

3 Harnessing Forests for Climate Change Mitigation through REDD+

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Abstract: Deforestation, forest degradation, and land-use change are a major source of carbon emissions. The Copenhagen Accord recognised the crucial role of reducing emissions from deforestation, emphasized the role of forests in climate change mitigation, and called for the immediate establishment of a REDD+ mechanism. Most likely, it will form an integral part of the future climate change regime. For many developed countries, REDD+ seems to be an attractive option to achieve part of their reduction targets through investments in developing countries. For some developing countries, this offers an additional source of financing to support sustainable forest management and to boost their development plans and poverty-reduction strategies. This paper analyses the challenges and major gaps that developing countries are facing when planning their national strategies for the implementation of REDD+ schemes. We conclude that REDD+ as a climate change mitigation instrument will only be able to proceed at a pace that allows the meaningful participation of all relevant stakeholders in consensus-building. When the REDD+ enters the markets, the rights of local communities to forest land and carbon will need to be clarified and secured. Successful implementation of REDD+ will, in most cases, require strengthening the stake of local communities for managing their forest carbon assets and allowing them to benefit fully from emerging carbon markets and other funding schemes. Governments will need to renew their institutions and adopt new approaches to handle these challenges by including the role of forests in climate change mitigation as an integral part of their development plans and policies.

Keywords: deforestation, degradation, REDD, carbon sequestration, carbon markets, climate change, policy, negotiation



3.1 Introduction

Deforestation, forest degradation, and land-use change are a major source of carbon emissions. The Intergovernmental Panel on Climate Change (IPCC) estimates that 1.6 billion tonnes of carbon are released annually due to land-use change, of which the major part is traced to tropical deforestation (Denman et al. 2007). The forestry sector represents about 15–20% of current global carbon emissions (IPCC 2007, Houghton 2008, Werf 2009), which is more than what comes from the fossil fuel-intensive global transport sector.

The Stern Review (2006) emphasises the preven-

tion of further deforestation as one of four “key elements” of future international climate frameworks. The arguments for inclusion of forests in a future climate agreement are that (a) the forestry sector is the second largest anthropogenic source of carbon dioxide (CO₂) to the atmosphere, after fossil fuel combustion, but avoided deforestation is not included in the Kyoto Protocol, and (b) the costs of reducing emissions from forests compare favourably with most other sectors (Kanninen et al. 2007, Lubowski 2008, Werf 2009).

Reducing emissions from deforestation and forest degradation is not only a question of volume or cost, it is also a question of timing. Recent results show the urgency of action in avoiding dangerous

Box 3.1 Forest-related issues in the Copenhagen Accord

In December 2009, the Copenhagen Accord was agreed to by 25 nations attending the UN Framework Convention on Climate Change Conference of the Parties (COP15) in Copenhagen. The 193 countries at COP15 agreed to “take note” of the Accord. As of April 2010, 113 countries have aligned themselves with it. The Accord reflects the status of understanding on major issues that were discussed and negotiated at COP 15. In the following, we present relevant paragraphs of the Accord dealing with forests:

6. We recognize the crucial role of reducing emission from deforestation and forest degradation and the need to enhance removals of greenhouse gas emission by forests and agree on the need to provide positive incentives to such actions through the immediate establishment of a mechanism including REDD-plus, to enable the mobilisation of financial resources from developed countries.
 8. Scaled up, new and additional, predictable and adequate funding as well as improved access shall be provided to developing countries, in accordance with the relevant provisions of the Convention, to enable and support enhanced action on mitigation, including substantial finance to reduce emissions from deforestation and forest degradation (REDD-plus), adaptation, technology development and transfer and capacity-building, for enhanced implementation of the Convention. The collective commitment by developed countries is to provide new and additional resources, including forestry and investments through international institutions,
- approaching USD 30 billion for the period 2010 to 2012 with balanced allocation between adaptation and mitigation. Funding for adaptation will be prioritised for the most vulnerable developing countries, such as the least developed countries, small island developing States and Africa. In the context of meaningful mitigation actions and transparency on implementation, developed countries commit to a goal of mobilizing jointly USD 100 billion dollars a year by 2020 to address the needs of developing countries. This funding will come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources of finance. New multilateral funding for adaptation will be delivered through effective and efficient fund arrangements, with a governance structure providing for equal representation of developed and developing countries. A significant portion of such funding should flow through the Copenhagen Green Climate Fund.
9. To this end, a High Level Panel will be established under the guidance of and accountable to the Conference of the Parties to study the contribution of the potential sources of revenue, including alternative sources of finance, towards meeting this goal.
 10. *We decide that the Copenhagen Green Climate Fund shall be established as an operating entity of the financial mechanism of the Convention to support projects, programme, policies and other activities in developing countries related to mitigation including REDD-plus, adaptation, capacity-building, technology development and transfer.*

climate change (Smith et al. 2009). According to the projections, global greenhouse gas (GHG) emissions should start decreasing by 2015, at the latest. Forests provide a unique opportunity for early emission reductions at relatively low cost. Because tropical forests are disappearing fast and are under threat from the changing climate, this cost-effective opportunity for reducing emissions is available now, but it may be lost soon.

During the two years of negotiations starting in Bali in 2007, and leading up to Copenhagen COP15 (fifteenth session of the Conference of the Parties), the issue of “avoided deforestation” raised interest and gained momentum – and changed its name three times from RED to REDD, and finally to REDD+. Although COP15 was not able to conclude with agreements on successor arrangements to the Kyoto Protocol, or to further commitments of Parties under

the Convention (including as relates to mitigation, adaptation, finance, technology transfer, and capacity building), the text that did emerge from COP15 – the Copenhagen Accord (see Box 3.1) – recognised the crucial role of reducing emissions from deforestation and enhancing removal of greenhouse gases from the atmosphere by forests, and called for the immediate establishment of a REDD+ mechanism. Most likely, they will form an integral part of the future climate change regime.

