Realising REDD+

National strategy and policy options

Edited by Arild Angelsen

CIFOR

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CIFOR advances human wellbeing, environmental conservation and equity by conducting research to inform policies and practices that affect forests in developing countries. CIFOR is one of 15 centres within the Consultative Group on International Agricultural Research (CGIAR). CIFOR's headquarters are in Bogor, Indonesia. It also has offices in Asia, Africa and South America.

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Bogor, Indonesia, and Ås, Norway
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Arild Angelsen

Summary

Reducing emissions from deforestation and forest degradation, and enhancing forest carbon stocks in developing countries (REDD+) started as a global initiative. Much of the initial debate has focussed on the global REDD+ architecture and how REDD+ can be included in a post-2012 climate agreement. But the debates and the focus of actions have now increasingly moved to national and local levels. More than 40 countries are developing national REDD+ strategies and policies, and hundreds of REDD+ projects have been initiated across the tropics. This book wants to inform these national and local processes, by asking some basic questions: How are participating countries going to reduce emissions and increase carbon stocks that they hope to be paid for through global mechanisms? What new institutions, processes, policies, and projects are needed? What are the options in these areas, and how do they compare?

This book seeks to answer these questions by examining what REDD+ at the national level might look like in four areas: institutions and processes to build the REDD+ framework, broad policy reforms to enable REDD+ implementation, sectoral policies to change incentives, and demonstration

activities to test and learn from different approaches. There are no 'one size fits all' recommendations. Most chapters present a menu of options and discuss their merits in terms of their climate *effectiveness*, cost *efficiency* and *equity* outcomes, in addition to their generation of *co-benefits*: biodiversity and other environmental services, poverty reduction and sustainable livelihoods, governance and rights, and climate change adaptation. We label these the 3E+ criteria.

A core idea behind underlying REDD+ is to make performance-based payments, that is, to pay forest owners and users to reduce emissions and increase removals. Such payments for environmental (or ecosystem) services (PES) has its merits: it provides strong incentives directly to forest owners and users to manage forests better and clear less forestland. PES will fully compensate carbon rights holders that find forest conservation more lucrative than the alternatives. They simply sell forest carbon credits and less cattle, coffee, cocoa or charcoal.

Although various PES systems for forest conservation have been running for some time, there are barriers for wide application. Land tenure and carbon rights must be clearly defined, yet most deforestation hotspots are characterized by unclear and contested land rights. Forest carbon must be monitored regularly at the scale where payments are made. Institutional and governance structures must be established to manage payments and information, and to link local PES systems to national (or global) REDD+ systems. Credible reference levels, reflecting what would have happened without REDD+ interventions, must be established. While PES might be the national REDD+ instrument of choice in the medium-long term, and should be encouraged as a transparent and equitable conservation strategy, it is unlikely to be the main REDD+ policy instrument within most countries in the short term.

Effective implementation of REDD+ therefore calls for a broader set of policies. These include institutional reforms in the areas of governance, tenure, decentralisation, and community forest management (CFM). Agricultural policies can limit the demand for new agricultural land. Energy policies can limit the pressure on forest degradation caused by woodfuel harvesting, while reduced impact logging (RIL) practices can limit the harmful impacts of timber extraction. Setting up protected areas (PAs) has proved effective in conserving forest, and – although being far from perfect – support for PAs should be considered as part of any comprehensive national REDD+ strategy.

Fortunately, we have several decades of experience and research from implementing many such policies. A major purpose of this book is to put these policy lessons on the table. There are certainly new elements in REDD+ compared to past efforts to manage forest; two of the most important ones the potential magnitude of the additional funding and the emphasis on performance based measures. But, most planned national policies to be implemented are comparable to measures tried in the past – often with disappointing outcomes. Thus a key challenge will be to build on this experience without repeating the mistakes of the past.

Part 1: Moving REDD+ from global to national level

Many past efforts have failed to prevent tropical deforestation from continuing at high speed. Two reasons are the failure to address the fundamental drivers, and the tendency to view the forest sector in isolation from other sectors. The current mainstream REDD+ debate has only *partly* taken these lessons into account and looked beyond the canopy.

REDD+ is being designed through political processes at global, national and local levels. REDD+ is controversial with many actors taking the stage with different – often conflicting – agendas and interests. The nature of the global architecture is not yet clear and will probably evolve quickly over the next few years. The global decisions will influence the design and implementation of national REDD+ schemes, and national policy makers face high uncertainties. Countries should adopt flexible mechanisms and implement REDD+ schemes in stages.

Domestic REDD+ debates are to some extent mirroring international discourse. Conflicting interests among actors could make it difficult to overcome the key challenges and hamper coordination, which could impede efficiency in formulating and implementing REDD+ actions. A review of five countries suggests substantial progress, but key challenges remain: ensuring high level government commitment; achieving strong coordination within governments and between state and non-state actors; designing mechanisms to ensure participation and benefit sharing; and establishing monitoring, reporting and verification (MRV) systems. Questions remain as to whether interests in REDD+ represent genuine motivations to move forwards on key issues such as land tenure and effective participation.

Part 2: Building REDD+ institutional architecture and processes

The second part of the book sets out four major options for channelling REDD+ finance into actions on the ground: projects, independent funds, funds within state administrations, and budget support. Many demonstration activities follow a project approach. REDD+ funds are also being established or considered by many countries (e.g., the Brazilian Amazon Fund). Over the past 20 years more than 50 conservation trust funds (CTFs) have been established in developing countries. They can serve as models for how to provide stable long-term funding with high credibility for financing major REDD+ activities.

Full national participation in a global REDD+ system requires a far better MRV system than currently exists, and there is a huge capacity gap. A recent review shows that only three out of 99 tropical developing countries have very good capacity for monitoring forest area change and forest inventories. Development of MRV systems must also be closely linked to policy analysis, so we can better understand the processes of deforestation and degradation and thereby formulate more effective policy interventions.

Better MRV systems are needed to develop performance-based payment systems. One concern is that high transaction costs (e.g., for forest carbon monitoring) prohibit the inclusion of local communities in PES-like systems. Recent work on community monitoring demonstrates that their costs can be substantially lower compared to professional surveys, and the accuracy is relatively good. Entrusting forest inventory work to communities could also improve transparency and highlight the value of CFM in providing carbon services.

Vertical integration across different scales (including inclusion of local communities) and horizontal integration across sectors present a key challenge in national REDD+ strategy and policies. Multilevel, multiactor and participatory governance allows stakeholders to negotiate, formulate and implement policy. The process will be time consuming, and short terms efficiency might in some cases have to be sacrificed to achieve equity and long-term effectiveness.

Part 3: Enabling REDD+ through broad policy reforms

There are four main types of policies to reduce deforestation: policies that bring down agricultural profitability (rent) in forested areas, policies that increase the value of standing forests and enable forest users to capture that value, policies that directly regulate land use, and broad, cross-sectoral policies that underpin the first three. Part 3 of the book deals with the broader polices and Part 4 moves into more specific policies that aim to change the incentives for forest use.

Among the broad, cross-sectoral policies, forest and land tenure stands out as a key issue in both global and national REDD+ debates. Tenure in forests is often unclear and subject to dispute, and this will often constrain the 3E+ outcomes of REDD+ policies. In spite of attention paid to the problem of insecure tenure to date, little progress has been made toward clarifying tenure arrangements. This is essential for the long-term success of REDD+ and to exploit the full range of policy instruments. Tenure reforms take time and can be politically controversial. While it is unrealistic to assume that countries can carry out wholesale forest tenure reform before REDD+ implementation begins, there are various processes and policies that can be undertaken to ameliorate the tenure situation in the short term, while aiming for deeper reform in the medium term.

Closely linked to forest tenure are the questions of carbon rights and benefit sharing. Allocation of carbon rights is a precondition for subnational carbon crediting, but not for most other policies. Discussion about sharing international benefits needs to go hand in hand with a discussion about sharing the costs and burdens of REDD+. Many policies will have no direct transfers to forest users but will impose costs to those that benefit from deforestation or degradation, and will lead to demands for compensation. It is also important to manage expectations regarding benefits, in particular because the international incentive systems are still under development. In fact, unrealistically high expectations generated in capitals and communities about large money flows and REDD+ rents put the REDD+ project at risk.

The potentially large money flows have generated concerns related to governance and the risk of more corruption. Many REDD+ interventions are likely to be affected by poor governance and corruption, but MRV mechanisms – both for carbon and financial flows – can also contribute to reducing corruption. As long as REDD+ is performance-based and receives high levels of national and international scrutiny, there is reason for optimism. But anti-corruption policies limited to the forest sector are unlikely to work in countries with high corruption levels, which require systemic institutional changes.

Many countries have over the last decade implemented forest decentralisation reforms, which have the potential to improve forest management. REDD+ strategies are likely to be more equitable and locally legitimate if they represents local needs and aspirations in its design, implementation and benefit allocation. Decentralisation of meaningful decisions to locally accountable and responsive (representative) local authorities would promote local engagement in REDD+ decision making. Rule making and benefit and cost distribution are key issues in constructing legitimacy for REDD+ and ensuring 3E+ outcomes.

Part 4: Doing REDD+ by changing incentives

About three-fourths of tropical deforestation is due to trees being chopped down to provide land for crops and cattle. The book introduces the concept of REAP, reduced emissions agricultural policy. Policies to stimulate agricultural production in forested areas run the risk of making agriculture more profitable and increase forest conversion. REAP should therefore prioritise agricultural assistance to growers in productive agricultural areas close to major population centres. REAP options in forest-rich countries might feature low tariffs on agricultural products, while REAP options in forest-poor countries might emphasise biofuel production.

Standing forests provide valuable benefits (forest products and environmental services) to local populations, but the incentives for individual villagers to include these in land use decisions are negligible. Community forest management (CFM) can give incentives to include such benefits into the land use calculus. Moreover, CFM projects can be used to channel REDD+ funding to local levels. A 50-year history of externally sponsored CFM provides a long catalogue of success factors. These include sufficient size and clear boundaries of forests, predictability of benefit flows, local autonomy in designing rules, clear and enforceable rules for access and use of forests, and provisions to monitor and sanction rule violations.

For land users to fully incorporate the global climate effects of forest conversion and degradation in their decisions, a system for payments for environmental services (PES) is needed at the local level. PES requires that certain preconditions be met, in particular land stewardship with 'the right to exclude third parties', a precondition that is not granted in many forest frontiers. Yet, PES has the potential to become an effective, cost-efficient, and equitable instrument for implementing REDD+ on the ground, particularly over the medium term. Using spatial targeting toward high-threat, high-service, and low-cost areas can dramatically improve the carbon outcome. Failing to use these design features can make PES inefficient, and at the extreme paying for 'hot air'.

Protected areas (PAs) should become an important element of tropical forested countries' efforts to implement and benefit from REDD+. Integrated conservation and development projects (ICDPs) have often been established in conjunction with PAs, to provide enhanced economic opportunities for people living in and around these areas who are often denied access to the protected resources. There are important similarities and overlaps between REDD+ projects and ICDPs, which have generally had disappointing results. Although the reasons for the poor performance of ICDPs are well understood, significant design and implementation flaws still persist. REDD+ projects should heed these experiences. The positive lessons from ICDPs include the importance of using adaptive management linked to hypotheses testing, establishing strong and flexible local management organisations, securing long term funding, communicating effectively with local stakerholders on how performance-based arrangements are expected to work, and enabling local institutions to participate in real decision making.

While the above policy options primarily seek to address deforestation, harvesting of timber and woodfuel constitute the main sources of forest degradation. Unsustainable harvesting and combustion of woodfuel can aggravate climate change, but woodfuel can become part of the solution if it replaces fossil fuel. Policies to reduce woodfuel demand (promote more efficient cooking stoves, substitute other fuels) can be effective if combined with and supported by other policies. Supply-side measures (efficient woodfuel production and plantations) can also help reduce emissions, but are no substitute for more effective control of harvesting in natural forests.

Stopping illegal timber harvesting and adopting reduced impact logging in the tropics, together with wildfire suppression, could efficiently reduce carbon emissions and enhance carbon uptake. This could further be enhanced by better post-logging forest management practices and active restoration. Halting degradation can also be aided by recent improvements in remote sensing techniques for monitoring logging and wildfires and by more available hand-held global positioning systems, especially when synergies with ongoing forest certification are fully exploited.

Part 5: Testing REDD+ at the local level

Several hundred 'first generation REDD+ projects' are in the pipeline or being implemented, and potentially offer valuable lessons for realising REDD+ under varied circumstances. The landscape of REDD+ projects varies significantly across countries, reflecting differences in land tenure systems, deforestation and degradation drivers, recent experience with conservation, and governance capacity. Many projects in Indonesia are obtaining forest concessions, while projects in Brazil put greater focus on PES for local actors. Third-party certification standards and international environmental organisations are major influences on project development.

The Bali Action Plan (COP13) asked for demonstration activities to be evaluated and the results communicated back to the international community. By definition, first generation REDD+ projects aim to produce verifiable emissions reduction and removals, and therefore require impact assessment. For REDD+ to succeed, we need information on all dimensions of the 3E+ outcomes. Unfortunately, there are few examples of rigorous impact assessment of conservation interventions. A thoroughly planned process and impact assessment of REDD+ could contribute greatly to our understanding of successful environment and development policy initiatives.

The forest, socio-economic and policy contexts vary enormously across and within countries. We are left in a complex world that defies simplistic explanations, but requires clear and simple policies. Policy makers are also facing a number of dilemmas in designing and implementing national REDD+ strategies and policies. REDD+ must be new, but it will have to build on existing assets and insights from past policy interventions. REDD+ must also be transformational, but policy making is normally about incremental change. Finally, REDD+ actions are urgent, yet the broad participation and coordination called for, to make sure policies meet the 3E+ criteria, suggest that REDD+ cannot be rushed.

The book concludes with cautious optimism that REDD+ can be realised in national policies, institutions and actions on the ground. REDD+ includes genuinely new elements, in particular performance based payments at a scale that has never before been attempted. The international community have demonstrated strong willingness to pay for REDD+. Many developing countries are demonstrating strong willingness to tackle the problems. This match between international 'willingness to pay' and national 'willingness to play' is essential for the success of REDD+.

Finally, the seriousness of climate change is becoming increasingly evident, and national and global policies are likely to increase their focus on effective solutions to reduce global emissions. REDD+ has the **potential** to become a key element of that global mitigation strategy; with this book we hope to contribute to realising this potential.

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Chapter 1

Introduction

Arild Angelsen

The REDD+ idea meets reality

Reducing emissions from deforestation and forest degradation, and enhancing forest carbon stocks in developing countries (REDD+) can, according to proponents, generate large, cheap and quick reductions in global greenhouse gas (GHG) emissions. The international community can achieve this by paying forest owners and users – either through national governments or directly – to fell fewer trees and manage their forests better. Farmers, companies and forest owners can simply sell forest carbon credits and less cattle, coffee, cocoa or charcoal.

This apparently brilliant idea now faces realities on the ground. The ownership of forests is often unclear or contested. Governance is weak, and corruption and power struggles at many levels are rife. Most countries do not have good data, or the skills and systems to measure changes in forest carbon. Added to all this, the international REDD+ architecture itself is far from clear and will continue to evolve over the next few years.

Box 1.1. What is REDD+?

… 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

REDD+ has evolved as a concept (Chapters 2–4) and means different things to different countries, organisations and individuals. In this book we use REDD+ as an umbrella term for local, national and global actions that reduce emissions from deforestation and forest degradation, and enhance forest carbon stocks in developing countries (REDD+). The plus sign indicates *enhancement of forest carbon stock*, also referred to as *forest regeneration and rehabilitation*, *negative degradation*, *negative emissions*, *carbon uptake*, *carbon removal* or just *removals*. (*Removals* refer to sequestration of carbon from the atmosphere and storage in forest carbon pools.) We have used these terms interchangeably in 'Realising REDD+', but all refer to activities that increase the amount of carbon per hectare, sometimes called *carbon density*. Finally, the term *fluxes* is used to cover both emissions and removals.

Figure 2.1 in Chapter 2 clarifies the three types of changes that are included in REDD+: *deforestation* means forest area is reduced, *degradation* means carbon density is reduced and *regeneration* and *rehabilitation* means carbon density is increased. Enlarging the area of forests (e.g., through afforestation and reforestation, A/R), is another way to increase forest carbon stocks, but A/R is not part of REDD+. Future decisions by UNFCCC might change this. (A/R is part of the Clean Development Mechanism, CDM.)

The terms *conservation* and *sustainable management of forests*, as used in the quote above, do not fit easily into our definition. These terms might refer to activities that cut emissions and boost removals. For example, the *stock difference* approach (Wertz-Kanounnikoff and Verchot 2008), the standard way of measuring emissions and removals, does not take into account how changes occur. The *gain–loss approach*, on the other hand, estimates the impact of different activities, e.g., better management of forests, on forest carbon. Activities that might qualify (be accounted and credited) under the gain–loss approach are yet to be determined.

The term *conservation* as used in documents and debates, is also not clearly defined. Forest conservation is, of course, a means to reduce emissions. But conservation might also refer to a system in which payments are made on the basis of *actual* forest carbon stocks not on the basis of *changes in stocks* (see Angelsen and Wertz-Kanounnikoff 2008). It is unclear whether future REDD+ payments will be made on the basis of carbon stocks. In this book we focus on fluxes, payments for reduced emissions and increased removals.

Finally, REDD+ is shorthand for both a set of *policies* or *actions* that aim to reduce emissions and increase removals, and for the final *outcomes* of those policies or actions (i.e., reduced emissions and increased removals). In this book REDD+ is used in both senses.

REDD+ debates and negotiations are no longer confined to global forums but have made their way into national capitals and communities. Governments in developing countries, national and international organisations, hundreds of REDD+ projects and thousands of forest communities are trying to figure out how to make REDD+ work for them. More than 40 countries are developing national REDD+ strategies and policies, and working out answers to the simple question: What should REDD+ look like in our country?

Purpose of this book

This book draws lessons from research and experience to inform national REDD+ strategies and policies. Our audience is those who are developing strategies and formulating and implementing national level policies and demonstration activities at all levels. The book should also provide a useful reality check to those working to design the global REDD+ architecture.

The core idea of REDD+ is to create a multilevel (global-national-local) system of payments for environmental services (PES) that will reduce emissions and increase forest carbon stocks. While payment directly to forest carbon rights holders (forest owners and users) has strong merits, the challenges for wide application in the short term are huge. Throughout the book we argue that, at least in the short to medium term, REDD+ will need to embrace a broad set of policies. These include institutional reforms to improve governance, clarify tenure, decentralise appropriately and encourage community forest management (CFM). Changes in agricultural policy could curb demand for new agricultural land and clearing of forests. Energy policies could reduce forest degradation caused by harvesting woodfuel, while encouraging reduced impact logging (RIL) practices could lessen the harmful effects of timber extraction. Setting up protected areas could also be effective in conserving forests.

This book puts lessons from several decades of experience in implementing such policies on the table. Many of the REDD+ policies that governments are planning are variations on measures tried in the past. CFM schemes sponsored by external agencies, for example, have been tried for more than 50 years, and protected areas have an even longer history. Unfortunately, many past interventions have had disappointing results. The lessons we have learned, although often about 'what not to do', are still important. REDD+ planners and policy makers need to appreciate that REDD+ is not something entirely new and that there is much we can learn from previous experiences in forest conservation and management.

Box 1.2. The forest transition

The change in the area of forest in a country may follow the pattern suggested by the forest transition theory (Mather 1992). Initially, a country has a high and relatively stable portion of land under forest cover. Deforestation begins, then accelerates and forest cover reduces. At some point deforestation slows, forest cover stabilises and begins to recover. This pattern is shown in Figure 1.1, where five different stages are identified:

- Stage 1: High forest cover, low deforestation rates (HFLD)
- Stage 2: High forest cover, high deforestation rates (HFHD)
- Stage 3: Low forest cover, high deforestation rates (LFHD)
- Stage 4: Low forest cover, low deforestation rates (LFLD)
- Stage 5: Low forest cover, negative deforestation rates (LFND)

The forest transition theory can be applied both to countries and regions within countries. The trigger that sets off forest transition is frequently new roads, which open up markets for agricultural products and are often part of colonisation programmes (Chomitz *et al.* 2006; Angelsen 2007). A number of reinforcing loops can accelerate deforestation: further infrastructure developments that provide better access to markets, high population densities and rising incomes that boost demand and capital accumulation. Two forces eventually stabilise forest cover, *economic development*, where better paid, off-farm jobs reduce the agricultural rent and the profitability of deforestation (see Box 10.1), and *forest scarcity*, where scarce forest cover increases forest rent (the value of forest products and environmental services) and puts the brakes on forest conversion (Rudel *et al.* 2005).

The forest transition is not a law of nature, and transitions are influenced by national contexts, global economic forces and government policies. Countries may have very little remaining forest before forest cover stabilises, or they might, if policies are appropriate, be able to 'bridge the forest transition' – a central aim of REDD+.

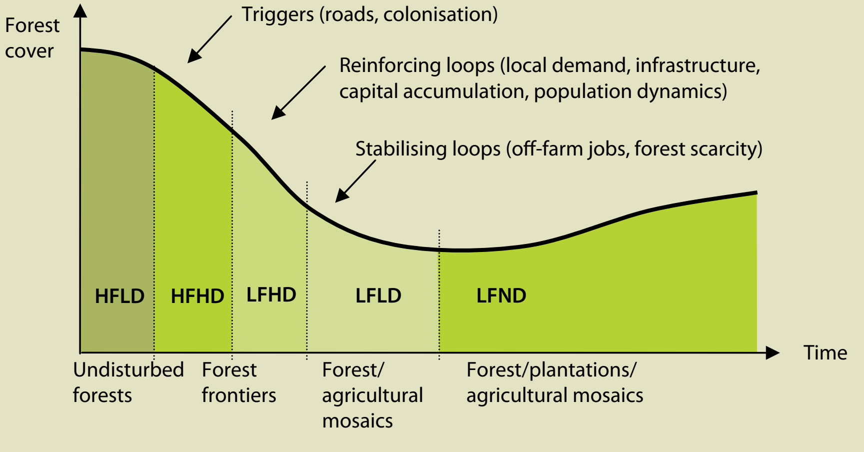

Figure 1.1. Different stages in the forest transition

Box 1.3. Effectiveness, efficiency, equity and co-benefits (3Es+)

The 3E+ criteria refer to effectiveness, efficiency and equity and are used in the climate debate to assess proposed options and their expected outcomes (Stern 2008), or to evaluate actual outcomes (Chapter 22).

Effectiveness refers to the amount of emissions reduced or removals increased by REDD+ actions. Are the overall climate targets met? *Efficiency* refers to the costs of these emissions reductions or removal increases. Are the targets being achieved at minimum cost? *Equity* refers to the distribution of REDD+ costs and benefits. Are the benefit shared and the costs allocated fairly? Angelsen and Wertz-Kanounnikoff (2008) elaborate these criteria.

Effectiveness An *ex ante* evaluation of the effectiveness of a proposal would consider subcriteria such as depth and additionality, breadth and scope, flexibility and robustness, control or avoidance of leakage, permanence and liability, and to what extent the action is targeting the key drivers of deforestation and degradation. Governance and corruption would also be important considerations. For example, to what extent is the proposed action vulnerable to corrupt practices? An *ex post* evaluation would measure changes in forest carbon stocks directly, and compare with a business-as-usual (BAU) baseline.

Efficiency criteria would consider start-up costs (including capacity building), running costs of financial and information (MRV) systems, compensation for lost income (opportunity cost) and rent (rent equals transfers minus costs) along with the implementation costs of forest owners, managers and users. All these, except compensation and rent, are transaction costs.

Equity criteria would consider different scales (global, national, subnational) and groups of stakeholders based on income, assets such as land, ethnicity, gender and so on. In assessing equity there is also a distinction between REDD+ rents, the overall transfers and the costs of the action. The debate focuses more on sharing benefits (transfers) than on distributing costs (Chapter 12). Many REDD+ schemes will make no direct payments to forest owners and users, but will impose costs or lost opportunities. For example, policies that reduce demand for woodfuels will cause charcoal producers to lose income (Chapter 19). Such costs should also be considered.

REDD+ is not only about climate change. Other goals, known as 'co-benefits' (i.e., benefits in addition to reduced climate change) are also important. There are at least four types of co-benefits to consider. First, forest conservation, in addition to storing carbon, provides other environmental services, such as preserving biodiversity. Second, REDD+ actions (e.g., financial flows) and forest conservation might have socio-economic benefits, such as reducing poverty, supporting livelihoods and stimulating economic development. Third, REDD+ actions may spark political change toward better governance, less corruption, and more respect for the rights of vulnerable groups. Fourth, REDD+ actions and forest conservation could boost the capacity of both forests and humans to adapt to climate change.

Inspired by the move from REDD to REDD+, this book refers to the assessment criteria of effectiveness, efficiency, equity and co-benefits as the 3Es+.

In 2008, CIFOR published ‘Moving Ahead with REDD’, which focussed on what the global REDD+ architecture might look like. That book set the stage for this one. In ‘Realising REDD’ we shift the focus from the global to the national level.

The challenge when discussing national structures and policies rather than the global architecture is that there is one world, but there are one hundred tropical developing nations. Each country’s forest context is unique: the drivers of deforestation and degradation are different, their forests are at different stages of the forest transition and their economies are at different stages of development. The capacity of countries to implement policies varies as do the politics that shape REDD+ strategies and policies. Given the diversity of national circumstances, formulating and assessing generic ‘one size fits all’ REDD+ strategy and policy options are very challenging.

The forest transition theory is a useful framework for making sense of the diversity of country contexts. This is partly because the extent of forest cover and rates of deforestation are important in themselves, and partly because the forest transition stage correlates with other country characteristics (see Box 1.2). The types of challenges and appropriate responses vary according to what stage a country’s forests are at according to the forest transition framework. This framework is thus useful for assessing policy options to address the drivers of deforestation (e.g., Chapter 15).

This book follows the same recipe as ‘Moving Ahead with REDD’. We set out the key problems, present options and discuss the options as regards carbon effectiveness, cost efficiency, equity and co-benefits (the 3E+ criteria, see Box 1.3). Chapters describe experiences and draw lessons from comparable interventions in the past, and point to what is new about REDD+. We believe this is the first comprehensive attempt to systematically discuss these lessons and their relevance to realising REDD+ at the national level.

The REDD+ debates display a wide range of opinions (Chapter 3). Researchers and scientists also disagree. Some of this diversity of opinions and interpretations of reality are also reflected in this book. This is healthy for the REDD+ debate, and open and free discussions should be encouraged. At the same time, some disagreements can be reduced by confronting positions with empirical evidence, including that of similar experiences in the past. The book therefore aims to both eliminate some of the disagreements but also stimulate further debate.

