***http://www.ucsusa.org/global_warming/solutions/forest_solutions/REDD.html***

REFERENCES

Achard F., Eva H., Stibig H., Mayaux P., Gallego J., Richards T. and Malingreau J.P. (2002). Determination of Deforestation Rates of the World's Humid Tropical Forests. Science Vol. 297. no. 5583, pp. 999 - 1002

Angelsen, A. (ed.) (2008). Moving ahead with REDD: Issues, options and implications. CIFOR, Bogor, Indonesia.

Asner, G. P., Knapp, D.E., Broadbent, E. N., Oliveira, P.J.C., Keller, M. and Silva, J.N. (2005). Selective Logging in the Brazilian Amazon, Science, Vol. 310. pp. 480 - 482

Brown D., Seymour F. and Peskett L. (ed.) (2008). Moving Ahead with REDD: Issues, Options and Implications, CIFOR, Bogor Indonesia

Canadell J. and Raupach M. (2008). Managing Forests for Climate Change Mitigation. Science, Vol 320.

CCBA accessed Jan 2009: www.climate-standards.org/

Chomitz K. (2007). At Loggerheads? Agricultural expansion, poverty reduction and environment in tropical forests. World Bank Report.

Dooley K., Griffiths T, Leake H and Ozinga S. (2008). Cutting Corners: World Bank's forest and carbon fund fails forests and people.

Dutschke M. and Wolf R. (2007). Reducing Emissions from Deforestation in Developing Countries: The way forward. GTZ Climate Protection Programme

Eliasch J. (2008). Eliasch Review: Climate Change - financing global forests

Ravels (2008). REDD myths: a critical review of proposed mechanisms to reduce emissions from deforestation and degradation in developing countries. Friends of the Earth publication

Geist and Lambin (2002). What drives tropical deforestation? A meta-analysis of proximate and underlying causes of deforestation based on sub-national case study evidence. LUCC Report Series No.4, 2002

GOFC-GOLD (2008). Reducing greenhouse gas emissions from deforestation and degradation in developing countries: a sourcebook of methods and procedures for monitoring, measuring and reporting. GOFC-GOLD Report version COP13-2. GOFC-GOLD Project Office, Natural Resources Canada, Alberta, Canada.

Grassi, G., Monni, S., Federici, S., Achard, F. and Mollicone, D. (2008). Applying the conservativeness principle to REDD to deal with the uncertainties of the estimates. Environmental Research Letters (3), p. 12.

Hare B. and Macey K. (2008). Tropical Deforestation

Emission Reduction Mechanism: A discussion paper. Greenpeace.

Herold (2008). Emissions and removals from land-use, land use change and forestry activities in a post-Kyoto regime - quantitative analysis of a framework for reducing deforestation

http://www.bgc-jena.mpg.de/~mhuettner/UBA-Report.pdf

ITTO (2006). Status of Tropical Forest Management 2005, International Tropical Timber Organisation, Technical Series No. 24.

Laporte, N., F. Merry, A. Baccini, S. Goetz, J. Stabach, and M. Bowman (2007). Reducing CO_2 Emissions from Deforestation and Degradation in the Democratic Republic of Congo; Woods Hole Research Center, Falmouth, MA.; http://www.whrc.org/resources/published_literature/pdf/WHRC_REDD_Congo.pdf

Parker C., Mitchell A., Trivedi M and Mardas M. (2008). The Little REDD Book. Global Canopy Foundation

Karousakis K. (2007). Incentives to Reduce GHG Emissions from Deforestation: Lessons learned from Costa Rica and Mexico. OECD / IEA

Karousakis K & Corfee-Morlot J. (2007). Financing Mechanisms to Reduce Emissions from Deforestation: Issues in Design and Implementation. OECD / IEA

Karsenty et al. (2008). Summary of the Proceedings of the International Workshop 'The International Regime, Avoided Deforestation and the Evolution of Public and Private Policies Towards Forests in Developing Countries' held in Paris, 21-23rd November 2007

Kerr, S., Hendy, J., Liu, S. and Pfaff, A. S. P. (2004). Tropical Forest Protection, Uncertainty, and the Environmental Integrity of Carbon Mitigation Policies. Motu Working Paper 04-03.