For many developed countries, REDD+ seems to be an attractive option to achieve part of their reduction targets through investments in developing countries. For some developing countries, this offers an additional source of financing to support sustainable forest management and to boost their development plans and poverty-reduction strategies. Now, REDD+ cannot be seen as solely mitigating

excessive carbon in the atmosphere; REDD+ should also further the permanent preservation of forested ecosystems and provide sustainable income for some of the world's poorest people. Effective emission reduction, efficient cost of implementation, and equitable sharing of benefits are not enough. REDD+ should generate co-benefits, including among others, conserving biological diversity, regulating water regimes, and eradicating poverty. But REDD+ competes with a multitude of interests inside and outside the forest sector. REDD+ happens in specific national circumstances, specific national governance conditions, and in an existing institutional multi-level landscape shaped by actors, interests, and development objectives.

What are the challenges related to all this? How can we stop deforestation and forest degradation now, especially if we look at all the efforts during the past 40 years and more, which, basically, have failed? Will REDD+ incentives be sufficient to stimulate afforestation, forest restoration, and forest conservation at significant scales? Is REDD+ a game changer? This paper analyses the challenges and major gaps that developing countries are facing when planning their national strategies for the implementation of REDD+ schemes.

3.2 What is REDD+?

The central idea behind REDD+ is to achieve reductions of greenhouse gas emissions from deforestation and forest degradation, and increased removals of GHGs from the atmosphere by forests in developing countries through a set of mechanisms that allow fewer forests to be converted to other uses, more existing forests to be protected and managed in a way that conserves forest carbon stocks, and through policies and measures that increase forest carbon stocks through restoration and other activities.

In terms of policies, a national REDD+ scheme can deploy various policy instruments to achieve its goals, among which could be: (a) reform of sectoral policies in forestry, agriculture, energy, and other sectors in order to reduce deforestation and forest degradation, and broader cross-sectoral reforms like tenure, decentralisation, etc. to enable REDD+; (b) introduction of performance-based payments for carbon sequestration services, i.e., to pay forest owners and users to reduce emissions or increase carbon sinks; and (c) development of national programs for promoting various REDD+ actions.

The thirteenth session of Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC) in Bali in 2007 approved the “Bali Action Plan,” which defined REDD (Reduced Emissions for Deforestation and

Forest Degradation) as:

... policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries (UNFCCC Decision 2/CP.13–11).

Since Bali, the discussion on REDD has evolved, and the term REDD+ was coined in the negotiations leading to Copenhagen in 2009. REDD+ can be considered as a broad “umbrella term” for actions that reduce emissions from deforestation and forest degradation, and enhance forest carbon stocks in developing countries (REDD+) (Angelsen et al. 2009).

The draft text on REDD+ that emerged from Copenhagen from the discussions of the Ad-hoc Working Group on Long Term Cooperative Action under the Convention, in one of the parallel negotiations, specifies five types of actions considered to be included under REDD+. The first two are the two “original” REDD actions of (1) reducing emissions from deforestation, and (2) reducing emissions from forest degradation, and three others representing the “+”: (3) conservation of forest carbon stocks, (4) sustainable management of forests, and (5) enhancement of forest carbon stocks.

Carbon stocks (C) in forests, or in any land use, can be estimated by two variables: (i) area of forest in concern (A); and (ii) carbon stock density per unit area (D) (IPCC 2000 and 2003, Kauppi et al 2006). Thus $C = A \times D$. Emissions from deforestation and forest degradation, or their reduction, are estimated either as the difference of carbon stocks at two moments in time (stock-change approach), or as an estimate the net balance of additions to and removals from a carbon pool (gain-loss approach) (IPCC 2006). In simplistic terms, the REDD+ actions are aimed both at changes in forest area (A) and in carbon stocks of forests (D). In practice, the five REDD+ actions described above can be implemented in various ways that affect both the forest area and the carbon stock density per unit area, separately or simultaneously, as described in Table 3.1.

The actions described in Table 3.1 are only illustrative examples of different kinds of activities that could be implemented under a REDD+ scheme. They are not mutually exclusive. For instance, the control of forest fires – mentioned in the table under forest degradation – can be an effective and efficient, and often a necessary, management tool for reducing emissions also in forest management, forest conservation, and enhancement of forest carbon stocks.

Table 3.1 Schematic representation of REDD+ actions in terms of changes in forest area and carbon stock density per unit area; and some examples on possible implementation of these actions in a REDD+ scheme.

REDD+ actions	Examples of REDD+ actions	
	Changes in the area	Changes in the carbon stock per unit area
Deforestation	Reduce the area of forests converted to other uses	If deforestation cannot be avoided, prioritise conversion to areas with low carbon density (e.g., degraded lands)
Forest degradation	Reduce the area of forests where degradation occurs	Minimise the reduction of carbon stocks in current land management practices and increase carbon stocks per unit area through improved land management practices, e.g., through control of forest fires, etc.
Forest management	Maintain and increase area of production forest under sustainable management	Minimise the reduction of carbon stocks in forest management practices through reduced impact logging and other improved forest management practices
Forest conservation	Maintain the area of intact forests (e.g., in protected areas)	Maintain the carbon stocks in forests through effective conservation and development measures, law enforcement, land-use planning, etc.
Enhancement of forest carbon stocks	Increase area under sustainable forest and land management practices and through afforestation	Increase carbon stocks per unit area through improved land management practices, longer rotation periods, denser stocking, and through forest restoration, rehabilitation of degraded woodlands, etc.

3.3 REDD+ Potential, Costs, and Funding Needs

Recent estimates indicate that halving deforestation rates would require an investment of about 7 to 30 billion USD per year (Eliasch 2008, Grieg-Gran 2008, Lubowski, 2008). This is about 5–25% of the volume of current global carbon markets in 2008 (Hamilton et al. 2009), or about the same order of magnitude as the annual financial flows (official development assistance & investments) to the forestry sector in developing countries (El Lakany et al. 2007). For global carbon markets, REDD may not become a major player any time soon, but for the forestry sector in developing countries, this can represent a major increase in forest funding.