How the book is organised

The book is divided into five parts, as shown in Figure 1.2. Part 1, 'Moving REDD+ from global to national level', describes the links between discussions at the global and national levels, putting the discussion about national REDD+ strategies and policies in the global context. Chapter 2 first reviews six key elements of the global REDD+ system as these have significant implications for national systems. The second part of Chapter 2 then sets out a broad conceptual model for a national REDD+ architecture (Figure 2.2) which is used in later chapters. Similarly, Chapter 3 describes global REDD+ debates and identifies key actors and interests before discussing to what extent the debates and agendas are mirrored in national debates. The chapter explains the realities of implementing REDD+ in five countries: Bolivia, Cameroon, Indonesia, Tanzania and Vietnam. Chapter 4 puts current REDD+ debates into the historical context, asking why large forest conservation programmes in the past have generally failed, what is new about REDD+ and whether we have learned anything from past mistakes.

Part 2, 'Building REDD+ institutional architecture and processes' discusses REDD+ national institutional structures, defining the capacities and responsibilities of different actors, and the rules for their interaction. The first two chapters deal with institutions for handling REDD+ financial flows.

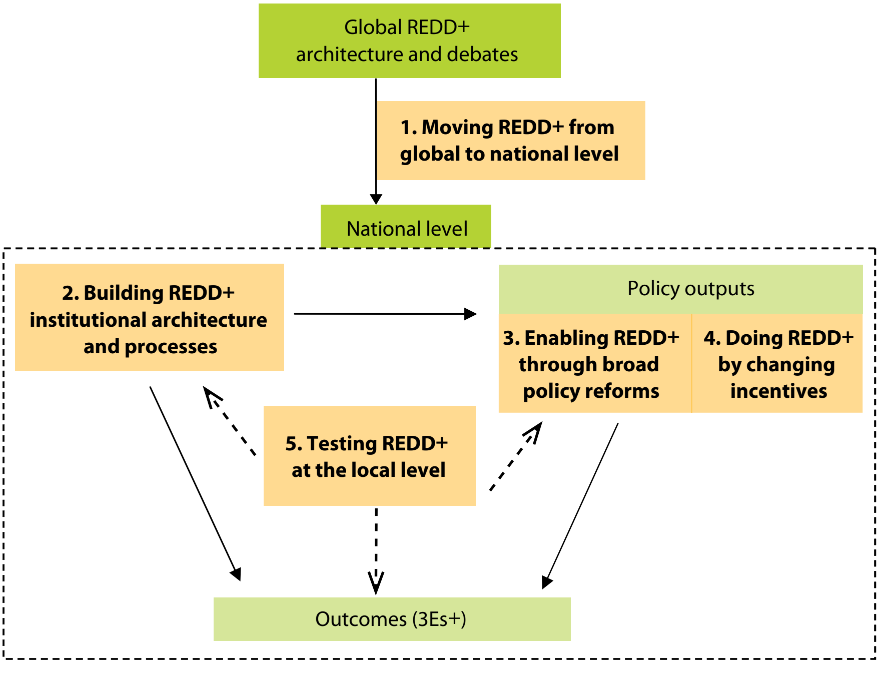

Figure 1.2. How this book is organised

Chapter 5 presents four options for managing REDD+ funds nationally, through projects, independent funds, funds within state administrations and budget support. Chapter 6 reviews the experiences of conservation trust funds (CTFs), which could be models for independent REDD+ funds, and discusses how different types of funds could manage different tasks in a national REDD+ scheme.

Chapter 7 gives a comprehensive overview of monitoring, reporting and verification (MRV) requirements for REDD+ and identifies three challenges. The first is linking MRV to national policies, the second is helping countries participate before they are ready to implement REDD+ fully and the third is linking implementation at the national scale to implementation at the subnational scale. One option for linking national and subnational implementation is to integrate community monitoring into the national MRV system. Chapter 8 reports the experiences of a large project which found that communities can monitor carbon cheaply and accurately, and thereby help to establish payments for environmental service (PES) schemes. Chapter 9 is a broad discussion of how to integrate actors, both vertically (across scales) and horizontally (across sectors and state and non-state actors), in formulating and implementing policy.

The institutions and processes lead to a set of outputs (policy documents and decisions), which in turn produce a set of outcomes for forests and people (Figure 1.2). Chapter 10 introduces Part 3, 'Enabling REDD+ through broad policy reforms' and Part 4, 'Doing REDD+ by changing incentives' through sectoral and specific policies. Sectoral policies include policies to bring down agricultural profitability or rent in forested areas, policies to make standing forests more valuable and enable land users to capture that value, and policies to directly regulate land use. The broad policy reforms may only affect forests indirectly, but they contribute to effective, efficient and equitable outcomes, and often more co-benefits (3E+) of sectoral policies.

Chapters 11 and 12 deal with some of the hottest issues in the REDD+ debate: tenure, rights and benefit sharing. Chapter 11 focuses on the imperative for tenure reform and suggests concrete ways of doing this. Chapter 12 follows up by discussing options for reforming laws and regulations related to tenure, carbon rights and benefit sharing.

Chapter 13 looks at governance and corruption, reviewing how corruption in the forest sector may affect REDD+ outcomes and recommending concrete steps governments can take to stem corruption. Case studies from Bolivia, Cameroon and Indonesia show that targeted interventions can work. The last chapter in Part 3, Chapter 14, draws lessons from decades of decentralisation in the forest sector, and assesses five optional levels for REDD+ implementation against the 3E+ criteria, central government, subnational governments, projects, forest user groups and traditional authorities.

The six chapters in Part 4, 'Doing REDD+ by changing incentives', deal with specific policies to realise REDD+. Chapter 15 first reviews how agricultural policies throughout history have shaped tropical landscapes, then introduces the concept of REAP, reduced emissions agricultural policy. REAP supports productive agricultural areas close to major population centres in order to reduce pressure from agriculture in forested areas.

The next three chapters look at three policy interventions that could be important at the local level. Chapter 16 draws on decades of experience and research in community forest management (CFM) to examine two questions: Under what circumstances is CFM likely to be viable? and, How can better design improve CFM interventions? Chapter 17 looks at payment for environmental services (PES) schemes, an important new feature of REDD+, and explains the preconditions for effective implementation. Lessons from PES experiences are discussed, including from case studies in Costa Rica and Ecuador, and a set of options for REDD+ implementation are put forward. Chapter 18 presents experiences from protected areas (PAs) and integrated conservation and development projects (ICDPs) over several decades, and the lessons we can learn for REDD+ implementation.

The last two chapters in Part 4 deal with degradation. Chapter 19 asks how emissions from the production and use of woodfuels (fuel wood and charcoal) can be reduced, and critically reviews previous policy interventions to either reduce demand or control supply. Similarly, Chapter 20 asks why so much tropical forest degradation is related to timber harvesting and discusses steps that can be taken to cut emissions and boost carbon uptake.

REDD+ is a new endeavour and several REDD+ activities (demonstration activities, pilot projects, first generation REDD+ projects) are already forging ahead. These are dealt with in Part 5, 'Testing REDD+ at the local level'. Chapter 21 gives a snapshot of current projects, particularly in the three largest tropical forest countries, Brazil, Indonesia and the Democratic Republic of Congo. Chapter 22 asks how we can 'learn while doing' in REDD+ projects. We must take a systematic approach to evaluate outcomes and to learn how REDD+ can work better, by collecting and analysing data. Chapter 23 concludes the book by presenting a set of dilemmas that national policy makers face in designing and implementing REDD+ strategies and policies.

Part

1

Moving REDD+ from global to national level

Chapter 2

Global and national REDD+ architecture

Linking institutions and actions

Sheila Wertz-Kanounnikoff and Arild Angelsen

- The global REDD+ architecture will influence the design and implementation of national REDD+ schemes. However, the nature of the global architecture is not yet clear and will probably evolve quickly over the next few years. To deal with uncertainties, countries should adopt flexible mechanisms and can implement REDD+ schemes in stages.
- Realising REDD+ within countries means paying attention to three key elements: incentives, information and institutions (the 3Is). *Incentives* consist of performance-based payments and changes in policies. Countries need to provide reliable *information* on realised changes in forest carbon stocks to qualify for funds from international sources. Effective *institutions* are needed to manage information and incentives.
- REDD+, as part of nationally appropriate mitigation action (NAMA), offers opportunities to harmonise national mitigation actions across sectors and to redirect development toward low carbon economies.

Introduction

REDD+ started as a global initiative and much of the debate has been about the global architecture. But, although the incentives for REDD+ will be set at the global level, realising REDD+ will require action at national and local levels. Tropical forest countries will have to redirect their budgets and administration, undertake reforms and reorient their economies toward low carbon emissions.

The problem facing countries looking to put REDD+ in place is that the global REDD+ system has not yet been decided, although it is gradually taking shape at meetings of the United Nations Framework Convention on Climate Change (UNFCCC), in particular at the annual Conferences of the Parties (COPs). The development process will probably continue for the next few years. Meanwhile, REDD+ is likely to be put in place in stages, as discussed below. Perhaps the greatest uncertainty surrounds the international funding that could be made available for REDD+ – the amount, timing and conditions. Planning for REDD+, therefore, must be flexible.

We are likely to see different REDD+ systems emerge. The current global focus is on UNFCCC negotiations. If REDD+ is linked to carbon markets, the main funding sources are likely to be the European Union Emission Trading Scheme (ETS) and the US carbon market. Avoided deforestation is currently not included in ETS and it is uncertain whether it will be included in the near future. In the USA, proposals are on the table to include REDD+ as an offset option. Other national or regional carbon markets and voluntary markets are also likely to emerge or develop further. Standards will probably vary between markets, introducing yet more complications for countries that want to implement REDD+.

This chapter first reviews the main features of the global REDD+ architecture currently being discussed as part of the UNFCCC negotiations. The global architecture will influence the design and implementation of national REDD+ strategies and policies. The second part of the chapter describes the main features of national REDD+ architecture. This framework will be discussed in several subsequent chapters.

Global REDD+ architecture and implications for national REDD+

Phased approach

Several countries have put forward proposals on how to incorporate a REDD+ mechanism into a post-2012 climate regime. One important and increasingly accepted proposal is for REDD+ implementation in three – possibly overlapping – phases (Meridian Institute 2009a, b). In the first 'readiness' phase, countries prepare a national REDD+ strategy through inclusive multistakeholder consultations, start building capacity in monitoring, reporting and verification (MRV), and begin demonstration activities. The second phase is 'more advanced readiness', but the focus is to implement policies and measures (PAMs) to reduce emissions (as set out in the national REDD+ strategy and which will be verified by proxy indicators). The third phase is full UNFCCC 'compliance'. In this phase, tropical forest countries are compensated solely for reduced emissions and enhanced carbon stocks relative to agreed reference levels.

The advantage of the phased approach to REDD+ lies in its flexibility: countries can participate according to their capacity and have incentives to progress from one stage to the next. This means that a wide range of tropical forest countries will be able to take part in REDD+. For example, countries with sophisticated MRV systems, and sound institutional frameworks may start at phase 3. Other countries with less sophisticated MRV systems can start at phase 1 or 2, but have incentives to move toward more sophisticated systems so that they can graduate to phase 3. The incentive for graduating

Table 2.1. Elements of a phased approach toward REDD+

	Phase 1	Phase 2	Phase 3
Scope	RED/REDD/REDD+	REDD/REDD+	REDD+
Crediting scale	Subnational	Nested (both subnational and national)	Nested or national approach
Performance indicators	Strategy adopted Legislative and policy assessment completed Consultations conducted Institutions in place	Policies enacted Measures enforced Proxies for forest carbon changes	Quantified forest carbon changes (tCO_2e), compared to a reference level
Funding	Initial support for national strategy development and readiness activities (e.g., FCPF, UN-REDD, bilateral initiatives)	Funding from bilateral and multilateral sources and COP-mandated funds.	Primarily linked to compliance carbon markets, but might also be via global fund
MRV systems	Capacity development	Capacity development and basic monitoring capacities	Advanced monitoring capacities and setting reference levels

Source: Adapted from Meridian Institute (2009a, b) from phase 1 to phase 3 is that by doing so, countries generate added and more reliable income from REDD+.

The sources of funds vary according to the phase of REDD+ implementation. In the early phases (phases 1 and 2), funding will come mainly from public sources. There could also be funding from voluntary markets, but this would be mainly for projects producing verified emission reductions (VERs). As countries develop more sophisticated MRV systems in phase 3, direct financing by compliance markets becomes feasible. Since carbon compliance markets could leverage more predictable and longer-term funding than public sources, countries that graduate to phase 3 could generate significant income from certified reductions in forest emissions.

Creditable REDD+ activities

In 2005, discussions focused only on 'reducing emissions from deforestation' (RED). As it became clear that forest degradation in some countries was an even bigger problem than deforestation, 'avoided degradation' – the second D – was officially endorsed at the 2007 COP13 in Bali and RED morphed into 'reducing emissions from deforestation and degradation' (REDD).

Subsequently, it was further recognised that there could be climate benefits not only from avoiding negative changes (deforestation, degradation) but also from enhancing positive changes, such as conserving and restoring forests (Angelsen and Wertz-Kanounnikoff 2008). This can be referred to as 'removals' or 'negative emissions' (cf. Box 1.1). This was expressed as the '+', and 'reducing emissions from deforestation and forest degradation in developing countries (REDD); and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries' (REDD+) became official language at the 2008 COP14 in Poznan. This change in scope is illustrated in Figure 2.1 in the form of a U-turn (which is not to suggest that negotiations are moving backwards!).

Changes in:	Reduced negative change	Enhanced positive change
Forest area number of hectare	Avoided deforestation	Afforestation and reforestation (A/R)
Carbon density (carbon per hectare)	Avoided degradation	Forest regeneration and rehabilitation (carbon stock enhancement)

Figure 2.1. Creditable activities in a REDD+ mechanism

Source: Angelsen and Wertz-Kanounnikoff (2008)

An important question is whether or not this U-turn will be completed, i.e., whether afforestation and reforestation (A/R) activities will be eligible for REDD+. A/R projects are already eligible in the Clean Development Mechanism (CDM), and hence are already included in the global toolbox to mitigate climate change. Some disagree that forest plantations should be included in a global REDD+ scheme, because encouraging plantation forestry could threaten conservation of biodiversity (e.g., Greenpeace 2009). Others argue that forest plantations need to be part of REDD+ to make rules for land use planning consistent and, ultimately, so that there will be just one coherent system that accounts for all changes in terrestrial carbon stocks (e.g., proposals by Indonesia, India and China; see Parker *et al.* 2009).

Subnational, national and nested approaches

A recurrent issue in the REDD+ debate is the level at which accounting and providing incentives will take place. Three approaches are being discussed: direct support to projects (subnational level), direct support to countries (national level), or a 'nested' approach that combines the two (Angelsen *et al.* 2008; Pedroni *et al.* 2009).

The global REDD+ negotiations lean strongly toward a national approach for a number of reasons: countries would be free to pursue a broad set of policies, countries could account for and control domestic leakage, and countries could have a stronger sense of ownership. In the short to medium term, however, a national approach is not feasible in many countries. So, global REDD+ negotiations are considering a subnational approach as a first step toward national approaches (UNFCCC 2007: Decision 2/CP.13).

Many project-based REDD+ activities are already underway in response to the call for national demonstration activities to inform the design of a global REDD+ mechanism (UNFCCC 2007: Decision 2/CP.13), see Chapter 21. Projects attract private sector finance, and encourage early involvement and broad participation. Emission reductions realised by these activities are considered to be 'early action' and may become eligible for credits under a global post-2012 REDD+ mechanism.

A nested approach, the most flexible of the three approaches, allows countries to begin with subnational activities and to move gradually to a national approach. The nested approach allows both subnational and national approaches to coexist and allows both projects and government to earn REDD+ credits, in a similar way to the Joint Implementation (JI) mechanism under the Kyoto Protocol. The challenge in the nested approach is to harmonise the two levels. It represents the most likely scenario for REDD+ in many countries, particularly in the short to medium term when subnational activities will continue and be credited by an international mechanism in parallel with national-level accounting and crediting.

Performance-based payments

A core idea of REDD+ is performance-based payments. That is, payments are conditional on the outcome of a REDD+ action. The main argument for payment for outcomes (as opposed to payment for inputs) is that linking incentives as directly as possible to problems will be most effective. For example, a payment for a policy reform cannot take into account how effectively a policy will be implemented, or whether other complementary reforms are also necessary.

In principle, performance-based schemes can be established for emissions or carbon stocks. For emissions, the net change in carbon stocks for a specific period – as compared with a reference level – can be used to calculate credits. For carbon stocks, payments could be based on the total carbon stock in a forest during a specific period, that is, on absolute levels and *not* the changes (emissions). The global carbon markets that are emerging trade emission reductions and, therefore, can be tapped to fund REDD+ activities (provided REDD credits are made fungible). Further, an emission-based approach targets the climate problem directly (i.e., the problem is emissions) and, therefore, provides countries and projects with a greater incentive than indirect approaches (Angelsen and Wertz-Kanounnikoff 2008).

One important requirement for performance-based payments is a capacity for MRV. Ultimately, in phase 3 of the implementation process, the performance indicators used to determine payments are quantified emission reductions or stock enhancements (tonne of carbon dioxide equivalent – tCO_2e). In phases 1 and 2, when MRV systems are less developed, interim performance indicators or verifiable proxies can be used to determine payments (Chapter 7). Proxies could be policies that have been enacted, measures enforced, consultations conducted, capacity enhanced, demonstration activities implemented, or proxies for changes in emissions and/or removals that have taken place (e.g., reduction in deforestation rates).

Performance indicators for policies and measures (PAMs) will be particularly important to leverage funds for phase 2 of REDD+ implementation. Many tropical forest countries are far from being eligible for phase 3, and need to make substantial investments in often costly policy reforms. The performance indicators for PAMs must, therefore, be internationally accepted and monitored. Tropical forest countries seeking to participate in an international REDD+ scheme will also need to adopt transparent design and implementation processes for REDD+ policies and measures.

Sources of funding

Since RED was put on the international negotiations table in 2005, the debate on finance has evolved significantly. From early, dichotomous discussions of fund versus market-based finance (Alvarado and Wertz-Kanounnikoff 2009), the debate now recognises that a variety of financing sources (voluntary contributions, market-based and fund-based finance) will be needed for REDD+ (Dutschke *et al.* 2008; Grondard *et al.* 2008; Meridian Institute 2009a), particularly in the early phases.

Funding in the three phases of REDD+ implementation is likely to come from different sources. Voluntary financial contributions (e.g., from the World Bank Forest Carbon Partnership Facility (FCPF), UN-REDD Programme, or bilateral initiatives) will be the main funding source for phase 1 (Meridian Institute 2009a). Bilateral and multilateral sources and COP-mandated fund-based finance, for example through the establishment of a global forest facility, will be the main sources of funds for phase 2 REDD+ national strategy implementation (Meridian Institute 2009b). Other ways to mobilise fund-based finance include market-linked approaches, where revenues are generated from auctions of emission allowances in Annex I countries (EC 2008; cf. Mexican and Norwegian proposals, see Dutschke 2009; Parker *et al.* 2009). Performance-based REDD+ finance could also be triggered by agreeing indicators (in the early stages of phase 2), or by setting national reference levels for forest carbon stocks so that changes in carbon stocks (or proxies) from the implementation of REDD+ policies (later stages of phase 2) can be measured. To monitor the effectiveness of policies requires appropriate data and capacities. A country's ability to provide these signifies a transition toward phase 3.

In phase 3, the changes in forest carbon stocks are measured against agreed reference levels. In this phase, emission reductions could also generate funds when sold as certified carbon credits on international carbon markets, and could become the main source of funding. But for carbon markets to exploit the full potential of REDD+ carbon credits, the inclusion of REDD+ credits needs to be accompanied by more ambitious targets for reducing global emissions.

Monitoring, reporting and verification and reference levels

The consensus on MRV is that a common methodology should be used for policy approaches (based on remote sensing and ground verification); that robust national forest monitoring systems and verification after the fact are required; and that there is a need for reference emission levels that take into account national circumstances.

Despite significant progress in the last few years, several questions concerning MRV are still being discussed in UNFCCC negotiations. These include which carbon pools should be monitored, whether verification should be done by national or international entities, and how reference (crediting) levels should be set (Verchot and Petkova 2009). Two options have been proposed regarding which carbon pools should be included, one is to monitor all five approved pools and the other is to monitor only selected pools. The latter option is likely to be more cost effective and more consistent with current CDM rules for A/R activities and with national greenhouse gases accounting for land use, land use change and forestry (LULUCF) in Annex I countries.

As regards whether verification should be done by national or international entities, Parties explored the option of verification at the national level (in accordance with internationally agreed guidelines and procedures) for nationally funded actions, and verification at the international level for actions implemented with external support (Verchot and Petkova 2009).

Although there is agreement that reference levels should be based on historical emissions and take national circumstances into account, there is no agreement on what constitutes a reference level, or the criteria or procedures for setting reference levels. Conceptually, reference levels can refer to either a business-as-usual (BAU) baseline or a crediting baseline (Angelsen 2008a). Different ways of setting the reference levels have profound implications for allocating global REDD+ resources and also for incentives (Meridian Institute 2009a).

Four options have been put forward for setting reference levels. These differ according to whether country-specific baselines are determined by a negotiated formula or whether the baseline is proposed by the country and approved by the COP, an independent panel of experts, or a combination of the two. Involving experts is considered to be critical in order to minimise the risk of inflated reference levels, which would limit or even eliminate global additionality (Meridian Institute 2009a).

National REDD+ architecture

In theory, the overall REDD+ architecture can be compared to a multilevel payment for environmental services (PES) scheme (Angelsen and Wertz-Kanounnikoff 2008). There are at least two levels. At the international level, buyers (e.g., voluntary or compliance markets) will pay sellers (governments or subnational entities) in tropical forest countries for an environmental service or measures likely to deliver this service (e.g., tenure reform, law enforcement). At the national level, governments or other intermediaries (buyers) will pay subnational governments or local landowners (sellers) to reduce emissions or to take other measures to reduce emissions (e.g., strengthen law enforcement or remove subsidies). In practice, the problems of national implementation of PES call for a much broader policy approach, as argued in several of the book chapters.

The key elements of a national REDD+ structure are shown in Figure 2.2. At the international level, funds may originate from carbon markets and international funds (of voluntary contributions or linked to carbon markets) as shown by the red arrows. At the national level, money can be channelled either as support to governments or related institutions, or to separate REDD+ funds. Direct support for projects is also feasible, as discussed earlier.

Figure 2.2 also shows the 3Is – *incentives* (red arrows), *information* (green arrows) and *institutions* (white boxes). The 3Is need to be flexible, as they will change over time as countries progress through the three phases of REDD+ implementation. For example, while subnational activities are likely to be particularly important during the early phases of REDD+ implementation (phase 1), this will change to a national approach in the long run (phase 3).

What should REDD+ funds be spent on?

Before discussing national institutions for implementing REDD+, we outline the main ways REDD+ funds may be spent:

1. **On capacity building and readiness.** This refers to money 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 learning, and also reduce and remove emissions.
2. **On broad policies to address the drivers of forest carbon change.** This refers to money spent on policies and measures (PAMs) to address the underlying drivers of forest carbon change, including regulating demand for agricultural and forest products, tenure reforms, land use planning, better governance, and command and control measures. Parts 3 and 4 of this book discuss these measures at some length.
3. **On performance.** This refers to money spent on rewards for performance or results, and requires some form of performance measurement, which could be indicators, proxies or quantified forest carbon change depending on the level of MRV capabilities. Payments for forest carbon services are the most direct form of performance payments, but other more intermediate forms between this and PAMs are feasible.

All three types of spending require MRV in order to ensure payment according to performance, the key principle behind REDD+. However, different institutional and MRV arrangements will be needed for the different types of activities and payments.

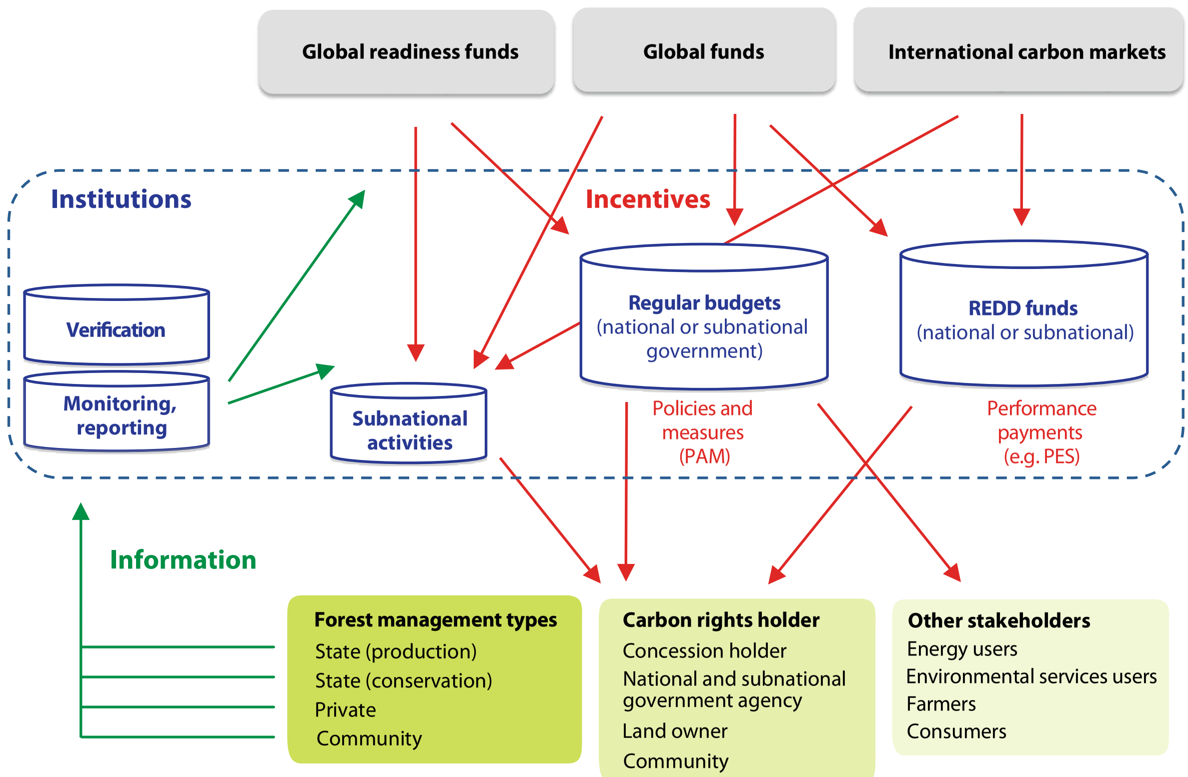

Figure 2.2. Conceptual model of national REDD+ architecture

Money could be spent in all three ways simultaneously. For example, PAMs will be needed in all three phases of REDD+ implementation. A country could produce REDD+ credits for sale in international carbon markets (phase 3) by putting in place a set of PAMs to reduce the pressure on forests and, at the same time, put in place performance-based measures.

Institutional framework for national REDD+

Figure 2.2 shows the three main elements of national REDD+ architecture: incentives, information and institutions (the 3Is). REDD+ *incentives* flow from international sources to a national fund or to regular budgets (e.g., ministries of finance) and then to the subnational level through the government budget or direct payments to carbon rights holders (Chapter 5). Carbon rights holders include private landholders, communities, concession holders and government agencies.