Locatelli B., Kanninen M., Brockhaus M., Colfer C., Murdiyarso D. and Santoso H. (2008). Facing an uncertain future: How forests and people can adapt to climate change. Forest Perspectives No. 5. CIFOR

Meridian Institute (2009). REDD - An Options Assessment Report (www.REDD-OAR.org)

Millennium Ecosystem Assessment (2005). Ecosystems and Human Wellbeing: Current State and Trends, Volume 1, Island Press, New York

Nepstad, Daniel C., Stickler, Claudia M., Almeida, Oriana T. (2006). Globalization of the Amazon Soy and Beef Industries: Opportunities for Conservation, 1595-1603, Conservation Biology, Vol.20, Nº6.

ONF International (2008). Reducing emissions from deforestation and forest degradation (REDD)

Analysis of 7 outstanding issues for the inclusion of tropical forests in the international climate governance.

Papua New Guinea (2009). Submission by Parties to the UNFCCC Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA) (7 May 2009)

http://unfccc.int/files/kyoto_protocol/application/pdf/papuanewguinea070509.pdf

Parry M., Canziani O. and Palutikof J. (2007). Contribution of Working Group II to the fourth assessment report of the Intergovernmental Panel on Climate Change, 23-78. Cambridge University Press, Cambridge, UK.

Presidência da República (2003). Plano de Ação para a Prevenção e Controle do Desmatamento na Amazônia Legal.

Rudel, T. K., Coomes, O. T., Moran, E., Achard, F., Angelsen, A., Xu, J. and Lambin, E. (2005). Forest transitions: towards a global understanding of land use change. Global Environmental Change (15 (2005)), pp. 23-31.

SBSTA (2008). Climate Change Financing - Fresh Resources for Sustainable Land Management or Relabelling? Background and account of discussions by an expert panel at a side-event to the 28th Session of the UNFCCC Subsidiary Body for Scientific and Technological Advice (SBSTA), Bonn, 2008

Stern (2006). Stern Review on The Economics of Climate Change http://www.occ.gov.uk/activities/stern.htm

Suyanto S., Leimona B., Pandu Permana R. & and Chandler F. (2005). Review of the Development of Environmental Services Market in Indonesia

UNFCCC REDD web platform (http://unfccc.int/methods_science/redd/items/4531.php)

United Nations (2008). Resolution 2007/40 on a 'Non-legally binding instrument on all types of forests' adopted by the General Assembly. New York. http://www.un.org/esa/forests/nlbi-call.html

VCS (2009). Voluntary Carbon Standard website, accessed March 2009: www.v-c-s.org

WWF (2008). Green Carbon Guidebook

IMPRINT

Editor
Deutsche Gesellschaft für
Technische Zusammenarbeit (GTZ) GmbH
Climate Protection Programme
Postfach 5180
65760 Eschborn / Germany
T +49 61 96 79 – 0
F +49 61 96 79 – 1115
http://www.gtz.de/climate

Responsible
Reinhard Wolf

Team of Authors
Silvestrum
www.silvestrum.com

Production
Michael Wahl

Design
Additiv. Visuelle Kommunikation
Berlin

Photos
P. 9 Jan Braackmann - Fotolia.com
P.11; 21: Karin Desmarowitz, agenda fototext
P.15: Tim Reinhart - Pixelio.de
P.17: Jörg Böthling, agenda fototext
P. 19: Siegfried Schnepf - Fotolia.com
P. 25: MAXFX - Fotolia.com
P. 29: RCsolutions - Fotolia.com
P. 31 Joe Gough - Fotolia.com

Printed by
RT Druckwerkstätten
Mainz

Eschborn, November 2009

Deutsche Gesellschaft für
Technische Zusammenarbeit (GTZ) GmbH

– German Technical Cooperation –

Climate Protection Programme

Dag-Hammarskjöld-Weg 1-5
65760 Eschborn/Germany
T +49 61 96 79-0
F +49 61 96 79-11 15
E info@gtz.de
I www.gtz.de