The Informal Working Group for Interim Finance for REDD (IWG-IFR) – formed by 34 countries and the European Commission – estimated that with the financing of 15–25 billion Euros (approximately 20–34 billion USD, or about 3–6 billion USD per year) for the 2010–15 period for REDD+ efforts, a 25% reduction in annual global deforestation rates

may be achievable by 2015 (IWG IFR 2009). This is in line with other estimations discussed above. At the UNFCCC COP 15 in Copenhagen, six countries (Australia, France, Great Britain, Japan, Norway, and the United States of America) committed 3.5 billion USD to a scheme as initial financing toward curbing deforestation and forest degradation between 2010 and 2012. This is close to the sum estimated by IWG IFR.

For avoided degradation, only a few estimations of potential exist. The IPCC 4th assessment (Nabuurs et al. 2007) does not present figures for the potential of avoided degradation as such, but it estimates that the global potential for “forest management” in terms of reduced emissions is 5780 MtCO₂ per year (1.6 GtC per year), which is about 42% of the total mitigation potential of the forestry sector between 2010 and 2030. Putz et al. (2008) estimated that carbon stocks in forests with improved management are predicted to be about 30 MgC/ha higher than those in conventionally logged forests. Using this as a proxy, we can estimate that to achieve the IPCC mitigation potential, about 52 million hectares should be managed under “avoided-degradation” schemes. This is



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Photo 3.1 REDD+ can represent a major increase in forest funding for the forestry sector in developing countries (Angavo, Madagascar).

about three times the Forest Stewardship Council (FSC) certified forest area in the tropics, or about half of total forest area under FSC certification (Nasi and Frost 2009).

The challenges related to the role of forests in the global carbon cycle and in the mitigation of climate change are very different in developing countries – which is the focus of this article – compared to northern, industrialised countries (see Box 3.2). Whether or not the possible implementation of REDD+ in developing countries eventually leads to a comprehensive climate change mitigation regime for global forests remains to be seen.

The implementation of REDD+ will not be an easy task. For decades, many donors worldwide have invested billions of dollars in conservation and development efforts to save tropical rainforests, with disappointing results. Why would conservation work now? Much deforestation is due to causes outside the forest sector, many of them related to overall development and globalised economies (Kanninen et al. 2007). For instance, the Amazon forest is being cleared mainly due to agricultural expansion of cattle and soybeans (Wertz-Kanounnikoff et al. 2008). In Asia, most of the tropical forests are under pressure of conversion to plantations of oil palm and fast-growing timber for the pulp industry (Kanninen et al. 2007, Eliash 2008). Understanding these external causes is crucial to identifying appropriate incentives to curb deforestation. Financing REDD+ may require

significant international funding to target these underlying causes of deforestation and forest degradation, e.g., those described above (Kanninen et al. 2007). Other reform processes or good governance initiatives (for example Forest Law Enforcement, Governance and Trade, FLEG) in the forest sector confirm the above needs and offer many lessons to learn for a successful implementation of REDD+.

3.4 Institutions, Capacity, and Governance Gaps

Weak institutional and governance environments are a reality in many developing countries with significant forest resources. In many cases, these countries are characterised by weak institutions, inconsistent and complicated laws, problems with land tenure, poor forest law enforcement, corruption, and lack of transparency. Thus, any effort for building a credible REDD+ scheme must incorporate long term efforts to create and reform institutions, strengthen the processes of governance, and build the capacity to implement new models of forest management (Kanninen et al. 2007).

As part of a global climate deal, a REDD+ mitigation mechanism must have a credible system for measuring, reporting, and verifying (MRV) changes in forest carbon stocks, and countries must set

Box 3.2 Role of northern forests*Gert-Jan Nabuurs*

The temperate and boreal forests of the Northern Hemisphere comprise 1.9 billion ha of forests, of which some two-thirds remain relatively unaffected by humans. The annual change in area in these forests was a net increase of 4.5 million ha per year in the period 2000–2005 (FAO 2007). These forests are thought to be the main biome taking up carbon for decades (Bousquet et al. 2000, Denman et al. 2007). There is general agreement about this, but the magnitude, location, and causes of this terrestrial carbon sink have remained uncertain. Generally, it is believed that the large primary tracts of boreal forest went through a phase of vegetation recovery in the past decades. In addition, the European and US temperate forests are believed to benefit from improved management and vegetation recovery from plantings in the past. Furthermore, forests of the Northern Hemisphere are affected by increased CO₂ concentrations and nitrogen deposition, leading to additional growth, and thus further stimulating the carbon sink.

Even though forests in the Northern Hemisphere are in a totally different state than tropical forests, they could still benefit from REDD+ regimes:

a) The continuous build up of biomass that we have seen in past decades cannot go on for-

ever; clearly, these forests are reaching their maximum. Natural disturbances are increasing in Europe and Canada (Schelhaas et al. 2003, Kurz et al. 2008). Some form of degradation is taking place, and may become worse under future climate change. Would this make these forests eligible for REDD+?

b) These forest areas are expanding on a net basis. But if we look at the gross dynamics of land use changes, then there is deforestation going on as well. Through urban sprawl, infrastructure, etc, this form of deforestation can amount up to a few hundred thousand hectares per year in Europe. This is a significant loss of carbon. Does this fall, in the future, under Article 3.3 (the “D”), or can this become part of a REDD+ regime?

c) Management has a large influence on carbon dynamics. The IPCC designed active management as optimal for the carbon balance in the long run (Nabuurs et al. 2007). *In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fibre or energy from the forest, will generate the largest sustained mitigation benefit.* So then, do these northern forests comply to the “+” part of REDD+?

Can we design a comprehensive regime for global forests out of this? This remains a challenge.

up compliant MRV systems. As discussed earlier (Section 3.2, Table 3.1), the two main variables to be measured and estimated to calculate the carbon stocks and changes in them are (i) the forest area and changes in it, and (ii) carbon stocks (carbon pools) per unit area of forest, or any land use and changes in them (IPCC 2003).

A recent assessment of national forest monitoring capabilities in tropical countries (Herold 2009) indicated that of the 99 countries assessed, less than 20% of them have completed a national greenhouse gas inventory. Only three countries currently had capabilities that were considered to be very good for both forest area change monitoring and for forest inventories (estimation of carbon stocks). Only about half of the countries had good or very good capabilities in any one of these categories.