Figure 2.2 also shows how international performance payments can flow directly to local carbon rights holders, without passing through national REDD+ funds or government budgets. This would occur in the subnational and nested approaches. Although the nested approach is limited to the early phases of REDD+ implementation (since a national approach is the long-term goal), it could persist for much longer if countries choose the project-based crediting route.

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 submitted to a national REDD+ payment authority (fund or treasury), a UNFCCC institution, and to international buyers of REDD+ credits. Payments to local carbon rights holders will be determined by this information.

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 REDD+ payment authority would channel funds from the international to the subnational level according to the volume, location and type of emission reductions (Chapter 5). Most probably, sub-institutions will be needed to manage technical, financial, administrative and supervisory aspects. The MRV system will gather and verify information on actual reductions in forest emissions and report to national and international counterparts (Chapter 7). In principle, the MRV system could cover any level, from national to international. Since MRV capabilities are costly to develop and maintain, regional MRV systems, such as envisaged by Central African Forest Commission (COMIFAC) countries, could be cost effective. 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 transition from subnational or nested approach to a fully national approach where project-level activities need to be integrated into the national system (also called the 'docking issue', see FCPF 2009).

Concluding remarks

The international REDD+ architecture will influence the design and implementation of national REDD+ schemes. But the international architecture is still evolving. Meanwhile, a phased approach, at both international and national levels, is important to ensure wide participation and to reward countries as they develop REDD+ schemes. The institutional arrangements countries put in place need to be flexible to accommodate changes as they move through the different phases of implementation.

Realising REDD+ within countries has three main features: incentives, information and institutions (3Is). First, countries need to put in place incentives to reduce forest emissions and enhance removal of carbon; this could be done directly by making payments for performance, indirectly by changing policies, or both. Second, countries need to set up reliable systems to collect information on changes in forest carbon stocks to secure cash flows from international sources. Finally, countries need to develop institutions, either by setting up new ones or by reforming existing institutions, to manage the upward and downward flow of information and rewards.

One topic that is cropping up more and more in international climate negotiations is the need for REDD+ to be part of 'nationally appropriate mitigation actions (NAMAs)' that encourage low carbon development. Clearly, climate mitigation in developing countries needs to align with developments in other sectors and at other levels (national and international), particularly as regards long-term, full carbon accounting. Making REDD+ part of NAMAs sets the scene for harmonising national mitigation actions across sectors and redirecting development toward low carbon economies.

Chapter 3

When REDD+ goes national

A review of realities, opportunities and challenges

Leo Peskett and Maria Brockhaus

- The development of national REDD+ strategies has progressed. Common challenges include establishing appropriate national institutions that link into ongoing processes; ensuring high level government commitment; achieving strong coordination within governments and between state and non-state actors; designing mechanisms to ensure participation and benefit sharing; and establishing monitoring, reporting and verification (MRV) systems.
- The different agendas of actors involved in policy formulation at the national level reflect those at the international level. Conflicting interests could make it difficult to overcome the key challenges and hamper coordination, which could reduce efficiency in formulating and implementing REDD+ actions.
- Issues such as participation, land tenure and other reforms are key issues in developing effective REDD+. But it is unclear to what extent these are mere rhetoric or whether they represent genuine motivation to address such issues the context of REDD+.

The politics of REDD+

Concerns about climate change at the international level have resulted in massive interest in tackling the drivers of deforestation and degradation. But REDD+ is also fast becoming a reality in national politics and on the ground. Despite the broad consensus over the role of forest emissions in global climate change, there is much less agreement over how emissions should be included as part of a global climate agreement and what national efforts are needed for REDD+ to make a difference.

Disagreements reflect different concerns and agendas. Concerns among developing countries with respect to an international REDD+ mechanism vary from the possible negative impacts on economic growth and loss of national sovereignty, to being left out of future compensation mechanisms because of the terms on which they will be established. Developed-country concerns range from the need to tap into the low-cost abatement potential of REDD+, to the environmental integrity and economic implications of including REDD+ within mechanisms such as international carbon markets. Critics in several areas have voiced concerns about potentially large financial flows leading to misuse, corruption, displacement of poor or indigenous people and possibly perverse incentives (Griffiths 2007; Lawlor *et al.* 2009). The result is a multitude of debates at different scales of what REDD+ could and should be.

Moving from the international to the national policy arena, we find a similar diversity in the debates. REDD+ strategies and policies are currently being formulated in a number of countries. Some REDD+ policy decisions are induced by international actors such as the UN-REDD Programme and the Forest Carbon Partnership Facility (FCPF) managed by the World Bank. Others derive from the design of Readiness Plan Idea Notes (R-PINs) and Readiness Preparation Proposals (R-PPs). Domestic REDD+ debates are similarly shaped by a variety of more or less powerful actors, operating at different scales and embedded among markets, hierarchies, coalitions, networks and the state. The debates are driven by a multitude of interests, strategies and 'beliefs'. To fully understand the outputs and outcomes of the REDD+ policy process, we must analyse the 'discourse, political interests and the agency of multiple actors' (Keeley and Scoones 1999; see also Hajer 1996).

This chapter first briefly describes the various agendas that have arisen in the global REDD+ debate. The main part of the chapter is a review of processes within REDD+ countries, with snapshots of the realities in Bolivia, Cameroon, Indonesia, Tanzania and Vietnam. We seek to address such questions as:

- What is shaping REDD+ at the national level, besides nationally translated international negotiations and debates?
- In which directions are the early national REDD+ strategies moving?

- What are the key challenges in developing and implementing such strategies and policies?

The REDD+ game: Who is playing and why?

Political decision-making processes rarely produce optimal outcomes. They are not controlled by formal Weberian political and administrative hierarchies, nor do they follow neo-economic ideas of purely market-organised supply and demand. Rather, the process of public policy is embedded in a decentralised network of well – or less-well – organised interests and actors at multiple levels, both governmental and nongovernmental (Mayntz 1993; Schneider 2003). Policy making is not always solution oriented or evidence based. Policy making around REDD+ is no exception, whether internationally or nationally, and will not always lead to the most effective, efficient and equitable REDD+ policy decisions.

Formal discussions at the international level initially focused primarily on technical and methodological issues. However, few issues are purely technical and they have been rapidly translated into political bargaining. New issues, particularly related to the magnitude and sources of international funding for REDD+, have also moved high on the REDD+ agenda. At the international level, the REDD+ debate is commonly divided into a number of key areas of contention (see also Chapter 2; Angelsen 2008b; Meridian Institute 2009a):

- **Scope:** relative emphasis of deforestation and degradation *vs.* carbon stock enhancement; types of activities to be accounted for; forest definitions; inclusion of sustainable forest management; natural regeneration; and afforestation and reforestation;
- **Scale:** level of accounting and crediting to be recognised in an international agreement; sub-national *vs.* national *vs.* nested approaches;
- **Financial mechanisms:** funding sources and delivery mechanisms (different international funds *vs.* carbon market integration *vs.* hybrid solutions, such as auctioning Assigned Amounts Units); governance and institutional structure of international REDD+ finance; level of funding required to implement REDD+;
- **Reference levels:** criteria and procedures to use for establishing reference levels; 'rewarding high deforestation' by using historical baselines; interpretation of 'national circumstances'; interpretation of the principle of 'common but differentiated responsibilities';
- **Participation of indigenous people and local communities:** type and extent of safeguards to be included and appropriate benefit-sharing arrangements; and
- **Co-benefits:** relative emphasis on climate benefits *vs.* co-benefits, in particular poverty alleviation and sustainable development.

These areas of contention have emerged because the main actors in the debate – governments in developed and developing countries, international organisations, NGOs, the private sector and local and indigenous groups – hold different positions. The positions reflect interests and goals that stretch far beyond climate goals, and they influence the key debates on the global REDD+ architecture and their potential outcomes. These include the direct economic benefits of participating in REDD+, concerns about cost efficiency and environmental integrity, national sovereignty, perceptions of fairness and social justice, and public relations and relationship with political constituencies (see Table 3.1).

To add to this complexity, questions are increasingly being asked about the linkages between REDD+ and broader climate change mitigation architecture, in particular nationally appropriate mitigation actions (NAMAs), the types of funding sources and mechanisms that could be used to support REDD+, and how MRV of both support and actions is handled (von der Goltz 2009).

The result has broadened the REDD+ debate to incorporate different agendas. This is seen in the expanding scope from avoided deforestation, through RED and REDD, toward REDD+, and proposals such as the 'phased approach' (Chapter 2), which in some ways relaxes the rules surrounding REDD+, enhancing participation and postponing some difficult decisions.

While debates about REDD+ at the national level are, in general, far less mature, many of the same actors are involved and similar drivers appear to dominate the emerging discourses. However, added layers of complexity need to be understood for how they may affect successful implementation. Finer disaggregation of actors such as governments is particularly important. They cannot be seen as one unit, but rather as a set of different actors with individual interests and an individual mix of drivers for their involvement in REDD+. The interplay between international, national and subnational actors is also an increasingly important issue. The following section outlines some of the important debates and issues in five early-starting REDD+ countries.[1]

When REDD+ enters national politics

Snapshots from Bolivia, Cameroon, Indonesia, Tanzania and Vietnam (Boxes 3.1–3.5) outline key processes and challenges in national REDD+ processes. The case studies reflect ongoing debate and discourse in these countries among the different actors with interests in REDD+. These include: different government institutions at national and subnational levels; international, national and local environment and development NGOs; affected communities;

1 In addition to being early starters, these countries were selected mainly because they are included in a global comparative research project on REDD+ by CIFOR and partners. Other countries might be equally or more advanced in their national REDD+ processes.

Table 3.1. Interests in the REDD+ agenda and their influence on different actors' positions on some key aspects of REDD+

Drivers	Influence on actors' positions on key REDD+ building blocks
Economic benefits	• Drives many developing country governments with low deforestation rates and high degradation to expand the scope from avoided deforestation to REDD+ • Drives conservation NGOs because of links to financing protected areas, biodiversity conservation etc., and to include forest conservation • Drives private sector positions on using systems based on markets and projects • May drive some local communities and indigenous people to engage with REDD+ because of the perceived benefits
Cost efficiency	• Drives many developed country government positions on the use of offsets and the interest in market-based systems for REDD+ (see FCCC/KP/AWG/2009/MISC.1, page 39), but also avoids transfers beyond actual costs of REDD+ • Drives private sector positions on the use of project-based systems for REDD+, which may be easier than working through governments (IETA 2009)
Environmental integrity	• Drives opposition from anti-market NGOs to the use of offsets and market-based systems (e.g., Bullock *et al.* 2009) • Drives positions on the scope of REDD+ in relation to sustainable forest management including logging or conversion to plantations
National sovereignty	• Drives many developing country government positions on offsets, scale, safeguards relating to indigenous peoples and development of MRV systems involving third parties
Fairness and social justice	• Drives pro-market NGO positions on the use of social safeguards for co-benefits in REDD+ (e.g., The Nature Conservancy 2009) • Drives anti-market NGO opposition to offsets and market-based approaches • Drives local and indigenous peoples' concerns for the development of social safeguards and co-benefit approaches in project and programme design
Political positioning , public relations	• Drives some developed country government positions (e.g., the EU in relation to NGO lobby and desire to be seen as progressive; Bozmoski and Hepburn 2009) on use of offsets and market systems. Also a key impetus for developing country governments positions on co-benefits and socio-economic development • Positive public relations drives private sector interest in systems (e.g., standards) to demonstrate co-benefits

the private sector; and international donor organisations. The snapshots give an indication of the different priorities given to specific policy issues.

The five countries differ in important ways. They cover different stages on the forest transition curve (see Box 1.2). Bolivia could be considered as being early in its forest transition, with more than 50% forest cover and relatively medium rates of deforestation (FAO 2007). Indonesia, Tanzania, Cameroon and Vietnam all have forest cover on 40% to 50% of their land, but Indonesia has had much higher rates of deforestation during the past two decades. Tanzania and Cameroon have lower rates, but above average rates of tropical deforestation, while Vietnam has reported an increase in overall forest cover (although deforestation is still occurring at subnational levels).

The governance systems also differ, but all have gone through or are in the midst of decentralisation processes, except Cameroon, where decentralisation is still in a very early stage). Tanzania has a long history of decentralised planning. In Indonesia, this process has been underway for a decade but is facing challenges, especially in the forest sector. Bolivia began a decentralisation process in the 1990s but has seen recent changes toward market sceptical governance systems, which will also affect its position in international REDD+ debates. Vietnam is in a process of decentralisation, but power and planning authorities have not yet fully arrived at the local level. The country's governance structure still remains rather centralised, but efforts to empower local communities are underway.

Box 3.1. REDD+ realities in Bolivia

Peter Cronkleton and Bernardo Peredo-Videa

Although Bolivia was an early starter in national REDD strategy development, institutional and political shifts have significantly reoriented the country's policy. Since 2006 Bolivia's government has advocated a strong role for forests in international climate change negotiations. In early 2008, Bolivia submitted an R-PIN to the Forest Carbon Partnership Facility developed by a technical committee consisting of representatives of the National Climate Change Programme (NCCP) in collaboration with NGOs and civil society. Toward the end of 2008, the government of Evo Morales more forcefully asserted policy positions that questioned the regulatory power of markets and the underlying capitalist logic supporting such market beliefs.

In 2009, the government's stronger policy orientation dramatically changed the course of the national REDD strategy and shifted institutional responsibilities for REDD. The government's new position rejected participation in market-based REDD mechanisms; instead, the strategy will rely on fund-based approaches. This stand provoked some criticism from departmental and municipal governments that had anticipated benefits from REDD markets.

Developing a coherent national REDD process under the new institutional structure will be a challenge because responsibility for climate change and forests has been split between ministries. The Ministry of Environment and Water is the focal point for REDD, specifically through the Vice Ministry of Environment, Biodiversity and Climate Change, where the NCCP is now housed. Forestry issues are under the mandate of the Ministry of Rural Development and Lands through the Vice Ministry of Forest Management and Development. The roles and jurisdictions of participating agencies are not entirely clear, and much effort will be needed to avoid contradictory actions, replication or intra-agency conflict. As of mid-2009, the NCCP, restaffed after the institutional shift, was working to define responsibilities and programmes in alignment with the government's strategy.

Progress in defining forest property rights is facilitating policy making. Bolivia's 1996 tenure reform law formally recognises indigenous communal properties (TCOs), and a new forestry law promoting sustainable forest management recognises some rights of private and communal landowners to forest resources. Nevertheless, work remains to finalise reforms and consolidate new property rights.

There are also initiatives to implement subnational REDD demonstration activities. A prominent one is the 'Subnational Indigenous REDD Programme in the Bolivian Amazon' organised by the NGO FAN and the national indigenous federation CIDOB. The high-profile role of CIDOB reflects its long history as a representative organisation, but also the fact that indigenous people control substantial forest area. The initiative, funded by the Moore Foundation and the Dutch and Danish governments, will involve 6 million hectares in three TCOs, six municipal governments and national agencies responsible for forest monitoring. Bolivia also hosts the Noel Kempff Project, one of the world's early avoided deforestation projects, funded by the private sector and implemented by The Nature Conservancy.

The final scope and design of the Bolivia REDD strategy are uncertain, but the government's commitment to smallholders and indigenous people gives reason for some optimism.

Comparing REDD+ realities: What can we learn?

The country snapshots highlight common themes emerging in evolving REDD+ systems. Recurring issues are scope, scale and financial mechanisms, as debated at the international level, but the national focus tends to be much more on how and by whom REDD+ is implemented, and related benefit sharing. In this comparative analysis, we critically review those themes by highlighting some of the interests driving the national processes, and discuss the challenges associated with the trends in the emerging REDD+ realities.

Box 3.2. REDD+ realities in Indonesia

Daniel Murdiyarso

The earliest step in the Indonesian REDD+ process was the formation of the Indonesian Forest–Climate Alliance (IFCA) before COP13 in Bali in December 2007. Supported by several bilateral donors (e.g., GTZ, DFID, AusAID) and the World Bank, the multistakeholder group built a national framework for long-term implementation and to identify outstanding methodological issues.

Indonesia took up the challenge to enhance its preparedness by developing policies and strategies to implement REDD+ at the national level by engaging with multilateral initiatives, such as the Forest Carbon Partnership Facility and the UN-REDD programme.

These early efforts, particularly during the IFCA process, have led to the establishment of a regulatory framework and national institutions, including the National Council for Climate Change (NCCC) under the President's Office and the REDD Committee under the Ministry of Forestry. But their performance and effectiveness, in relation to their authority and coordinating roles, are untested. The commitment of the different government agencies involved is dependent on – and often limited by – the formal mandate they have. Coordination across government agencies, coordination between central and local governments and improvement of institutional capacity remain huge challenges for Indonesia, which started decentralising relatively recently.

In the meantime, three regulations dealing with REDD+ project development, implementation and issuance of permits were enacted to ease the way for project developers, investors and hosts to start crafting their project idea notes, even though the regulation dealing with benefit sharing was contested by a variety of stakeholders including local governments, and might be revised. Since then, a number of pilot projects have been recognised. They have been developed in protected areas in Central and East Kalimantan provinces with the involvement of the central and provincial governments. However, the government has failed to acknowledge numerous projects initiated by local governments, local NGOs and private companies/financiers, which can potentially implement REDD+ effectively. This is partly because of the late arrival of the regulatory framework and preparedness of institutions to implement REDD.

The largest challenges faced by project developers are related to capacity in implementing the projects. During the preparedness phase, 2009-–2012, Indonesia will have to address issues related to the rights and responsibilities of local communities, land tenure insecurity faced by smallholders and forest rent enjoyed by large landholders. This is particularly crucial to ensure equal distribution of forests and carbon benefits. Strengthening tenure systems and clarifying property rights can improve forest governance and raise the incomes of local communities. Nevertheless, some NGOs (e.g., AMAN, Sinar Resmi) have expressed concern that REDD+ could further marginalise forest-dependent people and those with customary rights. Large-scale land acquisition remains a threat to smallholders with no formal legality.

Building capacity in implementing methods to assess carbon stocks (C stocks) and their changes over time to establish reference levels is also crucial. Cost-efficient MRV of C stocks will eventually improve benefits for project hosts. Although there will be a national-level carbon accounting system, known as NCAS, much needs to be done regarding data harmonisation and sharing protocols across participating agencies, the so-called information nodes. The infrastructure for data flow from central to regional and local nodes does not exist. As NCAS is top-down and technology intensive, there is a need to accommodate the participation of local communities in monitoring C stocks with more appropriate technology. Resources available from public funding during the preparedness phase should go toward improving the skills and bargaining position of local communities.

Institutions and links to ongoing policy processes

In most cases international organisations are the primary drivers of activity surrounding REDD+, particularly in relation to the FCPF (in around 40 countries, and all five countries in this chapter), and to a lesser extent to UN-REDD. New institutions that have developed alongside these processes include steering committees, national working groups and councils for climate change. These are often housed within forestry departments, or form subgroups of ministries mandated to deal more broadly with climate change issues. The countries' processes are also very similar: The main policy tools are the FCPF R-PIN, to qualify for the process, and the R-PP, to detail how finance will be used. Such approaches have had varying levels of success: there are still few R-PPs and some countries, such as Panama and Papua New Guinea, have suffered major setbacks because processes moved ahead too quickly. These strong international drivers and the standardisation of processes raise questions about the degree to which country ownership is being achieved within evolving REDD+ processes.

Box 3.3. REDD+ realities in Vietnam

Minh Ha Hoang Thi and Pham Thu Thuy

The Vietnamese government emphasises that REDD and REDD+ should enhance sustainable forest management, biodiversity conservation and forest carbon stocks, all within current environment and socio-economic development strategies. Since being selected in 2008 as a participant in FCPF, Vietnam has built a REDD road map, which proposes the country's central highlands and the northern central provinces for REDD pilot projects, because of their high rates of deforestation and high density of minority groups. In September 2009, the UN-REDD Programme, supported sharing early lessons learned among ASEAN members to build capacity, especially in countries in the Lower Mekong Basin. It will also establish the central highlands province of Lam Dong as a REDD pilot site.

The road map starts with strengthening coordination among ministries; one of the main constraints identified to implementing payments for environmental services (PES) and REDD in Vietnam were overlaps between the mandates of different ministries and weak cross-sectoral coordination. The Ministry of Natural Resources and Environment is the national focal agency for climate change activities in Vietnam, whereas governmental capacities for REDD are seated in the Department of Forestry at the Ministry of Agriculture and Rural Development (MARD). Although mandate division between the two ministries is clear and could potentially ease coordination, it may create difficulties in making any cross-sectoral action happen.

REDD in Vietnam is managed by a Climate Change Mitigation and Adaptation steering committee under MARD. A REDD National Network and working group have been established to enable the wider participation of stakeholders. The ongoing consultation process to plan REDD has only included central government bodies, with few consultations in the pilot areas or other sections of the public. Indigenous people, including ethnic minorities, however, are often at the centre of the discussions because it is recognised that the success of REDD projects depends on the application of lessons from earlier upland programmes on how to empower indigenous people. International organisations support this interest, especially those that have been actively involved in REDD consultation, networking and method development processes, such as JICA, World Agroforestry Centre, CIFOR, Winrock International, GTZ, RECOFTC and SNV. Yet the government seems to perceive these activities, especially those driven by international and national NGOs, to be opposing government-led REDD activities.

The REDD strategy proposes that payments be channelled to three groups: forest-dependent rural communities, natural resource management boards and local forest protection and enforcement agencies. Disbursement of payments to communities will be linked to inventory work and REDD success. The plan is for payments to be directed toward officially recognised groups (so far only government bodies) even at the community level. Nevertheless, it is unclear whether the benefit-sharing mechanism developed by the government will be based on performance or fixed payments. Vietnam lacks supportive policies, mechanisms and tested guidelines to achieve an effective, transparent and practical payment system to individual households. Several actions are planned to tackle these challenges with support from donors such as Norad, GTZ, USDA and the EU.

Other challenges, as noted in Vietnam's R-PIN, include the lack of tenure clarity, lack of money for tenure allocation programmes, high opportunity costs for land conversion and limited data on deforestation trends because of the lack of coordination and technology within the governmental departments. Data on deforestation trends in Vietnam are lacking and inaccurate for many reasons, including fragmentation of existing monitoring systems across government departments; application of low-resolution remote-sensing data in forest cover mapping; weaknesses in forest cover reporting systems from the local to the national level; and inconsistent use of forest classification systems between forest inventory cycles. Discussions underway include plans for local community groups to conduct monitoring to feed into national statistics (to be audited by the national REDD group) once tenure allocation to minorities has taken place.

Harmonisation of REDD+ with other environment and development strategies has emerged as a theme both in the snapshots presented here and in other REDD+ countries. Options for ensuring harmonisation are raised formally in many REDD+ planning documents. Existing laws, regulations and policy instruments are being proposed for implementing REDD+. The countries discussed in this chapter are at very different stages with respect to how such harmonisation could work; compare, for example, Bolivia and

Indonesia. The level of activity on REDD+ compared with other aspects of climate change also indicates some disparity between REDD+ and other mitigation sectors. This may raise the risk that REDD+ is not well integrated into broader climate change strategies if and when they emerge.

Pilot projects and demonstration activities are the preferred approach for learning how to develop REDD+. However, confusion is evident in how these can inform future national REDD+ programmes or how 'parallel' approaches, as discussed in the case of Bolivia, link to national approaches. Institutions and a framework to ensure lessons learned from pilots in the countries have not been observed.

Box 3.4. REDD+ realities in Cameroon

Denis Sonwa and Peter Minang

The Cameroon government has expressed strong interest in engaging in REDD+ activities, but related processes are still at a very early stage. Cameroon is also participating in Congo Basin submissions and the Coalition for Rainforest Nations (CFRN). An R-PIN was submitted in 2008, and in June 2009 a 'REDD cellule' was established to coordinate preparing the R-Plan. The committee is headed by the national focal point for the UNFCCC. Cameroon hosts a Central African Forest Commission (COMIFAC) REDD+ pilot project supported by the German Development Bank (KFW) and implemented by GTZ. A new pilot project on payments for environmental systems, implemented by the national Centre for Environment and Development (CED), has also started.

The main drivers of deforestation and degradation in Cameroon are land conversion for agriculture and logging. In an institutional environment which has excellent policies on paper but limited enforcement, expectations are high that REDD+ can reduce deforestation and degradation by providing alternative incomes. However, clarity is needed on who will bear which REDD+ costs and how they will be compensated. However, in a forestry sector with both legal and illegal logging, some resistance to the implementation of REDD+ can be expected. As with other countries in the Congo Basin, Cameroon is receiving great interest from Asian logging companies.

Indigenous people's rights to land and trees is one issue needing clarification, because of overlapping and conflicting customary and statutory rights. National and international NGOs have limited influence in forest policy making, but they have been very active in highlighting the rights of communities and voicing environmental concerns (e.g., on the construction of the Chad Cameroon Pipeline). Civil society organisations have also been active in REDD+ capacity-building activities.

As in other countries in the Congo Basin, Cameroon faces difficulties in terms of capacity (human and technical) for MRV across all levels. Proposals suggest participatory MRV at the local level. Lessons on planning and implementing management plans in community forests can provide insights that could be useful in MRV. The CED is already working with indigenous people to use GPS technology to map forest landscapes. The ASB consortium has generated relevant basic ecological information and economic analyses (opportunity costs and tradeoffs for REDD) of deforestation and land use and land cover change analysis for the humid forest zone of Cameroon. The Centre National de Cartographie and forest department could be useful in generating some basic information, but in general the country needs support in for improved MRV.

The current forest tax payment scheme is viewed as a possible financial distribution mechanism that can provide lessons for future REDD+ benefit sharing, with its 50–40–10 principle: 50% of the income goes to the national administration, 40% to the communal office and 10% is directly managed by rural communities living around the logging area.

Coordination across ministries is a precondition for successful REDD+ implementation. The Ministry of Environment and Protection is in charge of climate change and the Ministry of Forests and Wildlife is in charge of forest management; both are represented in the REDD cell. But the exclusion of ministries such as Finance, Agriculture, Mining and Planning could lead to cross-ministerial conflicts and limit the potential for success. The multistakeholder steering committee of the project REDD-KFW-GTZ-MINEP-COMIFAC can serve as an example for future coordination.

Coordination and commitment

Coordination and level of government commitment emerges as a key challenge in all cases, with coordination between ministries a particular focus in national REDD+ processes. Coordination between international and national actors and between national and subnational actors features less prominently, although this will be key for REDD+ success (Chapters 5, 9 and 14).

Government commitment and coordination. High level commitment to REDD+ and strong cross-sectoral coordination are likely to be prerequisites for successful REDD+ implementation. Some governments have made REDD+ a priority with strong involvement from key ministries such as finance, while in others, ensuring meaningful participation from important sectors such as agriculture and mining is proving difficult. In many cases there appears to be limited high level commitment for REDD+. Forest Commissions and other agencies that represent the country in the UNFCCC or FCPF push for REDD+, but there is limited support at Cabinet level.