According to the above assessment, the major shortcomings in the current monitoring capacities grouped according to IPCC reporting principles (IPCC 2003) were: (a) lack of consistency of estimations, (b) lack of transparency of information sources, (c) poor comparability of results due to lack

of common methodologies, (d) lack of completeness due to lack of suitable data, and (e) limited information on sources of error and uncertainty levels.

The results described above illustrate the challenges that we are facing in terms of building adequate MRV capacity in countries participating in the REDD+ schemes. Two major international initiatives – Global Forest Carbon Partnership Facility (FCPF) and UN-REDD Programme – have developed mechanisms and raised international funds for building capabilities in MRV and other relevant aspects of implementing REDD+ schemes (see Box 3.3).

More than two-thirds of the 37 “REDD Readiness” countries of the FCPF (see Box 3.3 for the list of countries) rank in the bottom half of the World Bank’s survey of governance indicators (Kaufmann et al. 2009), a study that covers more than 200 countries and measures six dimensions of governance between 1996 and 2008: (1) voice and accountability, (2) political stability and absence of violence/terrorism, (3) government effectiveness, (4) regulatory quality, (5) rule of law, and (5) control of corruption (Figure 3.1).

Box 3.3 FCPF and UN-REDD

The Forest Carbon Partnership Facility (FCPF) is a World Bank program to assist developing countries in their efforts to reduce emissions from deforestation and forest degradation (REDD) by providing value to standing forests. It was announced at COP13 in Bali in December 2007, and became operational in June 2008.

The FCPF's objectives are (a) building capacity for REDD in developing countries in tropical and subtropical regions, and (b) testing a program of performance-based incentive payments in some pilot countries, on a relatively small scale, in order to set the stage for a much larger system of positive incentives and financing flows in the future.

Two separate mechanisms have been set up to support FCPF's objectives:

- ◆ Readiness Mechanism and Readiness Fund, through which FCPF is assisting countries to prepare a national REDD+ strategy through inclusive multi-stakeholder consultations; start building capacity in monitoring, reporting, and verification (MRV); and begin demonstration activities.
- ◆ Carbon Finance Mechanism and Carbon Fund. FCPF expects that around five countries that will have made significant progress towards REDD readiness will also participate in the Carbon Finance Mechanism and receive financing from the Carbon Fund, through which the Facility will implement and evaluate pilot incentive programs for REDD based on a system of compensated reductions.

At the moment, 37 countries from Asia, Latin and Central America, and Africa have been selected into the Readiness Mechanism based on Readiness Plan Idea Notes (R-PINs) prepared by the countries. These countries are: Argentina, Bolivia, Cambodia, Cameroon, Central African Republic, Chile, Colombia, Costa Rica, Democratic Republic of Congo, El Salvador, Equatorial Guinea, Ethiopia, Gabon, Ghana, Guatemala, Guyana, Honduras, Indonesia, Kenya, Lao People's Democratic Republic, Liberia, Madagascar, Mexico, Mozambique, Nepal, Nicaragua, Panama, Papua New Guinea, Paraguay, Peru, Republic of Congo, Suriname, Tanzania, Thailand, Uganda, Vanuatu, and Vietnam. These countries account for about two-thirds of global deforestation, and about 20% of global forest cover (FAO 2005).

So far, about 100 million USD has been contributed by 11 donor countries (Australia, Denmark, Finland, France, Japan, Netherlands, Norway, Spain, Switzerland, United Kingdom, and the

United States) to the Readiness Fund. The target is to raise 185 million USD to support the REDD Readiness efforts of the 37 countries selected into the FCPF. The target for the Carbon Fund is 200 million USD, of which about 51 USD has been pledged already.

The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD Programme) is a collaborative program between FAO, UNDP, and UNEP. A multi-donor trust fund was established in July 2008 that allows donors to pool resources and that provides funding for activities towards this program.

The UN-REDD Programme aims at changing a developing country's economic balance in favour of sustainable management of forests so that their economic, environmental, and social goods and services benefit countries, communities, and forest users while also contributing to reductions in greenhouse gas emissions. The aim of the program is to generate the requisite transfer of resources to significantly reduce global emissions from deforestation and forest degradation. The immediate goal is to assess whether carefully structured payment structures and capacity support can create the incentives to ensure actual, lasting, achievable, reliable, and measurable emission reductions while maintaining and improving the other ecosystem services forests provide.

The UN-REDD Programme Fund is administered by the Multi-Donor Trust Fund (MDTF) Office of the United Nations Development Programme (UNDP) in accordance with its financial regulations and rules. So far, about 50 million USD has been contributed by two donor countries (Denmark and Norway).

The UN-REDD Programme works at both the national and at the international level. Within countries, the UN-REDD Programme supports processes for REDD readiness and contributes to the development of national REDD strategies. At the moment, the UN-REDD program countries are: Bolivia, Democratic Republic of Congo, Indonesia, Panama, Papua New Guinea, Paraguay, Tanzania, Viet Nam, and Zambia. At the international level, the UN-REDD Programme seeks to build consensus and knowledge about REDD, and raise awareness about the importance of including a REDD mechanism in a post-2012 climate change agreement. It also provides opportunities for dialogue between governments, civil society organisations, and technical experts to ensure that REDD efforts are based on science and take into account the views and needs of all stakeholders.