There have been significant efforts to enhance coordination in most cases, with the establishment of cross-ministry coordination processes for REDD+. However, changes in government policies (e.g., decentralisation or new institutional structures established for dealing with climate change) may cause coordination problems. For example, responsibilities for climate change and forests are split between ministries in many countries. These divisions may be exacerbated by differences in interests between different parts of government. Even within ministries, REDD+ may lead to tensions, for example, between production and conservation branches, where REDD+ could be construed as a threat to business as usual.

Similar issues play out between different levels of government. The case of Indonesia illustrates the ongoing challenges in authority and power sharing between central and local governments.

Box 3.5. REDD+ realities in Tanzania

Pius Z. Yanda

At the international level, the Tanzanian government is calling for an approach to REDD+ that 'establishes a pathway to engage in voluntary nationally appropriate mitigation actions (NAMAs) by developing countries in the context of sustainable development' (FCCC/AWGLCA/2009/MISC.1/Add.4). Tanzania sees a strong alignment between REDD+ and national development goals, including poverty reduction. The emphasis is on developing an inclusive approach to REDD+ that takes into account national circumstances in terms of scope of emissions sources included, baseline setting and capacity to monitor, report and verify. There are concerns, however, that little is known about the demand side of carbon markets and REDD+ could end up like the Clean Development Mechanism (CDM), which has yielded few benefits for the country so far. Safeguards need to be created to ensure price stability if markets are used. Other sources of financing will be required to support REDD, particularly in the short term.

At the national level, REDD+ discussions are rapidly leading to action. The Norwegian government has been a key driver of REDD processes, giving financial support of NOK 500 million (US $90 million) over five years (2008–2012), with 20% of this given to the UN-REDD Programme in 2009. REDD+ is administered by a National REDD Task Force (established under the broader National Climate Change Steering Committee), which is in charge of developing a national strategy for REDD. A Trust Fund for REDD, a semi-autonomous National Carbon Monitoring Centre (NCMC) and new integrated methods to quantify co-benefits are proposed. There is an emphasis on linking these to existing policies and processes, including participatory forest management, fire management systems and sustainable harvesting.

Participatory processes are being used to develop the strategy involving stakeholder consultations at zonal, district and local levels. At the local level, the focus is on forest-dependent communities, particularly those that have been practising participatory forest management. Other stakeholders' engagements include consultation with public and private sectors. There will also be in-depth interactions with forest-dependent communities during the annual meeting of the network of forest-dependent communities in Tanzania (MJUMITA). NGO pilot projects are also engaging with rural communities in various parts of the country. One of these is the Tanzania Forest Conservation Group, which plans to implement REDD+ through the existing Participatory Forest Management institutions, with around 18% of funding going directly to communities depending on their performance in reducing emissions. All these interactions will provide inputs useful for the development of the national REDD+ strategy.

There are major challenges to overcome to develop a REDD+ strategy that contributes to the goals of sustainable management of forest resources and poverty reduction. The greatest challenges include:

- establishing baselines with a paucity of accurate historical data;
- developing internal benefit-sharing systems for funds that pass through government;
- overcoming land tenure issues particularly relating to poorly demarcated 'general land' that may leave villages susceptible to external investment pressures; and
- addressing drivers of deforestation while enhancing livelihoods of the rural communities that depend on natural resources for their livelihoods.

State versus non-state actors*:* The greatest tensions arise perhaps in differences in position between state and non-state actors. The main concerns are from civil society organisations over the risk of further marginalisation in terms of rights and tenure related to REDD+ and who will hold the power in terms of managing and distributing benefits. The state still dominates many of the current national REDD+ proposals.

Similar challenges are arising between the positions of the state and the private sector. This emerges mainly in the area of subnational versus national approaches to REDD+. In some cases, the state has yet to recognise subnational approaches, has been slow to develop regulations surrounding these approaches (only Indonesia has such regulations) or is actively opposed to market systems in which the private sector could feature more prominently (e.g., Bolivia). In some cases, subnational demonstration projects are being developed in parallel with national strategies. This may be partly due to international and local pressure to develop workable demonstrations, but it is unclear how coordination may work between national and subnational approaches, which could raise further difficulties.

There are also differences in the positions of international and state actors in the development of REDD+, which may raise difficulties for overcoming implementation challenges. For example, in the cases of Vietnam and Cameroon, it is implied that donor and international NGO interests surrounding the discourse on participation, benefit sharing and tenure security could undermine the development of national strategies for REDD+, unless carefully managed.

Regional and international coordination between governments that may be suppliers of REDD+ emissions reductions or not subject to emissions caps (e.g., regional trade in Asia affecting REDD+ implementation in Vietnam, or Chinese private sector interests in investing in logging operations in Cameroon) is a key issue that has seemingly received little attention as yet.

Benefit sharing and participation

Participation and rights, particularly of indigenous peoples and local forest stewards, are among the most prominent issues in national REDD+ processes. These concerns have primarily been driven by international NGOs and national civil society organisations. They fear that existing efforts to preserve forests will not be recognised in REDD+ systems, that governments will retain financial benefits for themselves or, worse, that new risks will be introduced (e.g., incentives for much more heavy-handed forest protection related to REDD+). The country cases, especially Indonesia, Vietnam and Bolivia, highlight that these risks are real.

Formal processes for benefit sharing have not been discussed in detail in most cases, although different approaches are becoming apparent in national plans. One of the apparent tensions is over the role of government and non-government structures. For example, proposals in Vietnam and Indonesia have raised concerns about benefits either not reaching local levels or being allocated through ineffective government systems at the local level. But, as noted in Chapter 12, expectations about the magnitude of future REDD+ benefits and rents to share might well be unrealistically high.

An interesting trend is that in most of the countries, the focus of REDD+ is very much on forests, with benefit sharing, for example, being managed through existing community forestry arrangements or PES-type systems. There appears to be less discussion about the broader reforms that may be implemented under REDD+ (e.g., in agriculture or energy). These need to be considered in benefit sharing systems, as do their implications, such as their welfare effects. There is also a tendency to talk about 'payments' and channelling performance-related finance from national to local levels, whereas in fact many of the benefits and costs from REDD+ may be non-pecuniary.

At a macrolevel, countries differ in their positions on market-based and fund-based systems. This is particularly apparent comparing Bolivia, which has rejected market-based approaches, and Indonesia, which have embraced a market approach. But these basic observations become more complicated when looking at the realities. The Noel Kempff Project, for example, is an operating market-based system in Bolivia. It is not clear how governments view the role they would play in implementing market-based approaches, but in countries such as Vietnam, current proposals would see a strong role for the state in terms of interacting with markets and channelling finances to in-country projects and probably in terms of interacting with markets, if market approaches are adopted; in Indonesia, however, the regulations appear to allow for more direct market interaction.

In the five countries discussed here, and in most REDD+ countries, significant emphasis is placed on participatory development of REDD+ systems. Processes and systems have tried to enhance participation, particularly in the development of national designs related to FCPF and the UN-REDD Programme. There have been some concerns about how representative these processes are, given that in some cases they have tended to be dominated by government representatives (e.g., Vietnam), have involved large numbers of external consultants (e.g., Indonesia) and have not been held in areas where REDD+ will actually be implemented. Nonetheless, in most cases there are plans to further develop consultation processes and build capacity at the local level.

Monitoring, reporting and verification systems (MRV)

Data availability and technical capacities to measure and monitor emissions reductions are clearly a key issue for all countries. There is recognition that existing systems are inadequate and that capacity to develop and administer such systems needs to be enhanced. National systems under development are likely to take a long time to evolve to the level where REDD+ can be implemented with accuracy; consider the cases of Indonesia are and Vietnam, for example. Cameroon faces major human capacity shortages.

The countries presented here are looking toward a role for participatory MRV approaches for carbon stocks, partly to increase participation and partly to improve MRV systems more quickly from the bottom up (see Chapter 8). Such approaches have been piloted in many countries, but they may only be applicable once land allocation has occurred (e.g., Vietnam) and with significant public investments in training and appropriate technology. Unresolved differences over forest definitions (i.e., which forest types are applicable under REDD+), which can significantly affect benefits and their distribution, are another key barrier that needs to be overcome in most countries before debates about implementing MRV can be carried out.

Moving ahead with REDD+ at the national level

The approaches and associated challenges emerging across all countries involved in developing REDD+ are proving similar. Most prominent among these are the evolving institutions, and challenges relating to coordination and high level government commitment, benefit sharing, participation and MRV systems. Some of the main differences relate to government positions on international issues such as market-based and fund-based approaches and the rate at which they are moving forward in terms of ongoing policy challenges. REDD+ debates at the national level have also become embedded in political and institutional realities in the individual countries, and are therefore starting to gain unique national flavours.

Economic benefits are a key driver in national debates, with high expectations from many actors (including government, private sector, NGOs and communities), and competition for benefits despite a lack of clarity about what they will be (see Chapter 12). Fairness and social justice, a key impetus behind the positions of some NGOs, have also prominently entered national debates. International actors are a major impetus for REDD+ development at the national level and bring an additional set of interests, such as the need for cost-effective and rapid climate change solutions, which may arguably be less prominent without their presence. It is clear that the interests of powerful actors with high expectations will have to be balanced to achieve effectiveness, efficiency and equity.

Despite some agreement on the main challenges to be overcome to make REDD+ a reality, these different drivers and positions of different actors may make this difficult. This is particularly the case surrounding the issue of coordination, where the signs are that the differences between actors are pulling the implementation of REDD+ in a number of different directions.

More fundamental is the question of how far the attention (or lack of attention) to certain issues is representative of action. For example, the issue of participation is getting high levels of attention in REDD+ processes and national strategies. This is welcomed from an equity standpoint, but the evidence from existing REDD+ processes suggests it is questionable how much participation is being achieved. From an environmental standpoint, the fact that the underlying drivers of deforestation (particularly macro-economic drivers) do not appear to be at the forefront of debates in the countries reviewed may also be an indication of interests and priorities detached from climatic core objectives of the REDD+ debate.

What is the prognosis for moving ahead with REDD+ at the national level? Progress may be slower than first anticipated in many countries given the coordination problems, uncertainty about what the international REDD+ architecture will look like, the power struggles that are likely to continue to emerge and the processes required to overcome those struggles. In the international debate, such issues have to some extent been dealt with by broadening the agenda to incorporate different interests and the development of compromise solutions that postpone decisions or transfer them to the national level, rather than resolving major differences. At the national level, where the realities of REDD+ implementation are much closer, this is not an option. To ensure that all actors needed for implementing REDD+ are engaged, difficult compromises will have to be made which may see narrowing of the application of REDD+, slowing down certain processes and finding innovative ways to balance different interests.

Is REDD+ an idea whose time has come, or gone?

William D. Sunderlin and Stibniati Atmadja

- Previous international and national policies have, for various reasons, failed to prevent deforestation in developing countries.
- REDD+ incorporates some of these past policies, but also some innovations.
- Lessons from past experience will need to be taken on board and new alliances will need to be forged if REDD+ is to be successful.

Introduction

REDD+ has generated interest as a ground-breaking concept for saving tropical forests. Those in favour believe that REDD+ funds will be an incentive to keep forests standing and, in the latest permutation, REDD+, will also be an incentive to restore and perhaps even establish new forests. For those less in favour of the idea, it is the same old story about throwing lots of cash at forests as a be-all and end-all solution to deforestation and degradation.

This chapter poses the question: How much faith can we place in REDD+ to stabilise forest cover and store carbon in forests? The answer depends on whether REDD+ is just a new incarnation of previous policies and practices that failed, or whether it is indeed truly innovative.

To answer the question we examine the issue from several points of view. First, we look at previous policies to slow deforestation and forest degradation and why they failed. Second, we describe what is innovative about REDD+. Third, we look at the lessons from failure that have been taken up by REDD+ and those that have not. Finally, we look at the overall prospects for REDD+.

Why previous policies failed

This section looks at three policy approaches that have been taken to preventing deforestation in tropical forests: the intra sectoral approach, the smallholder and poverty approach and the public spending approach. We then examine the 'big picture' causes of deforestation and degradation that were not (adequately) taken on board in these approaches.

Intra sectoral (forestry only) approach

Early policies and practices to reduce deforestation assumed that forest policies were at fault and had to be fixed. The fixes assumed that sustainable forestry was built on industrial forestry and profit. This meant that technical fixes took the form of guidance by international forestry and silviculture experts, and more sophisticated, finely tuned management plans, such as Tropical Forestry Action Plans (FAO 1985). Financial fixes took the form of changes in taxation, stumpage fees and pricing. These technical and financial fixes were accompanied by the introduction of reduced impact logging and bans on the export of logs, among other measures.

This approach failed to appreciate that factors outside the forestry sector (e.g., agricultural expansion, investment in infrastructure, changes in the demand for goods and services, and changes in prices and incentives throughout society) were driving deforestation (Kaimowitz and Angelsen 1998; Angelsen and Kaimowitz 1999).

Smallholder and poverty approach

A later phase of policies assumed that smallholders and poverty were driving forces of deforestation. Initially, policies elaborated or tightened laws and regulations to keep local people out of protected forests, and to restrict the kinds and amounts of forest products they could harvest and commercialise. Often, swidden[1] cultivation was prohibited. As time went on, poverty came to be seen as the underlying problem that needed to be addressed. Projects started to integrate livelihoods and poverty alleviation objectives with

1 'Swidden' is a place temporarily cleared for agriculture by cutting back and burning off previous growth.

conservation objectives (e.g., integrated conservation and development projects; see Chapter 18). Alternatives to swidden agriculture were encouraged (van Noordwijk *et al.* 1995) and local management was promoted (e.g., social forestry and community forestry programmes).

These policies slowed deforestation and degradation on a small scale and, in some contexts, resulted in alternative livelihoods and management systems (Palm *et al.* 2004). But, by and large, they did little to stem accelerating deforestation worldwide.

Public spending approach

From the mid-1970s to the mid-1990s, billions of US dollars from international (e.g., US $5 billion from World Bank forest sector loans and bilateral funding) and national sources were spent to arrest deforestation in developing countries (World Bank 2009b). More than half the funds were targeted at east and south Asia (Lele *et al.* 2000). But deforestation accelerated rather than slowed, partly because of the shortcomings mentioned above. For example, the lending tended to pay little attention to threats external to the forestry sector (Lele *et al.* 2000). A review of the World Bank's forestry sector lending found that it focused on economic incentives and failed to pay attention to governance issues, which were a key factor in deforestation (Lele *et al.* 2000). In the late 1990s, the World Bank began to address the broader issues by making improvements in forestry governance a condition for structural adjustment loans (Seymour and Dubash 2000).

Why did previous approaches fail?

The three approaches to forest policy described above failed because they neglected to take the 'big picture' into account. Policy makers did not appreciate that the driving forces behind deforestation were deeply rooted and powerful, and could not be corrected by public spending and the policy approaches current at the time. The policies and practices did not take on board or give sufficient attention to:

- **Extra sectoral drivers.** In many contexts it is not the local people who are the main drivers of deforestation but powerful actors who extract timber and convert forest lands into silvicultural or agroindustrial plantations and other uses. The trend in the past 30 to 40 years has been toward large commercial actors in deforestation (Rudel 2007).
- **Political and economic drivers.** Deforestation can be driven by political and economic factors. These include accumulating capital and access to foreign exchange; the dominance of political and economic elites in making decisions on natural resource policies; and the comparative weakness of groups opposed to forest conversion. These drivers are closely related to corruption and other governance factors (see Chapter 13).

- **Corruption and other governance factors.** Weak governance in many developing countries opens up rent-seeking opportunities from extracting timber and converting forest land to other uses in defiance of national forest protection laws. Weak governance also fosters corruption, which is often positively correlated with deforestation (Koyuncu and Yilmaz 2009). Other governance factors that drive deforestation are a lack of financial transparency and accountability, insufficient capacity for forest management, overlapping mandates of ministries responsible for resources, and perverse incentives. For example, subsidies for developing plantations in Indonesia encouraged overharvesting of logging concessions and clearing of 'degraded' natural forests (Barr *et al.* in press).
- **Forest transition.** Forest transitions (the transitions from a forest where cover is initially high, through deforestation to a stage where forest cover stabilises and may even be partially restored; see Box 1.2) are evident in many countries. Forest transitions are not an outcome of carefully considered planning, policies and practices, but are the outcome of evolving land use patterns related to stages of economic development (e.g., Curran *et al.* 2004; Mather 2007) or scarce forest resources (Rudel *et al.* 2005).
- **Suppression of rights.** For centuries governments have asserted ownership and control over forests, often neglecting the rights of forest peoples. Heavy-handed state control, lack of respect for customary forest management practices, insecure tenure and conflict destabilise forest management systems. Some studies clearly show a relationship between insecure forest tenure and deforestation (e.g., Elmqvist *et al.* 2007).

REDD+ as a new approach

In some ways the REDD+ approach marks a radical departure from the past. The new features respond to a new perception of forests as assets that need to be protected, the commodification of carbon, the emergence of performance-based payments and the huge amounts of money involved.

Forests as assets to be protected

What is most distinctive about REDD+ is not so much the idea itself, but rather the context in which it is emerging. A seismic shift has taken place in the role of forests in socio-economic development. For millennia, forests have been viewed as a sacrificial biome – an ecological asset that could be depleted for the 'greater good'.

But, in the late 20th century, a new paradigm emerged to challenge this, growing out of concerns about the effects of socio-economic development on forests, including their extent and biodiversity, and the cultural survival of forest dwellers (see the upper arrow in Figure 4.1).

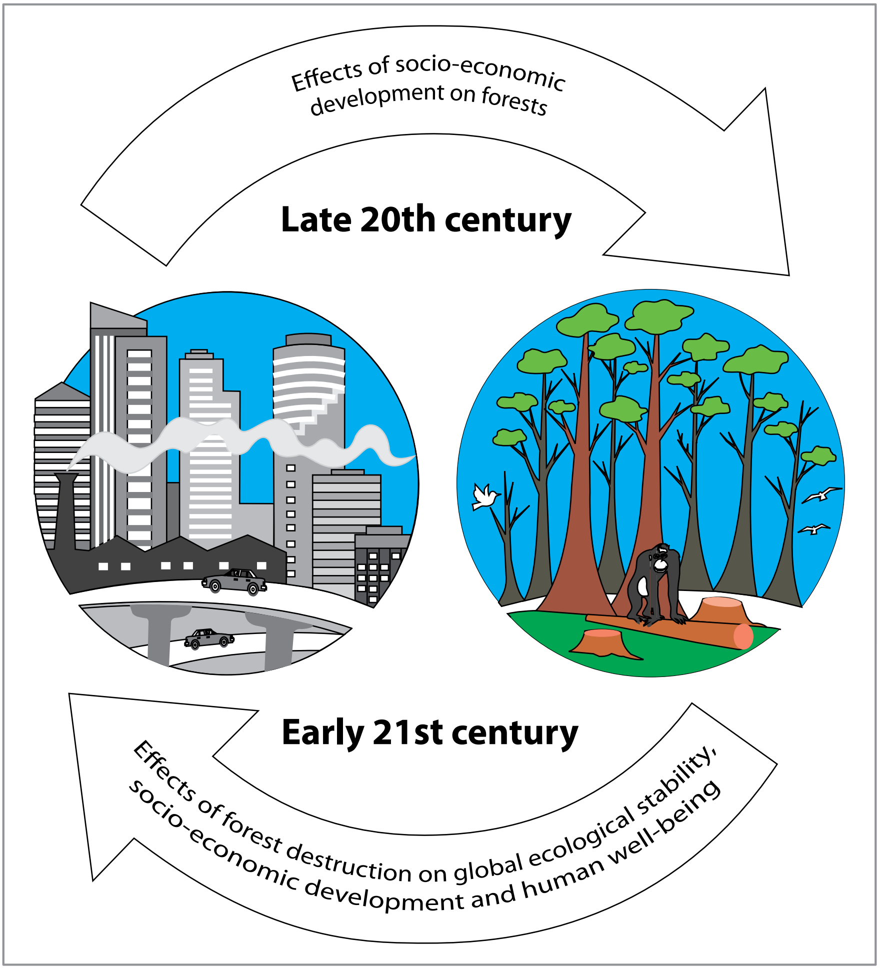

Figure 4.1. A paradigm shift in the dominant view of the relationship between people and forests

Currently, at the beginning of the 21st century, most of the world's forests have been transformed almost beyond recognition and the carbon sequestration functions of forests are under severe stress. Forests are now viewed (not just by ecologists but also by the general public) as biomes that have to be protected. The basis for concern is the potentially devastating effect of forest destruction on socio-economic development and human well-being (see the lower arrow in Figure 4.1).

The value of forest carbon

REDD+ means that forest carbon now has a value. Whereas carbon stored in forests had virtually no market value until recently, it is now traded in voluntary markets, and might soon be traded in international carbon compliance markets. Including REDD+ in a post-2012 climate agreement may spur the establishment of global forest carbon markets even further. The inclusion of forests in carbon markets is related to the contextual revolution above. Forests are valued no longer just for their goods (timber) and the land on which they stand, but also for the essential environmental services they provide.

Performance-based payments

A key feature of REDD+ is that payments will be based on performance. Projects or countries will be compensated only if they prevent the release of forest-based carbon into the atmosphere (see p.18), where it is assumed that REDD+ payments will be increasingly performance based). Systems to monitor, report and verify (MRV) forest carbon are being set up to ensure that reductions and increases in forest carbon stocks are measured accurately and rewarded accordingly.

A lot of money is involved

The financing for protecting forests could be in the order of US $2 billion to US $10 billion a year in the early phases, and even more if REDD+ is included in international carbon markets (Meridian Institute 2009a). This scale of financing was unimaginable before REDD+. The links between deforestation and climate change mean that substantial new funding has been made available (see Dutschke and Wertz-Kanounnikoff 2008). These new funds give forests a chance to survive against the profits of further conversion (opportunity costs) that have been the bane of forest protection worldwide.

Real versus rhetorical change

As for the shortcomings in past anti-deforestation policies described above, we ask two questions. Which shortcomings have been noted by the mainstream designers of REDD+, leading to promising course corrections in dealing with forest destruction? And which of those flaws have gone unnoticed or ignored, and run the risk of being reproduced in REDD+?

Real change

The formulators of REDD+ policies and practices have learned from the failures of previous policies and are now looking at the causes of deforestation through a wider lens. Lessons taken on board include:

- Better silviculture and technology are important, but do not address the underlying causes of deforestation and forest degradation. REDD+ must address the wider issues.

- Smallholders and poverty can be important causes of deforestation, but are not the whole story. The 'policies and measures' in REDD+ implicitly recognise that the causes of forest destruction are not merely local (i.e., related to smallholders and their well-being) but also national.
- There is implicit recognition that public spending alone cannot be the basis for a thoroughgoing solution. Private investments at the local, national, regional and international levels are expected to be a dominant force in REDD+.

Rhetorical responses

Although REDD+ planners are paying more attention to the underlying causes of deforestation than their predecessors did, it is still not clear how REDD+ will overcome the forces that drive deforestation. In the Readiness Plan Idea Notes (R-PINs) and Readiness Plans (R-Plans) already submitted, some of the proposed solutions come across as rhetorical rather than real:[2]

- **Spending.** Inevitably, governments will need to spend some money to slow deforestation, but there is still a belief in many quarters that large disbursements are the only solution. This means that measures that involve no spending at all, or redirect current spending, (e.g., mobilising the political will to enforce laws against illegal logging or to enforce the existing rights of exclusions of those indigenous people who protect forests) get less attention. Although there will likely be a massive shift from public to private spending, it will be spending nonetheless.
- **Political and economic drivers.** National actors who favour forest conversion have historically been more powerful than those who support forest conservation. Although REDD+ planners are aware of this, there is nothing in their proposals that will change this disparity in power. For example, plans for large-scale clearing of forests for agrofuels and plans to keep forests standing exist side by side. Global investment in developing agrofuel fell dramatically in 2009 because of the world economic recession (Roberts 2009), but will probably revive as the recession eases.
- **Corruption and governance.** While REDD+ readiness plans stress the need to reform governance as a requirement for effective implementation, they do not set out clear plans for dealing with, for example, transparency and accountability, weak capacity, overlapping mandates of resource ministries and perverse incentives. Unfortunately, because the income streams from REDD+ are likely to be significant and the controls limited and ineffective, there will be many opportunities for corruption.
- **Forest transition.** In countries in the latter stage of the forest transition (e.g., Costa Rica, Vietnam), powerful structural drivers in socio-economic

2 This assessment is based on the Davis *et al.* (2009) review of 25 R-PINs, summaries of the R-PINs, three R-Plans, and comments on those R-Plans. The review focuses on governance issues related to tenure, inter-sectoral coherence, benefit-sharing mechanisms and transparency, and accountability in monitoring.

development are already stabilising forest cover and, to some extent, restoring forest. This trend raises important questions for REDD+ planners. First, could REDD+ activities be superfluous and yield no additionality, particularly if payments are made to protect forests that are not threatened? Conversely, if REDD+ could indeed speed forest transition to the stable stage, could this be achieved through macro structural instruments alone, rather than through intervention and investments at the site level?

- **Tenure.** Whereas international and national framers of REDD+ speak of the need to clarify and strengthen forest tenure, to date there has been little action on reform. When people living in forests have no tenure rights their leverage in formulating national policy on REDD+ is limited. This lack of influence could translate into a poor share of the benefits from REDD+, and negative consequences for the effectiveness of REDD+ (see Chapter 11).

Avoiding the mistakes of the past

We have seen above that REDD+ is being shaped by forces that move in opposite directions. On the one hand, there are new underlying conditions and policy responses that appear to lead in the direction of giving due attention to the drivers of forest cover change and to making drastic course corrections. We have seen that widespread concern about climate-induced ecological collapse is one driver behind the emergence of REDD+. Another driver is potential economic opportunity through forest carbon trading. There are two attributes of REDD+ that attest to the gathering political will to finally do something on the scale needed: performance-based payments and unprecedented levels of financing.

On the other hand although REDD+ planners have learned some important lessons from history, there is still a risk that some of the mistakes from the past will be repeated. REDD(+) readiness plans do not offer a basis for confidence that the most important lessons have been learned, or if they have, that REDD+ will successfully address the key drivers of deforestation. Big spending will be part of REDD+, but it is not clear how all this money will produce the intended results. International and national planning for REDD+ has so far failed to show how the political and economic drivers of deforestation, such as corruption and other governance factors, are going to be successfully overcome. The full meaning of the forest transition is not yet being addressed in REDD+. By and large people in forests tend to be rights-deprived and this bodes badly for the success of REDD+.

Is REDD+ an idea whose time has come, or an idea whose time has gone? At this stage, the jury is still out. What must be done to make sure that the mistakes of the past are not repeated in REDD+? The solution has three elements.

First, REDD+ planners must learn from past failures in forest conservation and management. Climate experts, for example, who are heavily involved in making decisions about REDD+, may not have been involved in previous attempts to conserve and manage forests but need to take lessons learned from those experiences into account.

Second, political will needs to be considered: whose interests will it serve? The success or failure of REDD+ in arresting deforestation will be determined by the interaction between competing interests. It is impossible to predict which interests will prevail but we can speculate. Political will to make REDD+ successful could be mobilised if there is widespread acceptance that the cost of continuing business as usual is too high. But political will could also uphold business as usual. The lack of political will to reduce deforestation is one of the reasons why past policies have failed, and why REDD+ might also fail.

Third, because of the possible paralysis of political will, popular mobilisation could be the decisive factor for success. Public pressure often causes politicians to change course. To stop deforestation, stakeholders who might otherwise have little reason to interact will need to forge alliances: those who depend directly on forest resources (e.g., indigenous peoples); advocates for rights, cultural survival, poverty alleviation, and protection of biodiversity; parents across all classes, races, nationalities, and religions concerned about the world their children will inherit; and private investors and local governments that seek to benefit from forest protection. These alliances will counteract those who support forest conversion for conventional reasons (expansion of agriculture and pasture, infrastructure, timber extraction, mining) and for newer reasons (offshore food production by countries with limited agricultural land, energy such as agrofuels and the hydrocarbons underlying existing forests).

The future history of REDD+ will be the story not just of political will, but of a contest between opposing political wills, and of the way in which popular mobilisation and new alliances succeed or fail in guiding the course of this rivalry.

Part

2

Building **REDD+** institutional **architecture** and **processes**

Options for a national REDD+ architecture

Arild Vatn and Arild Angelsen

- Key criteria for assessing different institutional options are their overall legitimacy and ability to produce 3E+ outcomes.
- Four major options for channelling (international) REDD+ finance are projects, funds – independent or within the state administration – and budget support. The mix of these depends crucially on national conditions and the choice of REDD+ actions.
- Building national REDD+ institutions takes time, and early design might constrain later options. Countries must therefore ensure that the immediate steps taken fit future and more developed solutions.

Building a national REDD+ architecture

Realising REDD+ presupposes a national architecture or governance structure that facilitates comprehensive actions and delivers carbon mitigation outcomes that are effective, efficient and equitable (the 3Es). The long-term legitimacy of the system also hinges on the ability to deliver well on co-benefits, in particular poverty alleviation and sustainable livelihoods (3E+). Different constituencies will look critically at the quality of the procedures involved, such as democratic processes, transparency, accountability, broad participation and respect for national sovereignty.

The national REDD+ architecture can be seen as an institutional structure defining the capacities and responsibilities of the different actors involved and the rules for their interaction. Actors at the national level include private, state and civil society organisations. The governance literature emphasises that these actors are formed to serve specific needs or interests. The structures to facilitate coordination between the actors include trade, communication/ negotiations and command. The format of these structures influences both the costs of coordination – transaction costs – and the motivations of those involved (Box 5.1).

The chapter first gives an overview of the key tasks of a national REDD+ system. Second, we present a set of governance dimensions and evaluation criteria to consider. Third, we define and assess the main alternatives for national REDD+ architectures. In addition to a broad overview, we focus on four options to channel international REDD+ funding into national-level actions: projects, funds located outside the state administration, funds within the state administration, and budget support. The chapter closes with a reflection on the process taking REDD+ architecture from 'the drawing board into the forest'. Several of the topics raised in this chapter are elaborated in other chapters: Chapter 6 discusses the separate conservation fund option, and Chapters 7 and 8 focus on monitoring, reporting and verification (MRV) institutional set-ups. Our discussion also relates to later chapters, e.g., coordination across scales and actors (Chapter 9) and decentralisation (Chapter 14).

Instituting REDD+ at the national level will take time. Capacity building and pilot projects will be emphasised in the early stages to prepare the country for REDD+ at a larger scale in the future. This chapter looks at options for such a future national REDD+ architecture. It also underlines that the circumstances of each country form unique constraints and opportunities for instituting REDD+ that must be taken into account when forming the specific national systems.

Key functions within a national REDD+ architecture

The four main tasks to be performed by a national REDD+ architecture are described in the following four sections, overall responsibility and coordination, channelling international funding, monitoring and reporting, and verification and safeguards (inspired by Meridian Institute [2009b]).

Box 5.1. Institutional analysis

The REDD+ architecture is a system of *institutions and actors*. Institutions are the conventions, norms and legal rules that form the actors and regulate the relationships between them (Scott 1995; Vatn 2005). Actors are both individuals and organisations (e.g., firms, NGOs, state-level and local-level decision and administrative bodies). Institutional analysis studies how institutions are formed and function. It concerns three main issues: 1) the distribution of rights and responsibilities among the actors; 2) the costs of coordination/interaction between them (transaction costs); and 3) how institutional structures influence actors' perspectives, interests and motivations.

Institutions define who has access to which resources and the power to make decisions. Hence, legitimacy is a core concept in institutional analysis. This concerns not only whether the institutions in place are legally appropriate, but also the wider issue of democratic support.

Rights and responsibilities vary from system to system. In the case of political systems, the issues concern the distribution of decision-making power and the rules defined for political decision-making, e.g., who has access to the process and what role can they play. In the case of the economic system, rights concern, among other, access to productive resources, e.g., property rights. Rights and responsibilities are normative questions, and the overall legitimacy of institutional systems is very much related to the procedures established for decision making at various levels of society.

Transaction costs concern the technical aspect of institutions, i.e., how costly interactions between actors are. They cover costs of information gathering, formulation of agreements and controls related to fulfilment of what is agreed. Transaction costs vary due to both the characteristics of the issues or goods involved and the type of institutional system. Some services can easily be transacted through markets while, for others, the high level of uncertainty and measurement costs may make public systems more favourable. Whether REDD+ should be managed by markets or by political-administrative systems is a core question.

Institutional structures also influence the way actors see issues and what motivates their actions. Motivations vary across institutional systems and the positions people have. Owners of firms are motivated by the opportunity to make profits, managers by the opportunity to expand business and politicians by the logic of interest representation (stakeholders), or by wider concerns for the society at large (citizens). The capacity of different political systems to cultivate the role of politicians and to avoid corruption is a core aspect of motivational analyses (March and Olsen 1995).

Overall responsibility and coordination

The overall responsibility for REDD+ and its implementation lies with the government. Assigning the responsibility for general coordination to the highest possible level, e.g., to the office of the president, vice president or prime minister, offers several advantages. Alternatively, the task might be given to a ministry (e.g., Planning, Finance, Environment, Natural Resources, Forestry), or a special task force or commission within the government with representatives from several offices and ministries. (Country designs are detailed in boxes in Chapter 3). The tasks might include:

- developing a national REDD+ strategy, including a causal analysis of deforestation and forest degradation and identification of necessary policy reforms;
- assuming overall responsibility to approve and implement the strategy;
- identifying stakeholder groups and conducting consultations with regional/local governments, the private sector, civil society, NGOs, traditional land rights holders, indigenous people, parliamentarians and other stakeholders;
- aligning the strategy with low-carbon development (climate) plans (e.g., NAMAs) or other development strategies for the country, including the annual and medium-term government budgets;
- facilitating the necessary policy processes to define REDD+ related activities in non-forest sectors, and assigning clear sectoral responsibilities within the national strategy;
- specifying the rights and responsibilities of different levels of government;
- establishing necessary new actors with the capacity and authority to implement the strategy;
- reviewing and regularly assessing the strategy's implementation and outcomes based on agreed indicators; and
- reporting to relevant international bodies, or delegating this responsibility to technical agencies.

Channelling international funding

Appropriate national structures need to be developed to channel international funding to undertake readiness activities, capacity building and policy reforms, and to institute policy measures and direct incentives. The tasks might include:

- disbursing resources to approved REDD+ policies, programmes and projects;
- establishing a system of payments (incentives and compensation) to carbon rights holders – individuals, communities, companies or government agencies – for emission reductions and carbon stock enhancement;

- securing legitimate benefit sharing, including distribution of potential rents (see Chapter 12); and
- establishing a transaction registry for REDD+ payments to comply with international and national standards of transparency, accountability and fiduciary standards.

Monitoring and reporting

The monitoring and reporting of changes in forest carbon stocks is essential for international payments and for evaluating progress of the national REDD+ strategy. Moreover, if countries are to develop a system with direct payments to carbon rights holders, they need regular monitoring of stock changes at a scale equivalent to where payments are made. The tasks might include:

- developing national standards, in line with international protocols and good practice, to measure changes in forest carbon stocks;
- establishing or developing an independent national organisation with the required capacity to monitor and verify information;
- coordinating and harmonising carbon accounting and MRV systems across sectors and scales;
- establishing non-carbon MRV systems, including social and environmental safeguards;
- establishing transparent and coordinated systems for managing information, ensuring that all relevant information is publicly available to all stakeholders; and
- reporting to the relevant national and international agencies and providing relevant information to carbon market actors as appropriate.

Verification and safeguards

One or several independent organisations are needed to audit and approve REDD+ results and to publish results to support 'watchdog' functions. The tasks might include:

- overseeing that MRV for carbon is implemented in accordance with national and international standards;
- verifying or certifying emissions reductions to be credited in the voluntary or compliance markets, or to be rewarded by national or international funds or donors;
- overseeing the operation of social and environmental safeguards; and
- implementing and overseeing grievance procedures.

Governance dimensions and evaluation criteria

Crafting the national REDD+ architecture implies making decisions about what are legitimate governance principles and distribution of responsibilities, and how the tradeoffs involved should be dealt with. For example, an institutional structure delivering cost-efficient results in terms of greenhouse gas (GHG) emissions reductions may not deliver well on other important goals, such as poverty reduction, alternative livelihoods or biodiversity preservation. The way the system is set up will strongly influence the handling of such tradeoffs and hence the overall outcomes.

Past efforts have failed to yield long-term or transformative change, often because they did not adequately take into account the inherent complexity and interconnected nature of the diverse actors, rules and practices that comprise governance of forests (see Chapter 4). Failing to tackle problems of weak institutional capacity and coordination, accountability, transparency and public participation may exacerbate current conflicts over the use of forest resources and risk creating perverse outcomes for forest-dependent people, forest ecosystems and the global climate.

In practical terms, formulating a REDD+ architecture concerns which actors should be involved and what authority they should be granted. For example, to what degree should REDD+ systems be established separately from the present national administration? Who should have the responsibility for making which types of decisions? How should nongovernmental participation be facilitated? In what way should international actors formulate the conditions for money transfers? How can transparency and accountability be enhanced?

In Table 5.1 we put forward a set of criteria to consider when making such decisions. These overlap in part. For example, legitimacy can be an umbrella term encompassing the others.

Options for national REDD+ funding architectures

International funding for REDD+ could be made available in different ways, as discussed in Chapter 2. The use of these financial resources will partly depend on the local context and at which stage the country is in developing REDD, i.e., from readiness and demonstration activities to a fully developed REDD+ approach. The issues and demands will vary substantially between stages. Our analysis focuses on a set of alternative architectures for a more mature REDD+ structure at the national level. We envisage four different generic 'type' systems (see Figure 5.1).

Table 5.1. Criteria for assessing institutional options

Criteria	Specifications
Overall political legitimacy[1]	• Across sectors (horizontally) and across levels (vertically) of government • Within civil society • Internationally: donors, international organisations, NGOs
Good governance	• Transparency and accountability • Distribution of power and wealth • Protection and improvement of rights, responsibilities and participation • Motivational aspects, including the risk of corruption (see Box 5.1)
Coordination capacity	• Across sectors • Across levels of government • With the private sector and civil society
Links to broader reforms[2]	• Need for changes in basic societal structures, e.g., property rights structures and systems for participation • Potential as a catalyst for reforms
The above will influence the outcomes in terms of the 3E+ criteria. Specific aspects concerning these criteria will be:	
Effectiveness	• Ability to target the key drivers of deforestation and degradation • Capacity to handle leakage and secure additionality and permanence[3]
Efficiency	• Ability to target low-cost REDD+ actions • Transaction costs of administering policies/payments for environmental services (PES) system: MRV, setting reference levels; setting distribution of REDD+ resources
Equity	• Equitable sharing of REDD+ financial flows and any REDD+ rents (benefit sharing) • Channelling resources
Co-benefits	• Poverty reduction • Alternative livelihoods • Biodiversity • Protection and improvement of rights • Climate change adaptation

1 Ballesteros *et al*. (2009) defines legitimacy in three dimensions: power distribution, responsibility and accountability.

2 This criterion can be use in two opposite ways: REDD+ can be used as a vehicle to generate such changes, e.g., forest tenure reforms, but it can also be used as an argument against certain options if those options require large societal changes to be successful.

3 This is particularly important in the early stages before a national system of accounting and crediting is in place.

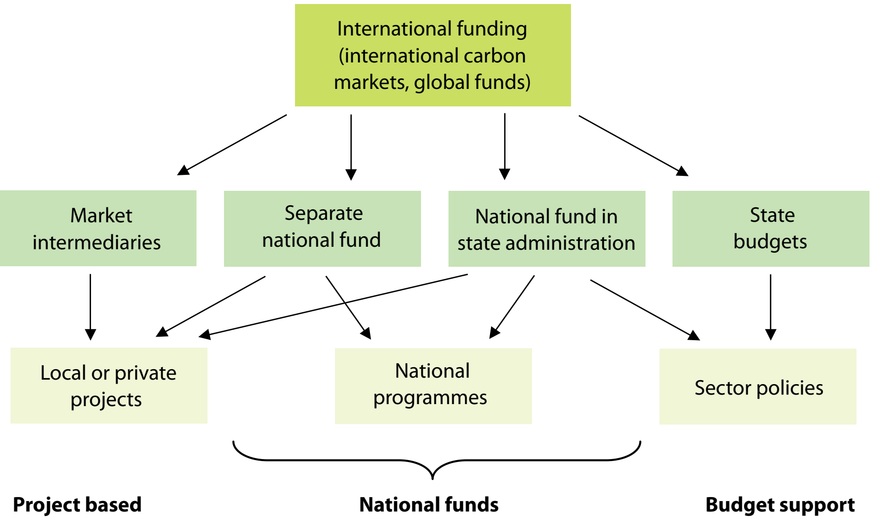

Figure 5.1. Options for national REDD+ funding architecture

The first option is project-based funding, where payments are channelled from international sources (voluntary market, CDM+ or donor funding) to local projects, or are used as a mechanism for national funds/governments to engage the private sector more directly (e.g., via a national REDD+ fund). The second option is a separate or independent national fund outside the government structure with independent administration and decision-making structures. This is similar to conservation trust funds (CTFs) in biodiversity protection (Chapter 6). The third option is a national fund within the state administration. This uses the capacities of the present administration, but resources are allocated by a separate board. The fourth option is regular budget support, where external resources are channelled directly via existing sector administrations. These options are not mutually exclusive; a country might pursue several options to fit different elements of the national REDD+ strategy.

The national REDD+ architecture will also require that MRV systems be set up, including monitoring of co-benefits. These should be established independent of the funding structure (see Chapter 7).

Table 5.2 offers a generic summary evaluation of the four options. Clearly, national circumstances vary and need to be taken into account, including existing institutional structures, capacities and legal frameworks. Further, the institutional choice and outcomes depend on the policies selected to be part of the national REDD+ strategy. For example, equity outcomes depend more on the design of the REDD+ actions than the location of the fund within or outside the state administration. Institutional choices also affect the fundamental incentives including equity considerations, for example.

Table 5.2. Generic evaluation of main options for national REDD+ funding architectures

	Project	Separate REDD+ fund	REDD+ fund within state administration	State budgets
Political legitimacy	Capacity to deliver targeted results on carbon. National legitimacy may be weak, especially if transfers are large. High legitimacy among private carbon buyers and donors.	National legitimacy higher than for projects. Might raise issues of state sovereignty. Legitimacy among the private sector may be less than for projects.	Scores high on state sovereignty, secures high national control. Potential concerns by the private sector and donors. Some issues concerning capacity to target interventions.	Scores highest on state sovereignty and national control. Problems of private actor engagement highest. Issues concerning capacity to target interventions.
Governance	May attract intermediaries that use information asymmetry to their advantage. Opportunities for corruption. Challenges concerning overall transparency. Need to establish separate fiduciary systems.	Corruption is a challenge. Might avoid corruption in state administration, but has governance challenges for funds. Need to establish separate fiduciary systems.	Corruption a serious challenge, but variable. Relies on country systems. REDD+ resources might be used to improve governance.	Corruption a serious challenge, but variable. Relies on current budget systems. REDD+ resources might be used to improve governance.
Coordination	Weak.	Weak, but depends on mandate.	Stronger, but depends on mandate and ability to use specific sector administrations.	Potentially strong, especially the use of specific sector administrations.
Changes in societal structures	Demands clearly defined property rights. Individual property rights favoured.	Depends on mandate. May require legal reforms. Well-defined property rights an advantage.	Depends on mandate, but offers high flexibility.	Depends on REDD+ policies implemented. Offers high flexibility.

	Project	Separate REDD+ fund	REDD+ fund within state administration	State budgets
Effectiveness (leakage, additionality, permanence)	Leakage a major problem. Permanence also an issue, but can be better secured through long-term contracts.	Leakage depends on mandate and size of forest area covered. Might have power to institute measures to avoid leakage. Permanence as for projects.	As for separate funds, but might have more power to institute measures to avoid leakage. Might also use sector policies to better secure this. Permanence depends on national commitment.	Better able to control and internalise leakage in accounting. Permanence depends on national commitment.
Efficiency (transaction costs)	The larger REDD+ becomes, the higher the transaction costs compared to funds and budget support. Establishment of intermediaries required.	Increases its competitiveness as REDD+ grows in volume. Needs to establish new systems to reach to 'the ground'.	Increases its competitiveness as REDD+ grows in volume as existing state administrations may be used. Further developments, especially in local administrations, may be needed.	Increases its competitiveness as REDD+ grows in volume as existing state administrations used. Further developments, especially local administrations, may be needed.
Equity	Intermediaries may capture large rents. Positioned to compensate losers directly, but local elite capture a challenge.	Positioned to compensate losers directly. Elite capture, especially at local level, a challenge	Positioned to compensate losers directly, but a challenge to secure equitable sharing of rents. Risk of elite capture.	Potential rents may be used to balance state budget. Risk of elite capture at all levels.
Co-benefits (poverty reduction, livelihoods, biodiversity)	Weak if conflict exists between cost-effective carbon measures and co-benefits. But project open to national and international scrutiny.	May be weak if conflict between cost-effective carbon measures and co-benefits, but specific focus on co-benefits might be part of mandate.	More likely to secure co-benefits as wider set of policy measures available. Depends on willingness and capacity of state.	More likely to secure co-benefits as wider set of policy measures available. Depends on willingness and capacity of state.
Examples of systems	• CDM projects • PES projects • REDD+ demonstration projects	• Conservation Trust Funds	• Indonesian Reforestation Fund • Amazon Fund	• ODA budget and programme support • Some REDD+ demonstration activities

Project-based funding

The strength of the project-based solution is that it resembles a market for carbon projects, thereby drawing on the capacity of markets to deliver efficient outcomes. A core aspect is the ability of this system to find solutions with the lowest opportunity costs of forest conservation. The system has high legitimacy among private carbon buyers and donors, and may therefore be more effective than the other options in mobilising private funding (Angelsen *et al.* 2008). The efficiency argument also relates to projects' independence from political systems that are assumed to have a weighty bureaucracy with high transaction costs and the potential for corruption.

Establishing and operating markets for environmental goods and bads often involve high transaction costs. When many actors are involved and the commodities or services are hard to demarcate and measure (e.g., environmental services), state-based systems such as subsidies and taxes may be more cost efficient (Rørstad *et al.* 2007; Vatn *et al.* 2009).

Further, potentially high transaction costs mean that the project solution depends on strong – in some cases even monopolistic – intermediaries that can both reap a significant share of REDD+ rent and become directly involved in corrupt practices. This critique has been raised against CDM and intermediaries involved, whose interests lie in the 'big money' rather than in the achievement of the overall goals (Lloyd and Subbarao 2009; see also Chapter 13).

While the prospects of delivering efficient solutions contribute to the legitimacy of the project-based option, it marginalises the state and local authorities of the host country, thereby potentially reinforcing the governance challenges. Again, the conclusion may depend on the magnitude of REDD+. National participation and integrity become more important the larger the REDD+ volumes are. But a classical dilemma resurfaces: should REDD+ resources be used to strengthen weak state administrations, channelled directly to projects or used to build separate systems such as independent REDD+ funds?

A project-based approach could undermine the state administration's ability to improve transparency, accountability and participation in decision-making; implementation of sector reforms; and coordination in forest management. This option will also not be able to cushion changes in REDD+ payments over time as effectively as the other options.

The experience with the Clean Development Mechanism (CDM) illustrates another challenge with a project-based solution: how to avoid leakage, which undermines both effectiveness and efficiency. To be viable, monitoring and control schemes must be set up outside the project area as well. While feasible, the system is based on separate projects; this might create a situation where actions on the ground are poorly coordinated.

The production of co-benefits is contested. A project will have as its primary aim producing emissions reductions (and removals), which might conflict with other aims (see Chapter 21). But NGOs and the private sector also have an interest in thinking beyond carbon, and projects are often subject to strong national and international scrutiny for their delivery of non-carbon benefits (Angelsen *et al.* 2008).

A project approach has equity implications in two ways: First, a project-based approach will affect country selection and location of projects, and thereby the distribution of REDD+ funds at the regional or country level. The CDM experience is not very encouraging (Sutter 2003). Few CDM investments have been made in the poorest regions, such as most of Africa (Saunders *et al.* 2008), reflecting concerns that weak institutions and high transaction costs, due to working in poor regions with poor people, will risk project success.

Second, a project approach has implications for the distribution within the project area. A system for payments for environmental (PES) has a number of prerequisites (Chapter 17). While land rights do not need to be either individual or fully formalised to secure participation in trading systems (Corbera *et al.* 2007), the project-based option will favour those with formalised property rights. The PES literature emphasises the problems of providing equitable processes and outcomes (Vatn *et al.* 2009). Moreover, there is a risk that the formalisation of property rights may exclude the rural poor not only from access to REDD+ resources, but also from land in general.

Separate national fund

This type of fund is established outside the state administration and is governed by a board of representatives from a broad range of stakeholders, perhaps also international ones, as has been the case for some Conservation Trust Funds (Chapter 6). A separate national fund can be assigned different tasks, e.g., managing a specific conservation area or managing a national PES system. The overall legitimacy depends on the process leading to its establishment and the stakeholders represented on the board. One critical issue is how the fund interacts and coordinates with other political and economic processes in a country.

A general advantage of the fund model is the prospect for more stable long-term funding than for the 'project' and 'regular budget' alternatives, e.g., to avoid resources being used to balance the state budget in periods of fiscal crisis. A separate national fund might also be a more stable solution in political systems where part of the administration is changed every time there is a change of government or minister. Compared to the project option, the possibility of formalising more trustworthy requirements on the delivery of co-benefits is an advantage.

Depending on the tasks of the fund, another potential strength compared to the project solution concerns the coordination of REDD+ resources nationally. It would be possible for this system to get involved in activities across sectors, although only in exceptional cases will it be able to get fully involved in the cross-sectoral policy coordination needed in implementing national REDD+ strategies.

A potential argument for a separate fund is that many state administrations are hampered by corruption. To the extent the separate fund is established along with a strong norm of supporting local communities, a guard against misuse exists. Nevertheless, if REDD+ grows, large amounts of money will be channelled through these funds, and it would be naïve to believe that the fund managers would not be at risk of corruption. The advantage is, however, that the transparency and public scrutiny of funds seem higher than they are for budget support, for example.

If REDD+ finance grows, the overall legitimacy of a separate fund to manage the lion's share of REDD+ funding might be questionable. If a large fraction of the forest land becomes involved, it will be politically difficult to accept that decisions concerning these areas are sidelined by a country's general decision-making structures and land use policy. Establishing systems parallel to the present administration may result in inefficient allocations and high transaction costs; the risk is that this will contribute to further undermining the government structures and limit the ability to undertake required sector reforms. But again, this depends on the country context: if the general operation of a government has low legitimacy because of high corruption, allocating a high share of REDD+ resources outside government structures might be the only credible solution.

National fund within the state administration

In contrast to the separate national fund, this type of fund is placed within the state administration. This could be within a ministry, or an agency under the ministry, as is the case with the Amazon Fund (Box 5.2)[1]. The allocation of resources is, as for separate funds, handled by an independent board with members from relevant state and public administrations and possibly from civil society. The board can allocate money to specific programmes, sector administrations or individual projects. Existing state structures and systems are used to allocate and disburse funds to relevant stakeholders.

1 The Amazon Fund may be viewed as lying somewhere between a separate fund and a fund within the state administration. It operates quite independently of the federal agencies responsible for policies which affect deforestation and land use, with few attempts to coordinate national policies.

Box 5.2. The Brazil Amazon Fund

Peter May

Launched in 2008, the Brazil Amazon Fund is designed to combat deforestation and promote sustainable development in the Amazon. Its creation was an indirect response to Brazil's gradual acceptance of REDD+ as a worthy approach to climate mitigation, counteracting the country's ongoing national sovereignty objections to any multilateral efforts to control forest land use that date back to the Rio accords in 1992. In both COP-12 of 2006 and COP-13 of 2007, Brazilian negotiators presented an approach for 'compensated reduction' that would reward national (and eventual subnational) reductions in deforestation against a 10-year historical reference level. Compensation payments would be derived, according to this approach, from public or private donations to a central fund, with no direct relationship to the carbon market. Despite initial scepticism regarding the potential to attract funding, the idea caught the interest of the Norwegian government, and later Germany. The fund has so far received a pledge for up to US $1 billion from Norway, contingent on achieving reduced deforestation rates. As of November 2009, US $110 million had been disbursed or committed for a first round of projects.

The Brazilian Development Bank (BNDES) is managing the Fund as part of its revamped environmental portfolio. This role constitutes a significant addition to the portfolio of activities of BNDES, whose role has otherwise been to finance major public and private infrastructure and investment projects in Brazil and other Latin American countries. BNDES is one of the world's largest national development banks, with annual loans exceeding those of the World Bank, the Inter-American Development Bank and the Eximbank combined. BNDES is not a signatory to the Equator Principles which articulate social and environmental principles for development financing. The bank has had a dismal environmental record over the past decade. It has, for example, recently been responsible for a number of substantial operations in the cattle industry that have contributed to pasture expansion and deforestation in the Amazon.

The Amazon Fund, which represents part of BNDES' efforts to 'green' its image, will finance the sustainable use of forests, recovery of deforested areas, conservation and sustainable use of biodiversity, and environmental control, monitoring and enforcement. Most of the 38 projects submitted to date include a mixture of these activities, with a substantially greater emphasis on restoring degraded landscapes, enhancing sustainable forest products and enforcing forest codes than on avoiding deforestation through trial payment schemes. Grant awards follow guidelines established by a guidance committee (COFA), which includes government and civil society representatives, but actual grant decisions will be made by BNDES (see http://www.amazonfund.gov.br/ for further details on fund management, including a listing of initial projects under consideration). Project proposals may be submitted by public institutions, state-owned companies and NGOs. A number of proposals have been submitted by private enterprises. However, a decision was made by a COFA subcommittee to deny grant support for profit-making enterprises. While international donors will have no direct influence over the award and use of grants, the Brazilian government has declared that the operations of the Fund will be 'results based, transparent and independently monitored'.