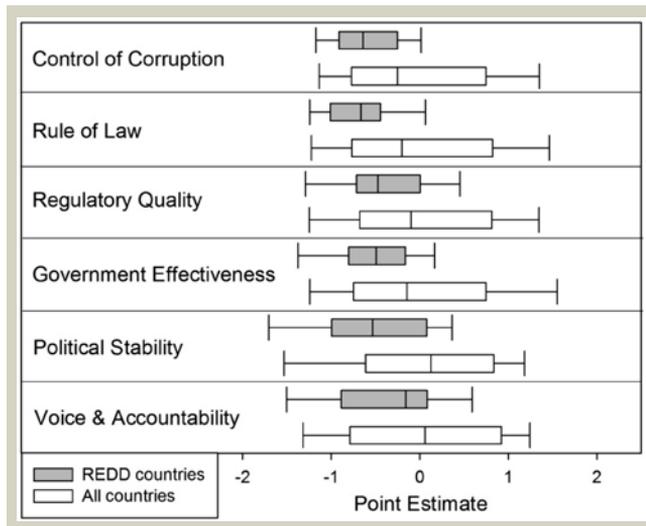


Figure 3.1 The World Bank's six Governance Indicators in the "REDD Readiness" countries of the FCPF (n= 37) and in all the countries (n = 212). Source data: Kaufmann et al. (2009). The lower boundary of the box indicates the 25th percentile, a line within the box marks the median, and the upper boundary of the box indicates the 75th percentile of the data. Whiskers (error bars) indicate the 90th and 10th percentiles.

The results described above illustrate the challenges that we are facing in terms of having adequate governance structures, institutions, and human capital in place to make REDD+ schemes work. In many countries, this may require a profound and transformational change in terms of new policies and practices to ensure transparency, accountability and efficient spending of REDD+ revenues, and disclosure of and access to information. This means that the countries need to set up monitoring, reporting, and verification (MRV) systems for flows of money as well as carbon (Seymour and Angelsen 2009).

Testing through pilots is the most immediate step to take and to learn while doing real activities on the ground. At this level, following national policies should be advisable to align with the overall readiness phase initiated by governments, depending on the national circumstances. They would eventually adopt the policies and measures when the capacity of the participating proponent is fully established. The absence of the rules and modalities should not hinder a project proponent in starting early. The indicative guidelines provided by COP decision 2/CP13 should suffice for the process.

Depending on the local circumstances, the design of REDD+ at the site level will determine how carbon benefits will be balanced by other co-benefits. Biodiversity benefits could be included by adding appropriate certification standards (Harvey et al. 2010).

3.5 Shaping the National REDD+ Structure and Agenda

The above described country-specific context will determine options for realising REDD+. At the national level, REDD shapes, or will be shaped by, the political economy of forests in the respective

country, and a multitude of actors with their individual interests will negotiate options for REDD+ and decide about countries' REDD+ design. Figure 3.2 shows the three main elements of national REDD+ architecture: (a) incentives, (b) information, and (c) institutions.

At the international level, REDD+ funds may originate from carbon markets and international funds (of voluntary contributions or linked to carbon markets). At the national level, funds can be channelled either as support to governments or related institutions, or to separate REDD+ funds. Direct support for projects is also possible (Wertz-Kanounnikoff and Angelsen 2009).

REDD+ incentives flow from international sources to a national fund or to regular budgets (e.g., ministries of finance) and then to the sub-national level through the government budget or direct payments to carbon rights holders. Carbon rights holders include private landholders, communities, concession holders, and government agencies.

Figure 3.2 also shows how payments from performance-based international markets can flow directly to local carbon rights holders without passing through national REDD+ funds or government budgets. This would occur in the sub-national and nested approaches (Pedroni et al. 2009). One of the key challenges represented here is the degree of uncertainty about the outcomes of the international debates, and the requirements for a REDD+ architecture at national level to respond to those. In countries like Papua New Guinea, however, where all forest lands are under customary ownership, REDD+ benefits could directly reach the forest communities (Melick 2010).

The second element is REDD+ information, i.e., data on forest emissions reduced or carbon stocks enhanced from each forest by type and location. This information will be gathered and processed through a national, regional, or international MRV system and

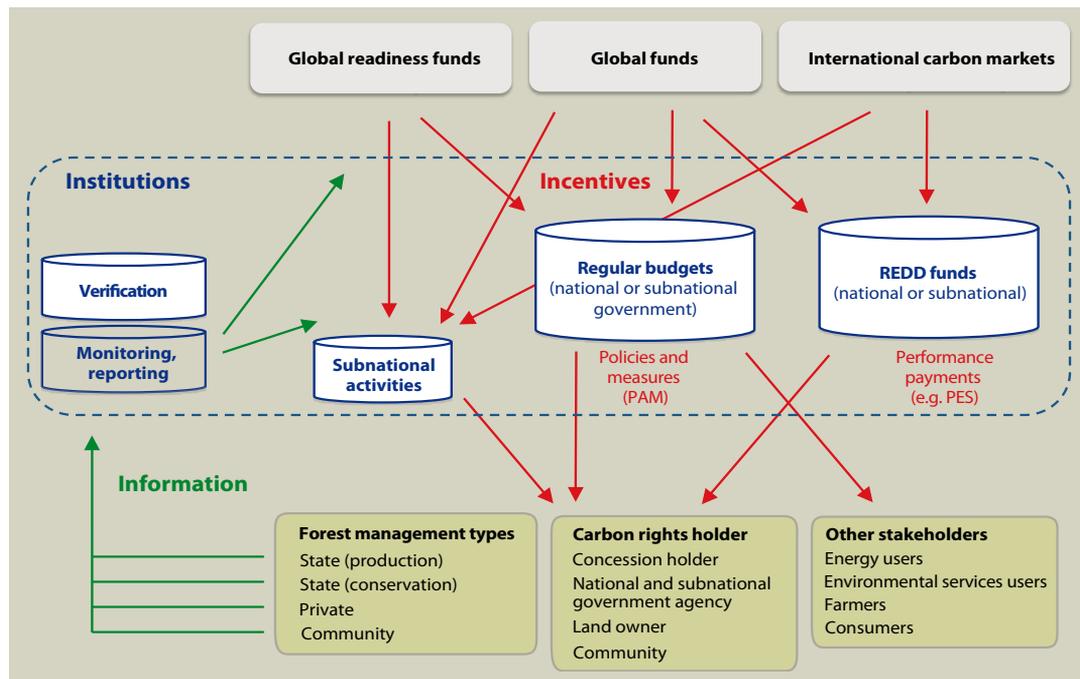


Figure 3.2 Conceptual model for national REDD+ architecture. Redrawn from Wertz-Kanounnikoff and Angelsen (2009).

submitted to a national REDD+ payment authority, a UNFCCC institution, and to international buyers of REDD+ credits. Payments to local carbon rights holders will be performance-based and determined by this information. Key issues arising in national debates around this element are the definition of where should REDD+ happen (e.g., what forest will be eligible for REDD+, who has the right to benefit, etc.), what degree of disclosure of information (who reports to whom, who has access to what information), and who will measure, report, and verify (national sovereignty, local capacities, etc.).

The third element is REDD+ institutions. These will manage the flow of information on changes in forest carbon stocks between levels and the flow of incentives to carbon rights holders. These institutions could build on existing institutions, and would include a REDD+ payment authority and an MRV system. The national REDD+ funding authority would decide on the most appropriate way to channel funds from the international to the sub-national level and what would constitute an equitable distribution of benefits (funds) from REDD+ activities.

In a national REDD+ scheme, funding – either from international or national funds – may be used in three main ways (Figure 3.3):

Capacity building and readiness. Funds are spent to develop a national REDD+ strategy, on consultations, and to develop MRV capabilities. It also includes money spent to set up demonstration activities, which both build capacity and help learn-

ing, and also reduce and remove emissions. (See Box 3.3 on international FCPF and UN-REDD programs and funds for increasing readiness.)

National policies to address the drivers of deforestation and forest degradation or to stimulate other forest mitigation activities (e.g., forest restoration). Funds are spent on policies and measures (PAMs) to address the underlying drivers of deforestation and forest degradation. This includes regulating demand for agricultural and forest products, tenure reforms, land use planning, better governance, and law enforcement.

Performance-based REDD+ activities. Funds are spent on payments for performance or results, which requires performance measurement in the form of quantified forest carbon stock changes.

Most probably, new institutional arrangements are needed to manage technical, financial, administrative, and supervisory aspects related to these transactions. However, in most cases, the direction of institutional change will depend on existing structures. It is important to note that some institutions and their functions will most likely evolve over time to respond to the changing demands in the different phases of the REDD+ implementation process, including the possible transition from a sub-national or nested approach to a fully national approach where project-level activities need to be integrated into the national system. At the national level, this will require flexibility as a key feature in the institutional architecture for REDD.

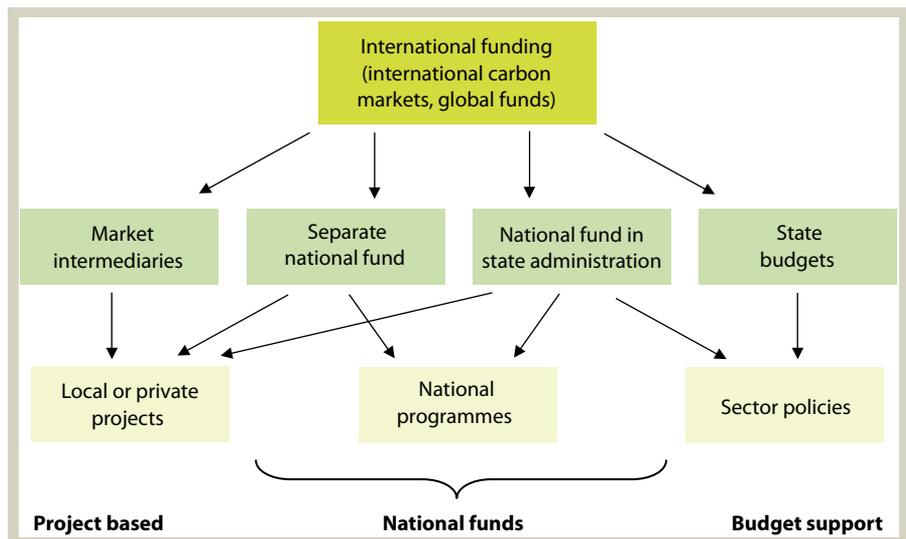


Figure 3.3 Options for national REDD+ funding architecture. Redrawn from Vatn and Angelsen (2009).

Key challenges in the institutional REDD+ set-up can be related to (1) the rigidity in institutional pathways, which shapes and incorporates REDD+ in such a way that it limits the effectiveness of REDD+, and may repeat historical failures in forest sector reforms rather than result in an institutional landscape that is shaped by REDD and that can meet the REDD+ agenda objectives; (2) the institutional capacity to translate technical information coming out of the MRV system into a financial action to identify recipients and transfer money; and (3) the process of coordination, horizontally and vertically, of REDD+ design, implementation, and evaluation.

In general, the main future challenges in establishing a national REDD+ structure and agenda include the following:

Scope: What is the relative emphasis given to reducing emissions from the five REDD+ actions described in Table 3.1: deforestation, degradation, forest management, conservation, and carbon stock enhancement?

Scale: What is level of accounting and crediting to be recognised in an international agreement? Is the national REDD+ scheme based on national, sub-national, or nested approaches (see Pedroni 2009)?

Reference levels: What are the criteria and procedures to use for establishing reference levels? Are historical baselines used? How do we interpret “national circumstances” and the principle of “common but differentiated responsibilities” (see Angelsen 2008)?

Leakage: How is leakage to be avoided? What are the monitoring and control schemes that have to be in place at different scales?

Permanence: What is the framework for continuous monitoring to verify permanence? How will social and environmental risks be managed and minimised?

Financial mechanisms: What are the funding sources and delivery mechanisms (e.g., international funds, national funds, carbon markets, hybrid solutions)? What is the level of funding required for implementing an effective REDD+ scheme?

Governance, institutions, and coordination: What is the governance and institutional structure of the REDD+ scheme? How do we build adequate human and institutional capacity cost-efficiently?

Participation of indigenous people and local communities, and rights: How will adequate consultation and participation in decision making processes be ensured? What will be the type and extent of safeguards and appropriate benefit-sharing arrangements?

Co-benefits: What is the relative emphasis on climate benefits vs. co-benefits, in particular poverty alleviation, biodiversity conservation, and sustainable development? What safeguards should be built into REDD+ activities to ensure that REDD+ activities do not negatively affect these benefits of forests?