Following its resistance to the fund-based donations approach during the COP13 negotiations in Bali, Brazil has since moved toward a more flexible approach, involving eventual access to the carbon market and subnational project architectures. The Fund will play a transitional role in REDD+ readiness, but there is strong pressure from within Brazil to extend financing to the broader use of market instruments. It is not clear as yet whether such an expansion would be managed by the Fund or by another government agency.

If the administration is politically legitimate, there are strong arguments for using it in facilitating REDD+. This type of fund has many qualities of a separate fund when it comes to coordination and avoiding leakage, but it extends these by making coordination across sectors and achieving co-benefits easier. Transaction costs could be lowered by using the existing administrative structures of the state and local administrations. The fund also gets access to state powers, implying that several policy instruments other than payments can be included. These can either supplement payments or be stand-alone measures. Implicit in this is also the possibility of using instruments that better reach areas and groups with weak land rights.

The experience with, for example, national parks and logging contracts in many countries illustrates that national administrations are not always protecting the interests of the rural poor (Hutton *et al.* 2005; World Bank 2006). Furthermore, state administrations may be weak, especially at the local level, and vulnerable to corruption. Using the instrument of a fund with an independent board is a way to guard against some of these problems. It can also deter the state from using REDD+ money to balance the state budget in times of fiscal crisis.

The strength of this model is that it offers the option to use current capacities of the state administration, but it could create competence conflicts within the national administration, i.e., between the fund and the sector administrations. There is also a risk of the system being co-opted. It might therefore be sensible to establish a unit for monitoring and control that is separate from the administration. This unit could be established under a national control board with representation from the private sector, civil society, national authorities and, possibly, international agencies.

Specific budget support

The last option reviewed is to channel international REDD+ funding through existing budget systems in the form of general budget support, or as more or less earmarked funding. This might be an option in the early phases of REDD+, which emphasise readiness activities and specific policies and measures (PAMs; see Chapter 2). At later stages, in a purely results-based national-level system, fewer strings will be attached to how the money is being spent. The continuous flow of international funding depends on the results delivered, and how money is spent is a matter for national governments to decide.

During the past decade, budget support, or macrolevel programme aid, has become an increasingly popular aid modality, although project support still dominates. In a number of African countries, it accounts for 20–40% of government budgets (Lawson *et al.* 2005). It represents a 'shift from traditional *ex ante* conditionality to a partnership approach' (Koeberle *et al.* 2006). It is assumed that a policy dialogue between host governments and donors will initiate appropriate policy reforms.

Budget support has the potential to reduce transaction costs, improve coordination across sectors and delivery of co-benefits, generate greater country ownership and assure overall policy coherence (Killick 2004). These potential advantages are similar to those generated by a fund within the national administration. The main problems concern potentially lower transparency and the risk that money will be directed toward purposes other than REDD+. This could be avoided through the way the MRV systems are set up and by using a purely performance-based system: International payments would be made to national authorities on the basis of documented emissions reductions and removals. Sovereign states are free to do whatever they find most appropriate to achieve the carbon credits and obtain the payments.

Although this option looks attractive, it faces some problems. First, it imposes great demands on a reliable and credible MRV system (Chapter 7). At least in the short to medium term, it is unlikely to generate enough good data to put all the 'eggs' of control into the 'basket' of measuring changes in carbon stocks. Credible reference levels must also be established (Angelsen 2008b). Second, the countries must assume all the risk. Only after actions are taken will anyone know if REDD+ generated any income. The risks concern both the actual impact of the measures taken on emissions and how these will be rewarded internationally.

Third, there is a potential problem of international legitimacy of the REDD+ policies. The international community has preferences for how REDD+ comes about locally. A system offering co-benefits and compensation to local people would be very differently assessed to one that forces local communities away from their livelihoods through the establishment of protected areas as a way to maximise REDD+ revenues for the state budget.

The potential gain lies in the capacity to avoid setting up a duplicate structure at the national level. Hence, transaction costs can be kept down as the solution also provides incentives to improve a country's overall governance, secure coordination across sectors and ensure better coordination with the use of other funding sources (e.g., ODA). Finally, if successful, REDD+ actions result in reduced state income (e.g., lost revenue from logging concessions), then budget support is a simple and logical compensation method.

From the drawing board to the forest

Setting up a national institutional REDD+ architecture that is legitimate and can deliver 3E+ outcomes on the ground is a major challenge for REDD+ countries. The particular form and mix of options in each country will depend on existing institutions and legal structures, current political and economic processes, the distribution of power and wealth, and the REDD+ actions appropriate to address the drivers of deforestation and degradation. It is demanding, both technically and politically, to establish systems that are very different from the existing ones. Nevertheless, REDD+ is 'a new game in town' and this invites new or modified institutional structures. Effective REDD+ actions also demand stronger links among central and local authorities and the communities involved (Chapters 9, 14, 16).

The four options discussed are of course not mutually exclusive. In many situations the solution is to formulate a good mix and to define which solutions are suitable for implementing which policies. For example, policies targeting intensive agriculture (Chapter 15) might appropriately be implemented through a separate fund or regular budgets within the Ministry of Agriculture, while the responsibility for developing a national PES system might be with a separate REDD+ fund. But the higher transaction costs of operating several systems must also be considered.

Building national REDD+ institutions – whether entirely new ones or modified existing ones – takes time. The phased approach (p. 14) has increasingly become a standard way of viewing the REDD+ process. National REDD+ strategies need to reflect that, but also be aware that the early design will constrain later options. The climate challenge demands quick actions, but an institutional long-term strategy is also needed to ensure that the immediate steps taken fit future, more developed, solutions.

Chapter 6

Conservation trust funds as a model for REDD+ national financing

Barry Spergel and Michael Wells

- REDD+ funds modelled after conservation trust funds (CTFs) can provide stable long-term funding with high credibility for financing major REDD+ activities.
- CTFs can function as administrators of REDD+ funds, as managers of PES, or as carbon brokers.
- Existing CTFs have high-level political support even though they are independent of government; using them to distribute international REDD+ funding could therefore mitigate concerns about loss of sovereignty while also reassuring funders and buyers of REDD+ credits.

Introduction

More than 50 conservation trust funds (CTFs, also referred to as 'environmental funds') have been established in developing countries during the last 20 years. In general, these were created to provide stable, predictable and sustainable financing for conserving biodiversity and achieving related environmental goals. This chapter describes how REDD+ funding institutions modelled on CTFs could be appropriate instruments to manage and distribute REDD+ payments within individual countries.

CTFs have been established in almost every country in South America, in most Central American countries, in more than 10 African countries, 8 countries in Asia and the Pacific, and in the newly independent states of the former Soviet Union. These CTFs each have their own distinct missions, which include implementing national environmental strategies, financing national protected area (PA) networks and sometimes funding the running costs of individual PAs. The three largest environmental funds (in Brazil, Mexico and Peru) each manage assets of over US $100 million. The aggregate amount managed by nearly 60 funds exceeds US $1.5 billion. The experiences and performance of CTFs have been thoroughly documented (Wells 1991; GEF 1998; Norris 2000; Oleas and Barragán 2003; RedLAC 2008; Spergel and Taieb 2008).

Environmental trust funds in many forested developing countries are either national in scale or focus on a particular geographic area. Some funds have already taken on key roles related to REDD+. Others have developed capacities in areas likely to be critical in achieving and rewarding REDD+ performance. These include long-term financial and strategic planning, managing performance-based payment systems, monitoring and evaluating project completion indicators, and managing multiple funds from various sources with different purposes.

Chapter 5 outlined four institutional options for disbursing REDD+ funding at the national level: 1) project-based funding; 2) a legally independent national fund outside the government, such as CTFs; 3) a separate earmarked fund within the national government; and 4) direct budget support to government ministries and departments. This chapter examines the suitability of the second option, the CTF model, for managing and distributing REDD+ funding. We first describe the characteristics of a CTF before discussing how such a fund could become part of a national REDD+ strategy and be coordinated with other government efforts. Next, we discuss the merits of CTFs in terms of effectiveness, efficiency and equity (the 3Es), and co-benefits. Finally, we outline three different roles a fund could play within a national REDD+ system.

What is a conservation trust fund?

Most CTFs make grants to government-run protected area (PA) management agencies, NGOs, or both. While each CTF is responsible for managing and disbursing funds as well as for monitoring and evaluating the use of funds, it is the grantees or implementing organisations that actually carry out the conservation projects and activities.

Each CTF is an independent legal entity governed by a board of trustees or directors responsible for ensuring that the fund's financial resources are managed and used for their intended conservation purpose. The legal structure of a CTF depends on the country in which it is located. Many CTFs have been established by special national legislation or decrees. Virtually all CTFs have 'mixed' governing boards, made up of representatives of public and private sectors and civil society. This is usually a condition of most international donor agencies for contributing to CTFs. CTFs are often one of the few institutions in a country in which representatives from various sectors of society – government, business, academia, NGOs and community groups – come together to jointly manage an important set of activities. Donor agencies are often also represented on CTF boards, sometimes in a non-voting capacity. For example, the Global Environment Facility (GEF) executing agencies, such as the UNDP and The World Bank, can only serve as non-voting board members (GEF 1998).

CTF grants support a range of activities. These include capacity building and staff training for government agencies and NGOs; purchases of equipment; building and maintaining PA infrastructure; proposing and implementing legal and policy reforms; scientific research and biological inventories; environmental education and public awareness activities; recurrent management costs of national parks, forest reserves and community managed forests; integrated conservation and development projects (ICDPs, see Chapter 18); and administering PES for maintaining watersheds (Chapter 17). Many activities currently supported by CTFs overlap with the activities for which REDD+ funds are likely to be used.

The financial resources of CTFs are usually in the form of endowments. Typically, the initial capital is provided by a combination of bilateral aid agencies (e.g., United States Agency for International Development, Kreditanstalt für Wiederaufbau and Agence française de développement), GEF, international conservation NGOs, foundations, corporations and the national government. The capital of each fund is usually invested by professional asset managers to generate a long-term stream of income to finance grant awards for the CTF's stated purposes. However, some CTFs are sinking funds, meaning that their capital will be completely spent over a fixed period, usually from 10 to 20 years. Revolving funds are a third type of CTF. They receive a continuous stream of revenue from specially earmarked fees, taxes, fines or payments for environmental services (PES). A CTF that manages and disburses REDD+ funding from the sale of national carbon credits on international markets would take the form of a revolving fund. However, official development assistance (ODA) funding for early phases of REDD+ activities could be managed as a form of endowment or sinking fund.

The Mexican Nature Conservation Fund (FMCN), established in 1993, is one of the most highly regarded environmental funds. Of particular relevance to

REDD+, the fund now administers a substantial part of the budget supporting Mexico's protected areas, and allocates funds to each protected area based on performance against goals and work plans. FMCN is governed by a board that includes government and nongovernmental representatives, all of whom serve in a personal capacity to ensure independence.

The delegation of authority to manage and disburse national REDD+ payments to an independent fund may prompt concerns about possible loss of national government sovereignty, although the degree of independence of a CTF will depend on the composition and power of its governing board. However, most CTFs do have a high degree of national ownership and high-level political support. Many were created by special acts of their national legislatures, and some were directly sponsored by their country's president (e.g., FMCN, the Foundation for the Philippine Environment and a new CTF in Ethiopia). To the extent that these institutions have already been accepted by governments, using an existing CTF to manage REDD+ payments could mitigate concerns about possible threats to national sovereignty. CTFs can also provide a measure of stability during changes in government or economic booms and busts when public sector spending programmes (especially conservation programmes) may be vulnerable to sharp budget cuts (Spergel and Taieb 2008).

Whether it will be more appropriate to adapt existing CTFs to administer REDD+ funding, or to establish new institutions using CTF models will depend on the situation in individual countries. Establishing and making a new CTF operational typically takes at least two years. This is due in part to the lengthy participatory process of designing a CTF, and in part to the time required for fundraising and negotiating with international donors. The latter might or might not be necessary when establishing CTF-type institutions to administer REDD+ funding at the national level. This will depend on the system that is adopted for allocating REDD+ funding at the international level. CTF-like funds offer lower transaction costs, openness and transparency, flexibility, an ability to secure stable, long-term funding and credibility with a broad array of national as well as international stakeholders. Given the need for urgent action to start the flow of funds for supporting REDD+ activities, the advantages of using CTF-like funds need to be considered.

CTFs and the 3Es plus co-benefits

Effectiveness

CTFs have shown that they can effectively administer international and domestic funds from diverse sources over long periods. They have effectively disbursed funds for prescribed purposes through grant programmes that enhance, but do not overwhelm, the absorptive capacity of recipient organisations. CTFs are designed to distribute funds over long periods and are insulated from year-to-year shifts in government priorities and revenue flows. As a result, they are probably more likely to fulfil the critical REDD+ goal of *permanence* than either purely market-based mechanisms, which may have revenue levels that fluctuate dramatically, or regular government budget support, which is subject to shifting political priorities.

Countries wishing to use CTFs or the CTF model for channelling REDD+ funding could either establish new CTF-type institutions to manage REDD+ revenues or, in some cases, extend the mandate of existing CTFs. Engagement in REDD+ may not be appropriate for all CTFs, however. The potential scale of REDD+ financing is considerably larger than that normally managed by CTFs. It is likely to have a significant impact on a country's land use practices and policies, and could overstretch the institutional capacities of the CTFs. Channelling REDD+ funding through CTFs would also require much closer policy coordination and revenue sharing among many different government ministries and agencies. Finally, the statutes or legal charters of some CTFs limit them to awarding grants for specific tasks or locations (e.g., the CTFs established with GEF funding for individual parks in Malawi, South Africa, Tanzania and Uganda).

Efficiency

Several studies have found that CTFs are usually more efficient and less bureaucratic than government agencies. They can facilitate the timely procurement of basic equipment and supplies as well as pay wages and salaries efficiently. In countries such as Brazil, Mexico and Peru, once CTFs began supporting a large part of the operating costs of the PA networks, delays ceased and it became easier to recruit better staff for the parks (Spergel and Taieb 2008).

Average CTF administrative costs are around 15% of their budget. Although the administrative costs of smaller CTFs (with endowments of between US $3 million and $10 million) may be much higher than this, most of the larger CTFs have administrative costs of between 10% and 12%, and this is also likely to be true of the CTFs that would administer the more than $100 million that REDD+ would generate each year in many countries.

CTF multistakeholder boards and transparent decision making processes provide checks and balances against corruption and waste. Independence from government allows CTFs to exercise a high degree of critical oversight, and to monitor and evaluate how grants to government agencies, such as national park agencies or government forestry departments, are being used. Like any institution, CTFs can become inefficient and bureaucratic, but a recent study found that most of the very few cases where these problems usually occurred had boards with a high proportion of government members or were otherwise subject to government pressures (Spergel and Taieb 2008).

Using an existing CTF to administer REDD+ payments could reduce the start-up period and minimise the risks associated with creating an entirely new institution. Using an existing CTF with a good track record in accounting for funds, and in monitoring and evaluating the performance of its grantees, is also likely to increase the confidence of those paying for REDD+. This should lead to lower risk premiums, thereby potentially resulting in greater efficiencies and in higher payments to REDD+ 'suppliers'.

Equity

A major advantage of CTFs is that they protect funds from being diverted by governments for other purposes, and insulate them from national budgetary crises. Many national finance ministries initially opposed the creation of CTFs as off-budget funds, but were persuaded to accept and support the establishment of CTFs as a way of accessing international funding.

CTF boards include a broad range of national stakeholders and have transparent decision making procedures and annual independent financial audits. Such structures may make them more able to distribute REDD+ funding equitably and resist 'elite capture' of benefits than either government line ministries and agencies or market-based mechanisms. CTFs, such as FMCN in Mexico and Indonesia's KEHATI Foundation, include social development NGOs on their boards, while the Suriname Conservation Foundation board includes representatives of indigenous forest communities. Many CTFs administer payments for compensating communities whose land or access rights have been restricted when protected areas were created. The CTFs make grants to those communities to improve healthcare and schools, and to provide training and technical assistance for developing alternative livelihoods.

Co-benefits

CTFs' significant experience, capacity and focus in biodiversity conservation gives them a clear comparative advantage over other institutional options for channelling REDD+ funding toward this co-benefit. CTFs can also have an advantage in providing co-benefits for indigenous people in cases where CTFs include indigenous people in decision making and as beneficiaries. However, CTFs do not appear to have an advantage over other institutional options in achieving the co-benefit of poverty mitigation. Because of their limited financial resources and their conservation-focused institutional mandate, CTFs only support poverty alleviation projects as a way of reducing human pressures on natural resources, and of generating greater community support for conservation, rather than as an end in itself. CTFs sometimes struggle with governments that want to use CTFs for poverty alleviation projects which are not related to conservation.

Three roles for CTFs linked to REDD+

We consider three options for the functions that CTFs could perform in relation to REDD+.

CTFs as administrators of REDD+ funds. A CTF could administer a proportion of international REDD+ funding to support a variety of REDD+ activities. Many REDD+ activities will require sustained long-term funding rather than short-term project funding. Most CTFs today support long-term activities for capacity building and readiness, such as strengthening national forest management and policy making capacity, and strengthening capacity at local levels, including for community forestry. Many CTFs have also supported the development of more environmentally friendly policies and measures (PAM) for forestry and agriculture. Some CTFs have even given grants specifically for developing legal frameworks for REDD+ and strengthening the national capacity in measuring, reporting and verification (MRV).

CTFs have also funded many different types of forest protection activities that need to be supported over long periods. These include improving law enforcement to reduce illegal activities; improving the environmental sustainability of logging concessions; improving post-harvest management efficiency; and afforestation and reforestation (A/R) projects.

CTFs as PES managers. CTFs could also be put in charge of managing a national (or subnational) system of payments for environmental services (PES). Some CTFs (such as Costa Rica's FONAFIFO, Guatemala's Sierra de las Minas Water Fund, the Mexico's FMCN and Brazil's FUNBIO) currently administer periodic PES to local forest owners or owners of forest user rights. These CTFs offer small-scale models of how larger-scale systems for distributing REDD+ payments could operate in the future. They have demonstrated the ability to effectively administer and monitor grants to the same types of beneficiaries that are likely to receive payments for REDD+, including national government ministries and agencies, local governments, private landowners, local communities and indigenous people.

In addition to their role in distributing PES, CTFs have also served as mechanisms for distributing long-term compensation and managing benefit-sharing programmes for local communities. This has required disbursing compensation payments over extended periods to people whose land or access

Table 6.1. Roles CTFs could play in administering REDD+ funding

Point of comparison	CTFs as administrators of REDD+ funds	CTFs as PES managers	CTFs as carbon brokers
Roles played by a CTF in the system of payments for REDD+	CTF acts only as administrator for disbursing REDD+ payments to implement specific REDD+ policies	CTF acts as manager of a national PES-based REDD+ system	CTF acts as broker or intermediary between large numbers of sellers and buyers of carbon units
Modality for setting payment amounts	Grants-based (more like traditional ODA or philanthropy)	Payments based on performance, but could be 'locked in' or negotiated for long periods	Market based, so the prices paid for REDD+ could change day to day
Criteria for distributing REDD+ payments	Payments based on: • need for capacity building, • assessment of project quality and past performance, • soft performance-based criteria, • equity and other relevant considerations	Payments based on measuring performance against agreed benchmarks: • actual emissions reductions, • rough proxies for emissions reductions	Payments to sellers are based on delivery of carbon units
Scale of operation and exclusivity	A CTF would be given authority to administer specific aspects of the national REDD+ system	A CTF would be given exclusive authority to administer the national PES system	A CTF would broker a large number of individual site-specific REDD+ transactions, but buyers and sellers could also deal directly or use other intermediaries besides the CTF
Transaction costs	Lower transaction costs, because payments are made for exogenous reasons (i.e., proxy indicators, such as implementing conservation programmes and strengthening enforcement activities) rather than the quantity of carbon units	Intermediate transaction costs, as payments can be based either on direct measurements of emissions reductions or on proxies	Higher transaction costs, because a CTF would measure and monitor (i.e., certify) the emissions reductions that it brokers, and would in effect serve as an insurer of the quality and quantity of carbon units
Equity considerations	In theory, can be more targeted to achieving social equity and benefiting disempowered groups; in practice, could become more susceptible to politics and corruption	An intermediate case, which might for example pay groups without clear carbon rights	Would favour those with clear and secure tenure rights (which could include indigenous groups, depending on whether they have been given land title and rights to sell carbon)
Required level of technical capacity and political stability	Suited to less developed or more politically unstable countries, because based on rough proxy indicators that are easier to monitor and verify	Suited to developing countries with moderate to high levels of technical capacity and/or good governance	Suited to countries with higher levels of technical capacity or good governance, because of the sophisticated skills and MRV capacity required

rights have been restricted in order to create or expand protected areas, or provide them with long-term benefits such as improved healthcare, schools, training and technical assistance for developing alternative livelihoods.

CTFs as carbon brokers. An additional role that CTFs could play is to certify and bundle together the emissions reductions of a large number of REDD+ sellers (such as small landowners, local communities and indigenous groups). CTFs would then act as brokers, selling carbon credits to international buyers (and perhaps also to domestic buyers that are high carbon emitters). This option would be a way to overcome impoverished sellers' lack of information, bargaining power and negotiating skills. It would also provide a way to save buyers the effort and cost of doing a 'due diligence' check on each seller from whom they buy carbon units. In addition, CTFs could lower the risks to buyers of sellers' failures to deliver promised emissions reductions, by spreading such risk across a large portfolio of projects.

Table 6.1 illustrates the different roles that CTFs could play in a national REDD+ system. These differences have been somewhat stylised for purposes of comparison. In practice, there could be more of a continuum between these options and, in any case, each option would have to be custom designed – like all CTFs – to fit the particular political, legal, economic and environmental situation in each country.

Conclusion

Forested developing countries are eventually expected to receive very substantial payments for reducing greenhouse gas emissions by selling carbon credits in international carbon markets. In the near future, however, REDD+ payments seem likely to originate from more conventional ODA sources to support REDD+ planning, strategy development, capacity building (e.g., in MRV), policy reform, demonstration activities, etc. Even though many countries are not likely to reach the full market stage for several years (phase 3, see Chapter 2), the institutional requirements of an effective disbursement system are likely to be so complex, demanding and possibly controversial, that planning should begin as soon as the international REDD+ architecture becomes clearer.

CTFs are a well-established institutional vehicle for managing assets and disbursing grants in the environmental arena, and have a generally successful track record in a diverse range of country contexts. CTFs, therefore, should be carefully considered as a national disbursement mechanism for REDD+ payments, even though REDD+ will bring new challenges that CTFs have not so far encountered.

Measurement, reporting and verification for REDD+

Objectives, capacities and institutions

Martin Herold and Margaret M. Skutsch

- Participation in REDD+ requires much more emphasis on measuring, reporting and verifying (MRV) than has been the case in most national forest monitoring to date.
- Roadmaps to build and sustain capacity for measuring, reporting and verifying national REDD+ implementation according to national and Intergovernmental Panel on Climate Change (IPCC) requirements and principles must be effective, efficient ansd equitable.
- Without clear links between REDD+ MRV and policy from the outset, REDD+ compensation schemes that are based on results will be ineffective.

Introduction

A cornerstone of any national REDD+ scheme is a reliable, credible system of measuring, reporting and verifying (MRV) changes in forest carbon stocks. A recent review shows that very few countries have even the minimum capacity (Box 7.1) needed for measuring and monitoring. Most developing countries also have a long way to go before they will be ready to fully participate in an international system that provides compensation for REDD+ actions based on results.

Box 7.1. National capacities for MRV in non-Annex I countries

In a recent study (Herold 2009), information from global information sources was analysed to assess the current national monitoring capabilities of 99 tropical non-Annex I countries. The assessment emphasised that most countries have limited ability to provide complete and accurate estimates of greenhouse gas (GHG) emissions and forest loss. Less than 20% of the countries have submitted a complete GHG inventory, and only 3 out of the 99 countries currently have capacities considered to be very good for both monitoring forest area change and for forest inventories. The current capacity gap can be defined as the difference between what is required and what currently exists for countries to measure and verify the success of REDD+ implementation actions using the IPCC Good Practice Guidelines (see Figure 7.1). Capacity gaps are largest in countries:

- that have limited experience in estimating and reporting national GHG inventories, and in applying IPCC Good Practice Guidelines and that have limited engagement in the UNFCCC REDD process so far;
- with weak existing capabilities to continuously measure forest area changes and changes in forest carbon stocks as part of a national forest monitoring system (reporting carbon stock changes on the IPCC Tier 2 level is considered a minimum requirement);
- that face specific challenges for REDD+ implementation that may not be relevant in all countries (e.g., they have high current deforestation rates, significant emissions from forest degradation and fires, or their soil carbon stocks are currently not measured regularly) and require significant investment to enable them to observe more IPCC key categories and move toward Tier 3 level measurements; and
- where data sources for REDD+ monitoring are limited (e.g., satellite data such as Landsat, SPOT, CBERS may be limited due to lack of receiving stations, persistent cloud cover, seasonality, topography or inadequate data access infrastructure).

Capacity building activities should consider different entry points and aim for a minimum level of monitoring capacity in interested countries within the next few years.