To respond to these challenges in a way that is efficient, effective, and equitable, further political commitment to a REDD+ structure is required, as well as a balancing of a multitude of powerful actors and their respective interests in forests and forest land resources while setting the agenda for realising REDD+ (Peskett and Brockhaus 2009).

3.6 Ways Forward

REDD+ as a climate change mitigation instrument will only be able to proceed at a pace that allows the meaningful participation of all relevant stakeholders in consensus-building, with regard to the way forward in how best to harness forests resources for climate change mitigation.

Several countries are proposing a phased approach for incorporating REDD+ into the post-2012 climate regime over a period of time and through (possibly overlapping) phases (Eliasch 2008, Stern 2008, Meridian Institute 2009a and 2009b, Wertz-Kanounnikoff and Angelsen 2009). The main reason for this is that sufficient time is needed to build credible global and national institutional structures and capabilities. Institutions and mechanisms need to be able to match the scale of the challenge and build trust between the actors while being flexible enough to adjust to changing circumstances during the evolution of the process.

A widely accepted approach includes three phases. In the first “readiness” phase, the objective is to build institutional and human capacity in REDD+ countries for measuring, monitoring, and verification; to prepare national REDD+ strategies through multi-stakeholder process; and to implement demonstration activities for “learning by doing.” The second phase is characterised by a “programmatic approach” mixed with incipient markets for REDD+ credits where countries focus on implementing policies and measures to reduce emissions (Wertz-Kanounnikoff and Angelsen 2009) while creating an operating environment where the results of demonstration activities are starting to attract investors (Eliasch 2008). In the third phase, as long-term commercial returns on REDD+ investment become clear, mainstream financiers, investors, and insurers enter the market (Eliasch 2008).

References

Angelsen, A. 2008. How do we set the reference levels for REDD payments? In: Angelsen, A. (ed.). *Moving ahead with REDD: issues, options and implications*. CIFOR, Bogor, Indonesia. p. 53–64.

Angelsen, A., Brockhaus, M., Kanninen, M., Sills, E., Sunderlin, W.D. & Wertz-Kanounnikoff, S. (eds.). 2009. *Realising REDD+: National strategy and policy options*. Center for International Forestry Research (CIFOR), Bogor, Indonesia. 362 p.

Bousquet, P., Peylin, P., Ciais, P., Le Quere, C., Friedlingstein, P. & Tans, P.P. 2000. Regional changes in carbon dioxide fluxes of land and oceans since 1980. *Science* 290: 1342–1346.

Denman, K.L., Brasseur, G., Chidthaisong, A., Ciais, P., Cox, P.M., Dickinson, R.E., Hauglustaine, C., Heinze, E., Holland, D., Jacob, U., Lohmann, S., Ramachandran, P.L., da Silva Dias, D., Wofsy, S.C. & Zhang, X. 2007. Couplings Between Changes in the Climate System and Biogeochemistry. In:

Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K.B., Tignorand, M. & Miller, H.L. (eds.). *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the IPCC Fourth Assessment. Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, UK and New York, USA. p. 541–584.

El Lakany, H., Jenkins, M. & Richards, M. 2007. *Background Paper on Means of Implementation*. Contribution by PROFOR to discussions at UNFF-7, April, 2007. Program on Forests (PROFOR). 50 p.

Eliash, J. 2008. *Climate Change: Financing Global Forests – The Eliash Review*. The Stationery Office. London. 250 p.

FAO 2005. *Global Forest Resource Assessment 2005: Progress toward sustainable forest management*, FAO Forestry Paper 147, Rome.

Grieg-Gran, M. 2008. *The Cost of Avoiding Deforestation. Update of the Report prepared for the Stern Review of the Economics of Climate Change*. International Institute for Environment and Development (IIED). 25 p.

Hamilton, K., Sjardin, M., Shapiro, A. & Marcello, T. 2009. *Fortifying the Foundation: State of the Voluntary Carbon Markets 2009*. New Carbon Finance, New York. 92 p.

Harvey, C.A., Dickson, B. & Kormos, C. 2010. Opportunities for achieving biodiversity conservation through REDD. *Conservation Letters* 3: 53–61.

Herold, M. 2009. An assessment of national forest monitoring capabilities in tropical non-Annex I countries: Recommendations for capacity building In. *GOCF-GOLD Land Cover Project Office*. 62 p.

Houghton, R.A. 2008. Carbon Flux to the Atmosphere from Land-Use Changes: 1850–2005. In *TRENDS: A Compendium of Data on Global Change. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A.* Available at: <http://cdiac.ornl.gov/trends/landuse/houghton/houghton.html> [Cited 11 May 2010].

IWG IFR – Informal Working Group on Interim Finance for REDD+ 2009. *Report of the Informal Working Group on Interim Finance for REDD+ (IWG IFR) October 2009. Discussion Document*. 81 p.

IPCC (Intergovernmental Panel on Climate Change) 2000. *Land Use, Land-Use Change, and Forestry. A Special Report of the IPCC*. Watson, R.T., Noble, I.R., Bolin, B., Ravindranath, N.H., Véaseardo, D.J. & Dokken, D.J. (eds.). Cambridge University Press, Cambridge and New York. 377 p.

IPCC 2003. *Good practice guidance on land use, land-use change and forestry, prepared by the National Greenhouse Gas Inventories Programme*. Eggleston, H.S., Buendia, L., Miwa, K., Ngara, T. & Tanabe, K. (eds.). Institute for Global Environmental Strategies (IGES), Japan.

IPCC 2006. *IPCC Guidelines for national greenhouse gas inventories*. Eggleston, H.S., Buendia, L., Miwa, K., Ngara, T. & Tanabe, K. (eds.). National Greenhouse Gas Inventories Programme, Institute for Global Environmental Strategies, Kanagawa, Japan.

IPCC 2007. *Climate Change 2007: Synthesis Report. Summary for Policymakers*. 22 p.

Kanninen, M., Murdiyarso, D., Seymour, F., Angelsen, A., Wunder, S. & German, L. 2007. *Do Trees Grow on Money? The implications of deforestation research for policies to promote REDD*. Forest Perspectives No. 4, Center for International Forestry Research (CIFOR), Bogor, Indonesia. 61 p.