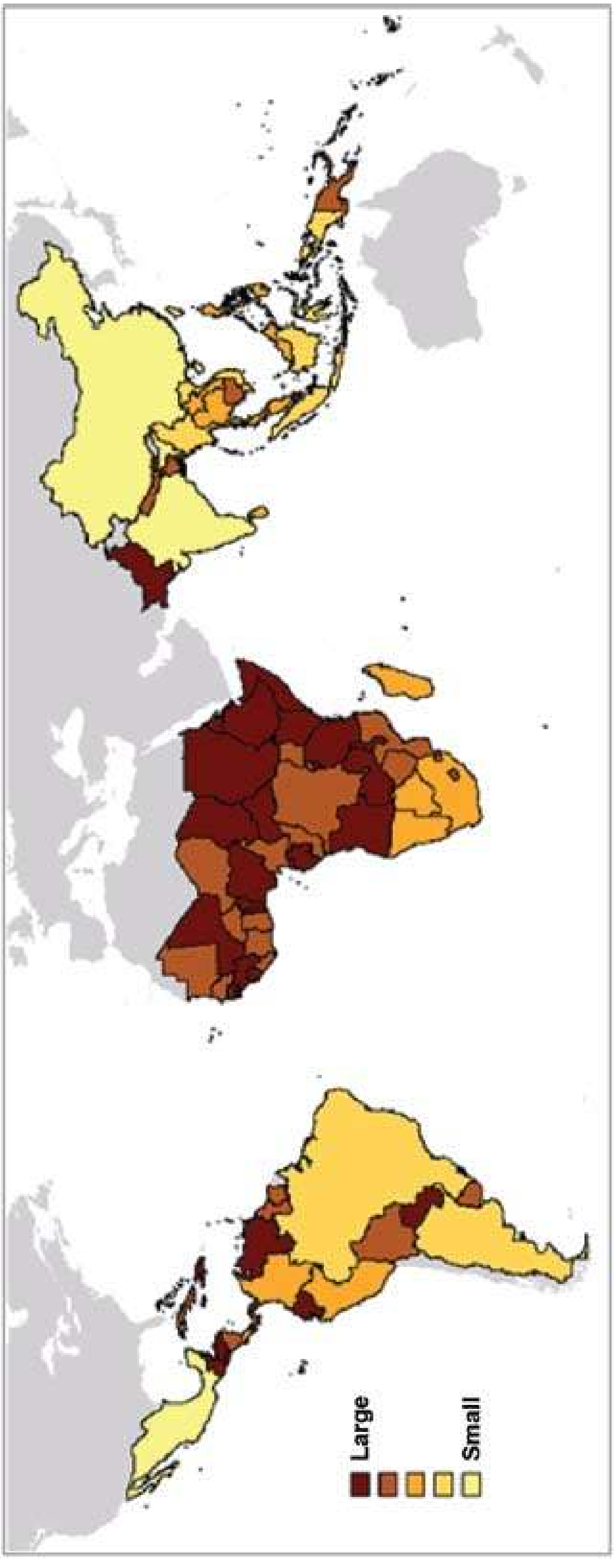

Figure 7.1. MRV capacity gap in 99 countries

MRV relates to both actions on the ground (i.e., that change forest carbon stocks) and REDD+ transactions (i.e., compensation and financial transactions or transfers). MRV of transactions is important for implementation, but is less significant in the readiness phase. MRV of actions is important in the readiness phase and for building capacity. National monitoring systems need to be established and use an appropriate combination of remote sensing and on-the-ground methods for forest carbon inventory. These monitoring systems would focus on estimating anthropogenic GHG emissions related to forests by source, removal by sinks, forest carbon stocks and changes in the area of forest. Each country will need to invest in a roadmap to establish an MRV system before participating in any REDD+ mechanism. This chapter sets out some of the steps in creating such a roadmap.

Policy should drive MRV and vice versa. Thus, a roadmap for developing an MRV system for REDD+ activities will need to take into account:

1. International requirements for MRV:
   - A roadmap should be guided by the principles and procedures for estimating and reporting carbon emissions and removals at the national level as set out in the IPCC Good Practice Guidelines and Guidance for reporting at the international level (IPCC 2003, 2006);
   - The particulars of the national REDD+ implementation strategy that has been selected, since different activities have different implications for MRV.
2. The existing national capacity for MRV:
   - A roadmap needs to be based on an assessment of the gap between the existing national forest monitoring system and the requirements of a REDD+ MRV system;
   - A roadmap needs to set out steps to put in place an effective, efficient and sustainable institutional and implementation framework for:
     - measuring and monitoring at different levels,
     - supporting national policies and REDD+ actions,
     - international reporting and verification,
     - linking MRV of actions and MRV of transactions.

This chapter highlights important issues with respect to international requirements, national capabilities and institutional settings. The specific issues and challenges in linking MRV and policy, interim performance indicators, and linking MRV at different scales are then discussed. The discussions assume that suitable methods for national forest carbon inventories are both available and can be applied. They also assume that the cost implications of initiatives to fill the capacity gap and develop national MRV systems are understood (Angelsen 2008b; GOFC-GOLD 2009; UNFCCC 2009b).

International requirements: IPCC Good Practice Guidelines

IPCC Good Practice Guidelines (GPG) require that two variables are measured and estimated in order to calculate (changes in) total forest carbon. The first variable – *forest area change* – needs to deliver spatially explicit trajectories of forest area change (deforestation and regrowth of forests) corresponding to Approach 3 of the IPCC guidelines (2003). Remote-sensing methods are considered to be appropriate for most developing countries to assess historical and future deforestation rates, i.e., forest area change (GOFC-GOLD 2009). For the second variable – *carbon stock change estimation or emission factors (carbon per hectare)* – the IPCC GPG provide different tiers with respect to the level of detail and accuracy required. While Tier 1 relies on global default data, Tier 2 requires national data (i.e., from forest carbon inventories). For Tier 3, detailed measurements of carbon stock changes need to be supplied for different carbon pools.

Five reporting principles underlie IPCC GPG: consistency, comparability, transparency, accuracy and completeness (UNFCCC 2009b). The data and estimates of many countries currently do not fully meet these reporting principles. These countries will only be able to develop MRV systems to meet these requirements over time. However, countries will need to prepare for an international review that will assess how they are working toward the requirements. The IPCC GPG call for all data, intermediate results and estimates to be acquired and analysed transparently, and made available to all actors and independent international review.

National capabilities and development pathways

The United Nations Framework Convention on Climate Change (UNFCCC) discussions currently assume that any change in forest carbon stocks from direct or indirect human activities has an impact on climate and should be accounted for. Considering the variety of country circumstances (see Box 7.2), different emphases will have to be placed on the different processes affecting forest carbon (e.g., land use change causing deforestation versus selective logging or shifting cultivation) in both policy and MRV. The gap between the capacity to meet national and international REDD+ MRV requirements and current capacity (understood as the capacity gap, see Box 7.1) differs from country to country. Country-specific capacity development pathways will need to be based on individual requirements, as elaborated in the following sections.

Box 7.2. Monitoring and establishing reference levels

Louis Verchot and Arild Angelsen

Setting reference levels for GHG emissions is among the more challenging issues in implementing REDD+ projects in developing countries. There is very little guidance in the agreed texts of the UNFCCC. The annex of decision 2/CP.13 suggests:

> *Reductions in emissions or increases resulting from the demonstration activity should be based on historical emissions, taking into account national circumstances.*

Neither is there any agreement among experts about how to set a reference level. Santilli *et al*. (2005) suggested using a 5-year average and updating it every 3 years. Others have suggested using 10-year averages (e.g., the recent Brazil commitment to reduce emissions). Global Observation of Forest and Land Cover Dynamics (GOFC-GOLD) recommends using forest cover values from 1990, 2000 and 2005, if better data are not available.

Baselines, or reference levels, can refer to two different things (Angelsen 2008a; Meridian Institute 2009a). First, they can refer to a business-as-usual (BAU) scenario, a prediction about what would happen without any REDD+ actions. Second, they can refer to a crediting baseline, which is similar to an emissions quota. The BAU baseline is the benchmark for measuring the effect of a REDD+ intervention, while the crediting baseline is the benchmark for rewarding a carbon rights holder. We use the term 'reference level' in the sense of crediting baseline. At the international level, reference levels can be seen as modified BAU baselines, which reflect 'common, but differentiated responsibilities'.

The overall reference level of a REDD+ country must be harmonised with the reference levels set for subnational activities, projects and forest owners. A combination of bottom-up and top-down approaches is needed. This harmonisation of reference levels across scales is a challenging task.

While setting reference levels involves political decisions, scientists can help predict deforestation. One approach to understanding the historical context of deforestation in a country might be to use the forest transition (FT) theory, as presented in Box 1.2. This concept, introduced by Mather (1992), has been used to describe a sequence where forest cover first declines and reaches a minimum before it slowly increases and eventually stabilises. The historical component in setting a reference level would consist of assessing the current position of a country or region within the FT curve, and modifying future predictions based on that.

The FT theory can also be combined with a land rent modelling approach (the von Thünen framework), constrained by land capability and other important factors (see Chapter 10). Using this combined approach, a country could assess a range of plausible future rates of deforestation and the future shape of the transition curve (Angelsen 2007).

A research project by CIFOR and its partners will combine the FT theory and von Thünen modelling approach. The research will not provide a single solution for estimating future emissions or allow objective estimates of appropriate reference levels. Rather, it will be a useful tool for assessing plausible future scenarios and for informing political decisions. Current proposals are for more or less straight-line projections from the recent past. This proposal provides for more sophisticated prediction of the future, although there is no guarantee that it is more realistic than current methods. However, it offers the opportunity for scenario analysis, long-term projections and the flexibility to update assumptions in the future as the REDD+ programme progresses.

Figure 7.2 gives a conceptual representation of the range of actions that a country might include in a national REDD+ strategy, and shows the basic data requirements for each action. Countries may start with only a few REDD+ activities – those which are easiest to set up or most likely to achieve success. Some parts of the national forest area may be selected for interventions designed to reduce degradation and stimulate forest enhancement. Other parts may be targeted for reducing deforestation or conserving carbon. This means that a mosaic of approaches may emerge, as sketched for a hypothetical country in Figure 7.2. It is vital that the connection between MRV requirements and particular activities under REDD+ is understood, and that MRV and activities develop in parallel under the national REDD+ plan.

Each country will have to develop an MRV system to meet REDD+ requirements and, at the same time, select REDD+ actions that are feasible as regards MRV. We provide some general suggestions and guidance. Figure 7.3 shows the phases in preparing for REDD+ MRV. Countries can address the strategy development and readiness phase quite quickly if they have adequate data and capacity. However, some countries may first have to establish initial datasets to provide a basic understanding of the extent to which drivers of forest emissions are active and what their forest carbon impact is. They will also have to establish how policies can be defined and implemented to influence drivers and processes. Thus, MRV analysis and assessment is essential in the policy context, as is suggested in the term MARV (measurement, assessment, reporting and verification).

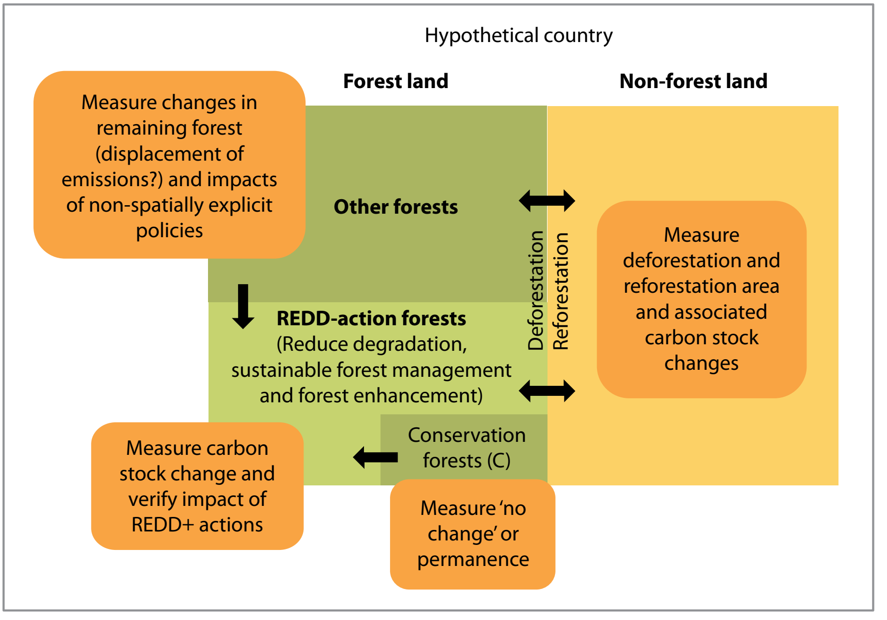

Figure 7.2. Different land types, their potential role in a national REDD+ programme, and the associated MRV tasks and objectives. Arrows indicate possible shifts in area which need to be monitored over time, while the orange boxes indicate what needs to be measured within each type.

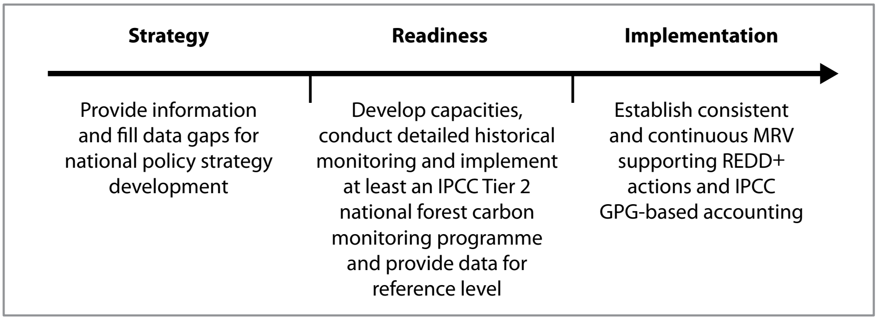

Figure 7.3. MRV objectives for different phases of REDD+ participation

Institutional framework and capacity

As a country moves into the readiness phase, it must establish the organisational capacity to operate a national forest carbon MRV programme efficiently and sustainably. The requirements for a national institutional framework for MRV are:

- **Coordination:** a high-level national coordination and cooperation mechanism to link forest carbon MRV and national policy for REDD+, and specify and oversee roles, responsibilities and co-benefits, and other monitoring efforts (see also Chapter 5);

- **Measurement and monitoring:** protocols and technical units for acquiring and analysing the data related to forest carbon at national and subnational levels;
- **Reporting:** a unit responsible for collecting all relevant data in a central database, for national estimates and international reporting according to IPCC GPG, and uncertainty assessments and improvement plans; and
- **Verification:** an independent framework for verifying the long-term effectiveness of REDD+ actions at different levels and by different actors.

Different actors and sectors need to work together to make the monitoring system efficient in the long term. Sustainability is an important principle in setting up an institutional framework for MRV. As a minimum, a country should consider setting up the following institutions and clearly defining their roles and responsibilities:

- A national coordination and steering body or advisory board, including a national carbon registry;
- A central carbon monitoring, estimation, reporting and verification authority; and
- Forest carbon measurement and monitoring units.

The resources required for setting up and maintaining institutional capacities depend on several factors. Some countries may acquire, process and analyse most data through their own agencies or central units; others may decide to work with partners outside government (e.g., contractors, local communities or regional centres), or involve communities (see Chapter 8).

Any compensation for REDD+ actions should be tied to data on the positive impact of both actions and support in the long term. Any particular subnational activity will need to be assessed in terms of the amount of forest carbon preserved (measurement). This means that subnational data must be provided to the national system so that it can be included in national estimates and reports, and verified in terms of leakage (through systematic national monitoring) and permanence (long-term assessment of compliance). The institutional framework for MRV of transactions should be directly linked to the requirements for providing data, so that compensation transactions give incentives to all actors and reflect their different roles and responsibilities within the country. The national institutional infrastructure needs to provide the foundation for inclusive and effective national REDD+ MRV.

The criteria of effectiveness, efficiency and equity (3Es) are a tool to assess REDD+ outcomes (see Box 1.3), but can also guide the development of a national MRV infrastructure:

- **Effectiveness** implies that development of MRV should be driven by the development and implementation of a national REDD+ policy and activities;
- **Efficiency** implies transparent, consistent and cost-effective data collection and procedures. This means setting up an institutional MRV infrastructure, clear terms of reference, and establishing sustained capacity within the country to meet national and international REDD+ requirements and report forest carbon changes according to IPCC GPG;
- **Equity** implies integrating local measurements, national monitoring estimates, international requirements and independent reviews to ensure participation and transparency among all involved.

Policy development and implementation on the one hand, and MRV on the other, follow similar fundamental principles in terms of the 3Es.

Challenge 1: Linking MRV to policy

International policies and MRV concepts focus on emissions and carbon impacts. However, national policy needs to focus on the drivers of forest emissions. National policies will need to target the key causes and processes that alter forest carbon on the ground. For an MRV roadmap, one needs an understanding of the active drivers and processes of forest emissions, sufficient data to assess their importance (carbon impact), and policies that will achieve REDD+ objectives (see Table 7.1).

This type of assessment will help develop priorities in terms of both national policy and monitoring requirements. Indeed, the decisions on national REDD+ strategies need to proceed in parallel with developing MRV procedures. One of the most fundamental questions is whether or not sufficient data are available to provide an understanding of the recent forest carbon impact of specific drivers and processes. If not, further studies may be needed in order to select actions which are likely to be successful in meeting REDD+ objectives. A REDD+ strategy and implementation activities should address the main drivers of change in forest carbon stocks. (Any given country most likely cannot start interventions immediately in all parts of its forest estate in any case.) This means that, initially, rather than defining MRV needs to fulfil all requirements, they can be defined in detail and accurately just for the drivers and processes causing most changes in forest carbon stocks. The IPCC GPG provide some flexibility in this respect as they focus on 'key categories'. Key categories are sources of emissions and removals that contribute substantially to the overall national inventory (in terms of absolute level or trends). Key categories, or pools, should be measured in more detail and with greater accuracy, and estimated using higher tiers (Tier 2 or 3).

Table 7.1. Drivers and processes affecting forest carbon change, national REDD+ policy opportunities, and monitoring requirements and priorities

Processes and drivers that affect forest carbon stocks	Current data and monitoring capacities (examples)	Importance (carbon impact on national level)	Suggested activity to fill monitoring capacity and data gaps	REDD+ opportunities and policies to encourage or discourage process
Forest conversion for expansion of agriculture	Sample-based national forest inventory for two points in time	Significant areas affected nationally and large carbon emissions per ha	Assessment by remote sensing of forest area change and forest carbon inventory data	Protect existing forests and use of non-forested land for agriculture
Selective logging in native forests and remaining forest	Harvest estimates and concession areas by companies and forestry department	Significant areas affected and low emissions per ha	Gather existing data on areas and harvests, convert to carbon emissions, long-term case studies	Shift toward low-impact logging and sustainable forest management
Clear fell and selective harvesting in forest plantations	Harvest estimates, concession areas and growth rates by companies and forestry department	Some areas nationally may act as C sinks or sources depending on previous land use and harvest cycles and intensity	Gather data at national level and evaluate data by remote sensing, convert existing estimates into carbon values	Encourage reforestation of non-forested land, low-impact harvesting and sustainable forest management

MRV indicated for the readiness phase (Figure 7.3) are to acquire historical data to meet requirements for at least IPCC Tier 2 national carbon monitoring, and to acquire data and information to establish a reference level (see Box 7.2). Monitoring historical and future changes in forest carbon should ideally be continuous and consistent. The historical assessment would be a one-time effort as part of the readiness phase. However, the type and quality of monitoring data available from previous years may be limited, in particular with respect to field data. Monitoring future changes can incorporate the specific requirements of REDD+.

Figure 7.4 provides some guidance on what MRV capacities may be needed. This assumes that Tier 2 monitoring of the aboveground vegetation carbon pool for forest area changes is the minimum requirement. The level of detail for the other components depends on a number of factors that are country specific. If some carbon stock changes are significant (key category), or if the REDD+ policy targets particular activities (i.e., shifting from conventional logging to sustainable forest management), it may be necessary to invest more in MRV capacities than would be required to meet minimum requirements.

Challenge 2: Early participation and interim performance

Countries with weak capacities and limited data will need more time to reach full REDD+ readiness than countries with stronger capacity and better data. Since early action is important, we consider what countries could do in the absence of a fully developed MRV system. A useful concept that provides flexibility in dealing with uncertain or incomplete data in the REDD+ process is *conservativeness* (Grassi *et al.* 2008). Conservativeness was introduced in the Kyoto Protocol. In the REDD+ context, conservativeness may mean that, when completeness or accuracy of estimates cannot be achieved, the reduction in emissions or increases in carbon stocks should not be overestimated and the risk of overestimation should be minimised. As an MRV system is implemented and improves, the need for conservative estimates may be replaced by the use of 'best estimates' if independent assessments show they are correct.

A set of simple interim indicators, or verifiable proxies, could be used to assess the performance of REDD+ actions in cases of incomplete and uncertain data. These would provide justification and help set priorities for implementation of REDD+ actions in the short term. The indicators would be based on the principle of conservativeness, while encouraging development of more accurate MRV over time. Monitoring using satellite data, for example, is straightforward. Just the fact that a country systematically acquires satellite data covering all its territory would engender confidence that key activities (forest area change) are being captured and that activities could be verified at

Figure 7.4. Flowchart showing key components of a national monitoring system and the capacities required (adapted and edited from UNFCCC 2009)

a later date. In this context, the data on area change may be most important. For some interim indicators, actual carbon data might not be needed initially. (This could be understood as a Tier 0 approach.) However, it is important to assume that all actors will use the best data available and internationally accepted methods, and will abide by the IPCC reporting principles of completeness, consistency, transparency, uncertainty and comparability. Independent international reviews of results are to be encouraged. Table 7.2 lists a set of suggested interim indicators and proxies that could be used to address a number of common processes affecting forest carbon at the national level. The idea would be to replace them as soon as performance can be measured, reported and verified according to IPCC GPG requirements.

Challenge 3: National MRV and subnational implementation

A national REDD+ strategy needs to encourage specific local actions. A national carbon monitoring system should provide data on these local actions, but also be flexible for more detailed, accurate measurement at these sites. More specifically, a national estimation and reporting system needs to incorporate measurement at the subnational scale driven by REDD+ related activities. This could be through a national stratification system that provides for all (subnational) REDD+ implementation activities to be measured with an appropriate degree of certainty. That is to say, with more precision and accuracy in REDD+ action areas and less detailed, systematic monitoring in the rest. A national stratification system could be based on forest carbon density and types of human activities (and thus REDD+ actions). Figure 7.2 shows different MRV objectives for different types of land. Such a system would help show the effectiveness of subnational activities by accounting for national leakage and, to some extent, for additionality. It would also provide a framework for continuous monitoring to verify permanence. The national mechanism should further provide entry points for existing pilot projects that are already receiving some kind of carbon credits that contribute to national targets. An example of subnational monitoring linked to a national system is provided in Chapter 8.

Final remarks

This chapter is intended to improve understanding of the links between MRV, national REDD+ plans and existing capacities. The development of an MRV system should accommodate specific country needs; be based on national and international IPCC principles requirements; and meet the criteria of effectiveness, efficiency and equity.

Table 7.2. Interim indicators for assessing the performance of national REDD+ activities in the absence of a fully developed MRV system

REDD+ objective	Justification	Interim performance indicator
No deforestation	Emissions from the loss of forests cause the largest per unit losses of terrestrial carbon.	Total area under current forest cover (as defined by the Marrakech accords) shall not decrease as monitored by satellite data.
Conservation of intact forests	Degradation of intact forest through human activities will produce a net loss of carbon and is often the precursor to further processes causing long-term decreases in carbon stocks.	The total area of intact forests within the country should remain constant as monitored by satellite data.
No increase in emissions from forest management (i.e., selective logging) activities	Forest management should work toward sustainable forest use with a net zero or positive carbon balance in the long term.	All areas under forest management should be monitored and activities documented as far as practicable using existing capacities (e.g., concessions, harvest estimates or satellite data where appropriate and useful). Observed changes in forest management activities should spur estimations of forest carbon impacts.
No increase in emissions resulting from anthropogenic forest fires	Forest fires result in direct emissions of several greenhouse gases.	Area of forest burnt each year should decrease compared to current amount, verifiable by satellite data.
Encourage increasing carbon sink capacities of non-forest and forest land	All changes from non-forest to forest land (i.e., through plantations, land use change) or within forest land (sustainable forest management, enrichment planting) increase the sequestration of atmospheric carbon.	Not considered relevant in the interim period before a proper MRV system is in place, but any dedicated activities should be documented as far as practicable.

MRV is of fundamental importance for REDD+ implementation and, in many environments, needs to have a much higher priority than national forest monitoring has had in the past. Currently, developing solid MRV systems is the key to participation in REDD+ and there are strong incentives for many countries to do so. A set of readiness funding mechanisms and capacity development activities are taking shape to support countries in this process.

It is also important to recognise that a basic set of forest data and information (and thus monitoring capacity) is required to underpin the development of national policy. A good understanding of the drivers and processes responsible for forest carbon changes, and their long-term effects, is fundamental for determining policies and actions to encourage or discourage them. Additionally, a consolidated national REDD+ implementation plan helps to pinpoint areas where detail and accuracy are needed and thus set priorities for MRV.

Developing an MRV system is a process. Many countries do not have even a minimum capacity for MRV. The priority for these countries is to develop a roadmap for establishing a sustainable MRV system and to get started. A first step could be to set up an interim system that would gradually lead to a fully developed MRV system. This would allow, and be an incentive for, countries to take early action. The step-by-step approach encourages continuous improvement toward more accurate monitoring that, ultimately, will allow full compensation for REDD+ actions based on results. Without clear links between MRV and policy from the outset, any national plan to achieve compensation for REDD+ actions based on results will be ineffective.

Chapter 8

Community monitoring in REDD+

Margaret M. Skutsch, Patrick E. van Laake, Eliakimu M. Zahabu, Bhaskar S. Karky and Pushkin Phartiyal

- Communities in forest areas can be trained to map and inventory forests although they may need technical support for some tasks.
- The cost of community carbon monitoring is likely to be much less than for professional surveys and accuracy is relatively good. The degree of precision depends on the size of the sample. There is a tradeoff between the cost of increasing the sample size and the amount of carbon that communities could claim.
- Entrusting forest inventory work to communities could have other advantages for national REDD+ programmes, such as transparency and recognition of the value of community forest management in providing carbon services.

Introduction

The scope of REDD+ now includes, in addition to reducing emissions from deforestation and degradation, conservation, sustainable management of forests and enhancement of forest carbon stocks ('negative degradation'). This means that countries participating in REDD+ will need to carry out forest inventories regularly and systematically to measure changes in forest carbon stocks. Forest inventories could be expensive if professional surveyors are employed and there could be a serious shortage of survey services. A cheaper option would be for communities in forest areas to do the forest inventories, particularly communities that are involved in payments for environmental services (PES) or other community forest management (CFM) schemes.

This chapter looks at ways in which communities could carry out forest inventories to monitor changes in carbon stocks. First, we explain the detailed data that communities and countries would need to collect if they are to be rewarded for reduced degradation and for forest enhancement. We then briefly present the steps involved in collecting data and describe some experiences with community carbon monitoring. Finally, we discuss reliability and costs, and how community carbon monitoring might be integrated into national REDD+ systems, and draw some conclusions. The chapter is mainly based on the authors' experience of the Kyoto: Think Global, Act Local (K:TGAL) programme.[1]

Stock change related to degradation and forest enhancement

Most community forest management (CFM, see Chapter 16) programmes are not primarily directed at reducing large-scale deforestation (land use change). Their focus is on sustainable fuelwood and charcoal production, decreasing slash and burn farming, and controlling the collection of fodder and grazing in the forest. Successful CFM not only halts degradation of forests, but also enhances forest carbon (which can be seen as 'negative degradation'). Reduced degradation and forest carbon enhancement are both now included in REDD+, and CFM could, therefore, be rewarded. However, the implications for monitoring, reporting and verification (MRV) have not been fully appreciated in current debates.