Kaufmann, D., Kraay, A. & Mastruzzi, M. 2009. *Governance Matters VIII: Aggregate and Individual Governance Indicators, 1996–2008*. Brookings Institution and the World Bank. Washington, DC.

Kauppi, P.E., Ausubel, J.H., Fang, J., Mather, A.S., Sedjo, R.A. & Waggoner, P.E. 2006. Returning forests analyzed with the forest identity. *PNAS* 103, 17574–17579.

- Kurz, W.A., Dymond, C.C., Stinson, G., Rampley, G.J., Neilson, E.T., Carroll, A.L., Ebata, T. & Safranyik, L. 2008. Mountain pine beetle and forest carbon feedback to climate change. *Nature* 452: 987–990.
- Lubowski. 2008. What are the costs and potential of REDD? In: Angelsen, A. (ed). *Moving ahead with REDD: issues, options and implications*. Center for International Forestry Research (CIFOR), Bogor, Indonesia. p. 23–30.
- Melick, D. 2010. Credibility of REDD and experiences from Papua New Guinea. *Conservation Biology* 24 (2): 359–361.
- Meridian Institute 2009a. Reducing emissions from deforestation and forest degradation: an options assessment report. Prepared for the Government of Norway by Angelsen, A., Brown, S., Loisel, C., Peskett, L., Streck, C. & Zarin, D. Available at: <http://www.REDD-OAR.org> [Cited 11 May 2010].
- Meridian Institute 2009b. REDD+ institutional options assessment. Prepared for the Government of Norway, by Streck, C., Gomez-Echeverri, L., Gutman, P., Loisel, C. & Werksman, J. Available at: <http://www.REDD-OAR.org> [Cited 11 May 2010].
- Nabuurs, G.J., Masera, O., Andrasko, K., Benitez-Ponce, P., Boer, R., Dutschke, M., Elsidig, E., Ford-Robertson, J., Frumhoff, P., Karjalainen, T., Krankina, O., Kurz, W.A., Matsumoto, M., Oyhantcabal, W., Ravindranath, N.H., Sanz Sanchez, M.J. & Zhang, X. 2007. Forestry. In: *Climate Change 2007. Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge. p 541–584.
- Nasi, R. & Frost, P.G.H. 2009. Sustainable forest management in the tropics: is everything in order but the patient still dying? *Ecology and Society* 14(2): 40.
- Pedroni, L., Dutschke, M., Streck, C. & Porrúa, M. 2009. Creating incentives for avoiding further deforestation: the nested approach. *Climate Policy* 9: 207–207.
- Peskett, L. & Brockhaus, M. 2009. When REDD+ goes national: a review of realities, opportunities and challenges. In: Angelsen, A., Brockhaus, M., Kanninen, M., Sills, E., Sunderlin, W. D. & Wertz-Kanounnikoff, S. (eds.). *Realising REDD+: National strategy and policy options*. Center for International Forestry Research (CIFOR), Bogor, Indonesia. p. 25–43.
- Putz, F.E., Zuidema, P.A., Pinard, M.A., Boot, R.G.A., Sayer, J.A., Sheil, D., Sist, P., Elias, & Vanclay, J.K. 2008. Improved tropical forest management for carbon retention. *PLoS Biology* 6: 1368–1369.
- Schelhaas, M.J., Nabuurs, G.J. & Schuck, A. 2003. Natural disturbances in the European forests in the 19th and the 20th centuries. *Global Change Biology* 9: 1620–1633.
- Seymour, F. & Angelsen, A. 2009. Summary and conclusions. REDD wine in old wineskins? In: Angelsen, A., Brockhaus, M., Kanninen, M., Sills, E., Sunderlin, W. D. & Wertz-Kanounnikoff, S. (eds.). *Realising REDD+: National strategy and policy options*. Center for International Forestry Research (CIFOR). Bogor, Indonesia. p. 293–303.
- Smith, J.B., Schneider, S.H., Oppenheimer, M., Yohe, G.W., Hare, W., Mastrandrea, M.D., Patwardhan, A., Burton, I., Corfee-Morlot, J., Magadza, C.H.D., Füssler, H.-M., Pittock, A.B., Rahman, A., Suarez, A. & van Ypersele, J.-P. 2009. Assessing dangerous climate change through an update of the Intergovernmental Panel on Climate Change (IPCC) “reasons for concern”. *Proceedings of the National Academy of Sciences* 106: 4133–4137.
- Stern, N. 2006. *Stern Review: The Economics of Climate Change*. Cambridge University Press, Cambridge, UK.
- Stern, N. 2008. Key elements of a global deal on climate change. The London School of Economics and Political Science (LSE), London. 56p.
- Vatn, A. & Angelsen, A. 2009. Options for a national REDD+ architecture. In: Angelsen, A., Brockhaus, M., Kanninen, M., Sills, E., Sunderlin, W. D. & Wertz-Kanounnikoff, S. (eds.). *Realising REDD+: National strategy and policy options*. Center for International Forestry Research (CIFOR). Bogor, Indonesia. p. 57–74.
- Werf, G.R. van der, Morton, D.C., DeFries, R.S., Olivier, J.G.J., Kasibhatla, P.S., Jackson, R.B., Collatz, G.J. & Randerson, J.T. 2009. CO2 emissions from forest loss. *Nature Geoscience* 2: 737–738.
- Wertz-Kanounnikoff, S. & Angelsen, A. 2009. Global and national REDD+ architecture. Linking institutions and actions. In: Angelsen, A., Brockhaus, M., Kanninen, M., Sills, E., Sunderlin, W.D. & Wertz-Kanounnikoff, S. (eds.). *Realising REDD+: National strategy and policy options*. Center for International Forestry Research (CIFOR). Bogor, Indonesia. p. 14–24.
- Wertz-Kanounnikoff, S., Kongphan-Apirak, M. & Wunder, S. 2008. Reducing forest emissions in the Amazon Basin: a review of drivers of land-use change and how payments for environmental services (PES) schemes can affect them. CIFOR Working Paper 40. Center for International Forestry Research (CIFOR), Bogor, Indonesia. 21 p.