The kind of degradation that CFM attempts to reverse tends to be slow. Typically, emissions are in the range of 1–2 tonnes of carbon (3–7 tonnes CO_2) per hectare per year. Forest enhancement from CFM also happens fairly slowly. Remote-sensing methods cannot pick up such small changes, let alone measure them over the short time frames of carbon accounting periods (yet to be defined, but perhaps 1–2 years, and in any case not more than 5 years). Although some types of degradation can be measured using a combination of high-technology remote-sensing procedures (e.g., Souza *et al.* 2003),

1 The Kyoto: Think Global, Act Local programme (www.communitycarbonforestry.org) was financed by the Netherlands Development Cooperation. All views expressed in the chapter are, however, those of the authors. Parts are taken from Skutsch *et al.* (2009b). The GOFC-GOLD Sourcebook, (2009: Chapter 3.4, Van Laake and Skutsch) gives a more technical account of procedures and options for community-based monitoring.

these methods are not meant to deal with the type of degradation that CFM addresses. Rather, they detect activities such as logging, which are sporadic, localised and thus easier to observe in satellite images. Nevertheless, the small but positive gains that are associated with CFM are important from a climate change perspective, not least because they span very large areas.

In order to make credible international claims for reduced degradation and forest carbon enhancement resulting from CFM, countries will need to monitor carbon using Tier 3 standards (see Box 8.1 and Chapter 7) through regular ground inventories over CFM forests. If generalised data (Tiers 1 or 2) are used, the margin of error will be wider than that of the small per-hectare carbon savings that result from CFM. Since the costs of forest inventories are essentially the same per hectare regardless of the biomass level, it may not be cost effective for governments to regularly survey forests which are changing only slowly. This means that CFM efforts to reduce forest degradation could go unrewarded under REDD+ because of the cost of MRV under a compliance regime.

Box 8.1. IPCC monitoring standards: Tiers 1, 2 and 3

Tier 1 data are default data on average carbon stocks and growth rates for six typical vegetation classes for each continent. Tier 1 data are highly generalised and may be very different from the actual situation in any given location on the ground. Tier 2 data are based on national-level inventories and studies, and are typical values for forest types present in that country. Tier 2 data are likely to be a little closer to the actual situation, but could still be very inaccurate for specific locations. It is likely that safety margins will be needed and deductions will be made to ensure estimates are conservative and to avoid 'hot air' if Tier 1 and 2 data are used. Tier 3 data are site specific, usually measured in permanent *in situ* plots. As the error factors are low, a much larger part of the estimated carbon saving can be claimed.

Community monitoring of carbon stocks

One option to address these issues is to have communities that manage forests do the forest inventories. Payments for carbon could be based on these inventories. Although several studies have examined the capacity of local people to assess forest biodiversity or disturbance (Topp-Jørgensen *et al.* 2005; Holck 2008; Danielsen *et al.* 2009), only a few projects have trained local people to make detailed measurements of carbon stocks. Two examples are the Scolel Te project in Mexico, from which carbon credits are sold in the voluntary market (Box 8.2) and the K:TGAL project. K:TGAL is a research project designed specifically to assess the feasibility, reliability and cost effectiveness of community forest carbon inventories (Skutsch 2005; Zahabu *et al*. 2005; Tewari and Phartiyal 2006; Karky 2008). It examined CFM projects in 30 sites in eight countries in Africa, Asia and Latin America, over periods of 3–5 years.

K:TGAL found that local people with as little as 4–7 years of primary education who are already involved in CFM can easily be trained to carry out forest inventories using standard methods such as those recommended by the Intergovernmental Panel on Climate Change (IPCC) Good Practice Guidance (IPCC 2003). Box 8.3 summarises the K:TGAL methodology, which involves sampling all aboveground biomass (trees, shrub and herb layers, and litter), but not soil carbon. Soil carbon is excluded because of the technical difficulties of estimating changes in soil carbon over time, and because it is not yet clear whether soil carbon will qualify for carbon credits under REDD+. Belowground biomass is calculated using standard factors (secondary data on the typical ratio of belowground to aboveground tree biomass).

Box 8.2. Community monitoring in the Scolel Te project

The Scolel Te project in Chiapas involves tree planting in a coffee agroforestry system and other agricultural systems, as well as sustainable management of surrounding natural woodlands. An NGO, AMBIO, manages the project using a system called Plan Vivo. The project is financed from the voluntary carbon market. Farmers develop plans for carbon sequestration on their land and draw up contracts with AMBIO through a highly participatory process. Following 1–2 days of training, each farmer measures yearly increases in woody biomass stock using standard forest inventory methodology. Farmers from one village cross-check carbon measurements of farmers from another participating village, and AMBIO technical staff recheck 10–15%. Each participant has a passbook to record carbon increments and payments for the carbon (through Plan Vivo certificates). The anticipated increment in carbon is calculated up front. Farmers receive around 20% of the anticipated payments when they begin to cover start-up costs. The rest of the payment is made in two stages (after 5 and 10 years). This system encourages farmers both to take part initially and to look after the trees. Only 90% of the total carbon recorded can be sold, leaving 10% to cover uncertainties. Farmers receive approximately 60% of the value of the credits in the voluntary market, the rest is used to cover the overhead costs of AMBIO (http://www.planvivo.org).

Box 8.3. Methodology for community forest inventories

The K:TGAL field manual sets out a methodology for community carbon monitoring (www.communitycarbonforestry.org). The manual is designed to be used by an intermediary (e.g., local forest department or NGO). Intermediaries have basic computer skills, and are able to train people from the community and maintain the equipment. The method is 'participatory', although like all participation, the question of who actually participates may be problematic. In brief, the method consists of the following steps:

Boundary mapping. Georeferencing forest boundaries using a hand held computer or personal digital assistant (PDA) linked to a global positioning system (GPS) with a standard geographic information system (GIS) programme and a geo-referenced base map or satellite image. Boundaries are walked, and immediately appear on the base map on the screen. The forest area is automatically calculated (Figure 8.1).

Identifying strata. Heterogeneous forests are stratified on the basis of dominant tree species, stocking density, age and aspect (slopes, orientation), as well as by different types of community management. Strata boundaries are added to the base map using the same technique (walking the boundaries of each stratum).

Pilot survey for estimating variance, to determine the number of (permanent) sample plots required. Circular pilot plots are set out in each stratum and these plots are used to train people to do the biomass inventory. A central point is marked, and a sampling circle is set out; data on dbh (diameter at breast height) and the heights of all trees over 5 cm dbh are recorded in the database on the PDA. Trees are identified using local terminology. A drop-down menu opens for each entry, with multiple choices for data, such as species and condition, while numeric data are entered using the keyboard. The database is set up so that every tree is recorded separately in a file for each plot, and all the plots in one stratum are held in one file. The protocol is based on MacDicken (1997) and IPCC Good Practice Guidance (IPCC 2003). Local allometric equations and expansion factors in the database convert dbh and height variables into biomass estimates. Variance in biomass in pilot survey plots is used to calculate the sample size needed to achieve a maximum of 10% error. Statistical manipulations (means, standard deviations, confidence interval) are pre-programmed.

Permanent plots are laid out. Central points are marked in the field and on the computer base map using parallel transects across the area from a random start point. This is done by the intermediary with the help of the village team (Figure 8.2).

Re-finding the permanent plots and measuring biomass in each of them. For the annual survey by the community team, the plots are located using the GPS. The inventory is carried out as described in step 3.

Sampling the herb and litter layers. Samples of the herb and litter layers from quadrants within the permanent plots are bagged, dried and weighed.

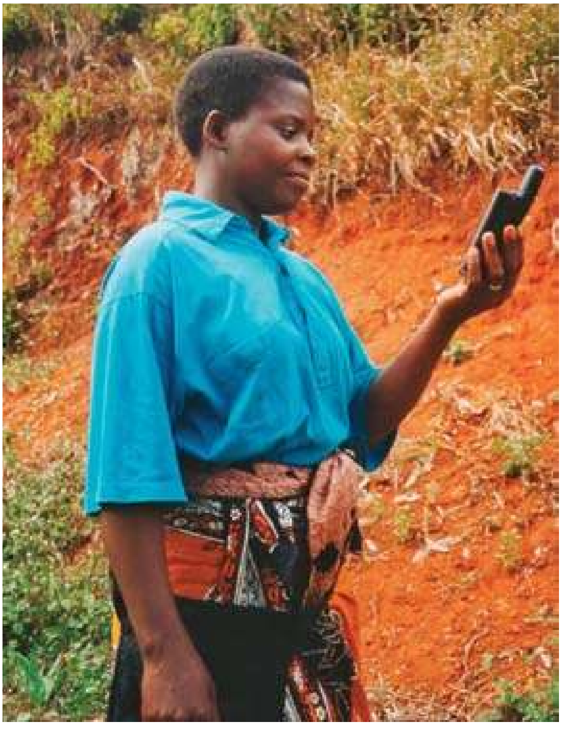

Figure 8.1. Using a personal digital assistant to map forest boundaries (Photo: Margaret M. Skutsch)

Figure 8.2. Setting out permanent plots (Photo: Cheikh Dieng)

Steady annual increases in carbon stock have been recorded in 24 of the 28 K:TGAL CFM sites for which data is available. In the other four, there were annual losses because of encroachments, but the overall trend was for increasing biomass, indicating that CFM was generally successful in building up carbon stocks. Moreover, the research showed that under CFM the carbon gain from forest enhancement was three times more than the estimated carbon gain from reduced degradation (Skutsch *et al.* 2009a, b).

While systematically monitoring carbon stocks over time gives good estimates of forest carbon enhancement, calculating emission reductions from reduced degradation is not so straightforward. The reference level for carbon enhancement is zero change, whereas the reference level for degradation is a hypothetical construct of the counterfactual, i.e., what would have happened without REDD+ in a business-as-usual scenario. Historical data on degradation are not available for most CFM areas. A conservative nominal rate (such as one tonne per hectare per year) could be set for the historical rate of degradation, but this would always be open to question.

To resolve this, a simple option is to reward *only* the measured forest carbon enhancement and to treat the avoided degradation as an additional, unpaid contribution. From a carbon buyer's perspective, this would be an advantage as carbon claims would be conservative. Because most CFM quickly reverses degradation and from then on enhances forest carbon, rewarding forest enhancement rather than avoided degradation makes sense (Figure 8.3).

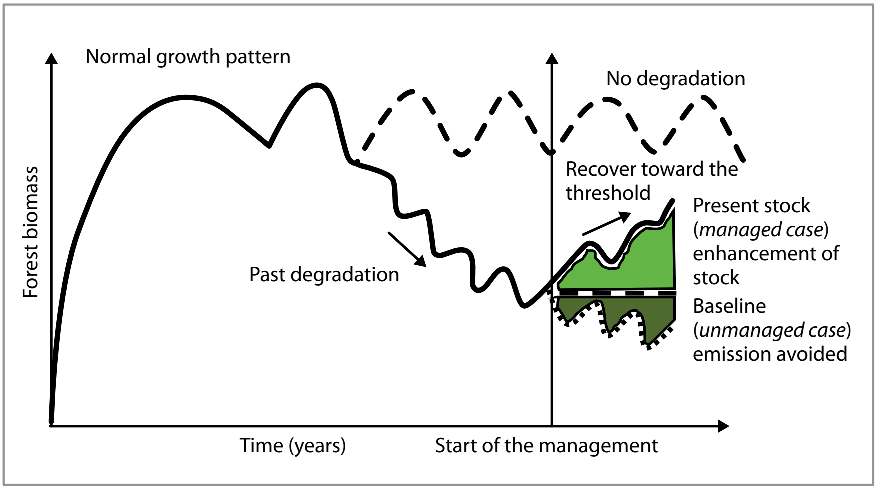

Figure 8.3. Avoided forest degradation and sequestration resulting from community forest management

Source: Zahabu (2008)

Reliability of community monitoring

How reliable is community monitoring? Are the results comparable to forest inventories carried out by professionals? Data from the K:TGAL project in community forests in Tanzania and the Himalayan region show that the difference in estimates of mean biomass made by the community in 2008 and those made by independent experts who carried out control surveys that year was never more than 7%, and was mostly less than 5% (Table 8.1). In all cases, the estimates of the community were lower than those of the experts. This seems to imply that the community estimate was more conservative, but probably reflects the fact that the expert survey was done several months after the community survey and that the trees had grown in the meantime. The real difference between community and expert estimates is almost certainly less than that shown in Table 8.1. However, in some cases, the variance of the estimates was higher for the community measurements, implying that, although the accuracy was good, the precision was weaker. The difference in

Table 8.1. Biomass estimates by villagers and professional surveyors in Tanzania and the Himalayan region

Site	Estimates by community	Estimates by professionals	Difference of means (%)
Dhaili village, Uttarkhand, India			
1. Even aged *banj* oak forest:			
Mean biomass (t/ha)	64.08	66.97	4
Standard deviation	25.42	25.46	
2. Dense mixed *banj* oak forest:			
Mean biomass (t/ha)	173.39	188.05	7
Standard deviation	59.09	62.37	
3. *Banj* oak *chir* pine degraded:			
Mean biomass (t/ha)	66.29	66.87	<1
Standard deviation	17.75	18.16	
Lamatar village, Nepal			
Oak forests:			
Mean biomass (t/ha)	125.28	125.99	<1
Standard deviation	72.56	50.47	
Kitulangalo SUA Forest Reserve, Tanzania			
Degraded *miombo* woodland:			
Mean biomass (t/ha)	42.19	43.15	2
Standard deviation	8.65	3.75	

Sources: Zahabu (2008), K:TGAL (2008)

precision, however, is because the consultants used a slightly different sampling method (e.g., larger plot sizes), not because of any lack of measurement skills on the part of the community.

Reliability improves with regular sampling over time. Ideally surveys should be done in the same season every year and, even though carbon gains may be calculated and rewarded over a full accounting period, annual surveys are recommended. Growth rates fluctuate because of variations in annual rainfall and temperature, and a data series may smooth and average out these effects. Further, if data are gathered annually, there is a greater chance of catching errors, as anomalies will show up. Annual surveys are also important for continuity, so that surveys become a habit. The teams trained to do the surveys will not forget what they have learned and have to be retrained.

Carbon estimates must normally be verified before any payments are made. Communities could also do some verification. The Scolel Te project (Box 8.2) verification method of combining measurements by 'neighbours' and technical staff is interesting and could be explored further.

Costs of community monitoring

A second important question is how the costs of community monitoring compare with the costs of professional monitoring. The K:TGAL experiment examined costs of community inventories for four sites in Tanzania (Table 8.2). The first year costs for the community surveys (high because of initial training and setting up permanent plots) were between 70% and 30% of the costs of professional surveys (Table 8.2). Costs fell rapidly over time since the surveys were done every year and little retraining was necessary. The average cost of community inventories over four years is about one-quarter the cost of

Table 8.2. Costs of carbon assessment by local communities compared to costs of carbon assessment by professionals

Study site	Forest area (ha)	Cost (US $/ha)				
		By local communities				By professionals
		Year 1	Year 2	Year 3	Year 4+	Yearly
Kitulangalo	1020	5	3	2	1	10
Handei	156	17	12	8	2	44
Mangala	29	53	37	24	6	176
Ayasanda	550	8	6	5	1	13

Source: Zahabu (2008)

professional surveys. The costs of community monitoring include the time of community members involved ($2 per day, the typical local day rate for unskilled labour), the time and expenses of the intermediary organisation that provides training and supervision, and a share of the costs of equipment and software. The costs of the professional survey were the actual payments made to the survey team based on normal local rates, including travel costs.

The main reason for the very high variation in costs between sites (Table 8.2) is that economies of scale are a factor, for both community and professional surveys. At a given degree of homogeneity, fewer sample plots are required for the same level of precision in large forests than in small forests. In addition, training is a fixed cost, and thus, per hectare, costs more for small forests than for large forests. This suggests that it might be cheaper for several communities to bundle their claims for emissions reductions together.

In the case of Dhaili, Uttarkhand, India, in three forest strata totalling 58 ha, the cost of community labour for the first year's work was estimated at $3 per hectare, while cost of the professional team was estimated at $5.50 per hectare. From the second year onwards, the costs would be about half this for both teams, since mapping boundaries and setting out sample plots would not have to be repeated.

There is a tradeoff between claiming more carbon payments by monitoring more precisely and the cost of this increased precision. More precision means increasing the size of the sample – in terms of both the size of each plot and the number of plots measured – which increases monitoring costs. The differences in cost between the professional and community approaches described above reflect this in some cases. It would certainly be possible for communities to make their estimates more precise by increasing the size of the plots, but this would involve more work. Until the value of a unit of carbon is known, it will be difficult to decide which way to go. There is also no ruling yet on what will determine the reward for carbon reductions – whether it will be the estimate of the mean, the lower end of the confidence interval, or some other discount factor that represents uncertainty. In the Scolel Te project, for example, only 90% of the measured carbon stocks are credited. Clearly, it will be difficult for the community itself to do complex calculations, but once the rules are agreed, the cost–benefit tradeoff will be much easier for the supporting intermediary to determine.

Community monitoring and national REDD+ programmes

Under REDD+, countries will have to carry out far more forest inventories than they have in the past if they are to report under the United Nations

Framework Convention on Climate Change (UNFCCC) at the accuracy that the IPCC has proposed (i.e., a maximum 10% error at the 90% confidence level). Community monitoring seems to be a simple option for dramatically scaling up forest inventories. Within a national REDD+ programme, community monitoring could be a relatively cheap way to get accurate ground-level data (Tier 3). Countries could start community monitoring, especially where communities already actively manage forests, while still using gain–loss (Tier 2) or other methods in areas where this is not yet possible.

Communities could upload the results of their inventories directly into national electronic databases. Simple statistical analyses can detect suspicious reporting. As in all carbon-reduction schemes, some form of verification (such as random spot checks using very high resolution remote-sensing techniques) would also be necessary.

Data from community inventories could be used:

- To directly assess biomass and biomass change over time;
- To support stratification of forest resources into homogeneous units based on resource type, resource condition, management regime and temporal dynamics;
- To support independent validation of claims for reductions in carbon emissions by correlating individual inventories with satellite imagery *ex ante* and *ex post*. This may eliminate the need for extensive field visits and thus lower transaction costs;
- To make data estimates more accurate, and reduce uncertainty and error margins, thus allowing a country to claim more carbon credits, particularly for reducing degradation and enhancing forest; and
- To distribute financial benefits transparently under national carbon payment for environmental services (PES) or PES-like systems (Luttrell *et al.* 2007; Peskett and Harkin 2007; see also Chapter 17).

Further, community inventories will highlight the importance of community management in providing carbon services, and legitimise community claims to a share of the financial benefits. Communities will also have a stronger negotiating position in disputes about the relative value of forests versus other land uses.

There are several possible institutional models for linking community inventories to national REDD+ programmes. Clearly, all carbon PES programmes could require communities to be responsible for biomass inventories. Payments would be based on results, and the costs of making the inventories would be recouped by communities from the payments they receive for carbon. However, in the short term this could lead to high transaction costs. There might also be intercommunity conflict because some communities have more opportunities to earn carbon credits than others; not only do forests naturally differ from one another, but the way forests were managed previously may have increased or decreased opportunities to earn carbon credits. As a transitional step before national REDD+ systems become fully operational, communities could be paid a flat rate per hectare to measure and monitor changes in carbon stocks rather than being paid for carbon gains. Although it might seem that this would remove the incentive to restore carbon stocks, the payment could be tied to a management agreement, which would be a proxy for reduced degradation and forest carbon enhancement.[2] Countries would benefit because they would get detailed data on changes in carbon stocks, which would enable them to claim carbon credits for reduced degradation and forest enhancement. Communities would earn income for generating data, not for the carbon itself.

Conclusion

Community forestry is likely to be adopted by many countries as part of national REDD+ programmes. Although other monitoring methods (professional forest inventories, gain–loss methods based on secondary data) could be used to claim rewards for changes in carbon stocks, community monitoring has a number of advantages. It is cheap and relatively reliable, particularly if carried out annually, and it delivers Tier 3 data. Community monitoring is feasible in all forest areas within range of rural settlements, particularly in forests that are already under CFM or that REDD+ will bring under CFM. Community monitoring may, in itself, encourage communities to become involved in REDD+. From a national point of view, community monitoring could be a transparent way to make carbon payments related to output.

Current rules for REDD+ carbon accounting are not clear. We do not know, for example, how avoided degradation will be assessed at the local level, what proportion of the increase in carbon stock may be claimed by a community as 'forest enhancement', or how much communities can expect to be paid. Clarifying these rules and spelling out the benefits communities can expect are essential to move current experiments with community monitoring forward and to make community monitoring an integral part of national MRV systems.

2 Most PES systems currently work with flat-rate payments and are not output based, mainly because measuring outputs of, for example, biodiversity or water conservation, is very difficult. Carbon is much easier to measure, but, nevertheless, it may not always be necessary to base rewards on actual outputs.

Chapter 9

Multilevel, multiactor governance in REDD+

Participation, integration and coordination

Tim Forsyth

- Governance is the act or manner of governing. Multilevel, multiactor, participatory governance allows stakeholders to negotiate, formulate and implement policy.
- Multilevel, multiactor governance of REDD+ schemes will be needed to overcome differences between government ministries, and to build the trust of investors and local citizens.
- Creating new forms of governance that allow stakeholders with different degrees of political influence and different interests to come together could be time consuming but will allow REDD+ to achieve the 3Es+.

Introduction

Governance is the act or manner of governing. Inclusive and transparent governance allows stakeholders to participate in formulating and implementing policy. Multilevel governance allows stakeholders, such as officers at local, district and national government ministries and departments, investors and local citizens, to come together to negotiate, formulate and implement policy.

Reducing emissions from deforestation and degradation, together with the conservation and enhancement of carbon stocks in existing forests (REDD+), require multilevel governance involving multiple actors to make it acceptable to stakeholders with different interests. Multilevel, multiactor governance can boost the participation of local people and agencies that often compete with each other and, consequently, could reduce potential conflicts in achieving REDD+ efficiency, effectiveness, equity and co-benefits (the 3Es+).

This chapter argues that we can look at multilevel, multiactor governance in two ways. *Horizontal* coordination refers to how stakeholders at more or less the same level and degree of influence can collaborate to implement REDD+. *Vertical* coordination refers to how stakeholders at different spatial scales, and with different degrees of influence, can work together to negotiate how REDD+ schemes are both formulated and implemented.

What is multilevel, multiactor governance?

'Good' governance is a form of political decision making that emphasises legality (rules to resolve conflicts), legitimacy (acceptance and trust by the public that create accountability) and participation (inclusiveness within decision making).[1] Governance is different from 'government' or 'decentralisation' (see Chapter 12). Good governance *includes* and enhances *participation* of both citizens and governments in formulating and implementing policies, such as for REDD+.

Building inclusion and participation into new policies engenders trust and acceptance by different stakeholders, and reduces the risks of conflict or failure of REDD+ projects. Multiactor governance implies collaboration among different stakeholders to achieve public policy objectives. Multilevel governance is the implementation of public policy across diverse spatial scales and by actors who have dissimilar influence and values. Both forms of governance are considered more inclusive, coherent and participatory than 'top-down' governance, such as legislation (Kern and Bulkeley 2009).

Analysts have put forward three important components of multilevel, multiactor governance: actors, scales and interests.

Actors

Actors who have different objectives and different degrees of political influence may be connected by horizontal links. REDD+, for example, involves several government ministries or agencies, such as those concerned with forests,

1 See http://www.undp.org/governance/mdgs.htm

agriculture or land use (see Chapter 14). Sometimes actors are from different sectors. For example, REDD+ could attract private investment, but investors need to cooperate with state agencies and with local people. Multilevel, multiactor governance therefore requires ready and coherent collaboration among actors. In terms of the 3Es+, good horizontal collaboration among actors can boost effectiveness (the amount of carbon stabilised through REDD+), and efficiency (the relative costs and speed of achieving stabilisation). For example, because most deforestation results from agricultural expansion, a REDD+ scheme will be more effective and efficient if forestry and agriculture ministries harmonise their efforts.

Scales

Vertical links could connect actors at the national and subnational levels according to international frameworks for REDD+. The nature of the links could be indicated by the United Nations Framework Convention on Climate Change (UNFCCC) or be guided by large donors. For example, if smallholder farmers who commonly occupy areas where REDD+ schemes are proposed are included in national and subnational negotiations, this might enhance their participation and inclusion in REDD+. But, if they are excluded from negotiations and rigid rules for REDD+ are imposed from on high with no consultation, misunderstanding and resentment are likely to follow (see Chapters 12 and 17). An effective way of increasing forest carbon stocks might be to plant quick-growing pine or eucalyptus plantations that would rapidly sequester carbon and produce timber. But local land users often resist plantation monocultures because they restrict land available for agriculture and preclude collection of a variety of forest products. Inclusive and successful vertical governance, therefore, could maximise equity and effectiveness by ensuring the willing participation of different actors at different scales.

Interests

Similarly, agreement on REDD+ can only be achieved when different actors have a common understanding of its objectives, or are willing to accept compatible forms of REDD+ alongside each other. Different actors are likely to place different values on REDD+, and on forest and land use in general. Forestry and agriculture departments, for example, are likely to value tree crops that maximise timber production, conservation forestry or export crops. Many private investors are likely to take into account how investing in REDD+ might enhance their corporate image. Smallholder agriculturalists, however, are likely to value food security and livelihoods. REDD+ projects based on differing interests are likely to fail unless participants can come to a shared understanding of what kind of landscape is desirable, or reach an agreement about multiple forms of land use (Griffiths 2008). The World Rainforest Movement, an NGO based in Uruguay, has an ongoing campaign called 'Plantations are not Forests!',[2] for example. The Movement advocates for balancing the different interests in production, conservation and community forestry, rather than seeing forests only in terms of maximising timber production or carbon sequestration. Balancing these interests can boost equity in the use of forests, or 'equity plus co-benefits', such as biodiversity and better livelihoods for forest users.

Approaches to multilevel, multiactor governance

There are, of course, different ways of achieving multilevel, multiactor governance. Table 9.1 shows three approaches. These are based on the extent to which actors participate in shaping rules about forest use, and to what extent each form of governance reflects different interests.

Nested institutions

The first approach to governance involves 'nested' (or sometimes, 'polycentric') institutions (Ostrom 1990, 2005). This approach sets rules for forest use that give forest users incentives to follow the recommendations for REDD+. The concept of 'nested' institutions is sometimes visualised as a Russian doll, where each local set of rules and incentives fits within the rules and objectives set at larger scales (e.g., regional, national and international) (see Angelsen *et al.* 2008). For example, the framework for REDD+ proposed in international meetings has clear objectives (to reduce deforestation and forest degradation), agreed mechanisms (to provide incentives via carbon credits) and transparent regulations (such as regular monitoring, and sanctions for failure). This governance framework applies at all scales. Ideally, the REDD+ system will be established so that the same rules apply to everyone. This approach to forest management appeals to economists because they appreciate the role of financial incentives and regulations in organising human behaviour. It could work best where the objectives of REDD+ – to maximise carbon sequestration and to provide rewards for stakeholders (either by sharing carbon credits, or some other reward based on credits) – are clearly established and accepted by all parties.

Legal pluralism

However, this 'nested' approach to multilevel governance has often been criticised by anthropologists. The third column of Table 9.1 summarises these criticisms in terms of legal pluralism and community-based natural resource management (CBNRM) (see also Chapter 16). Nested institutions are systems for managing a resource at different scales under one general set of rules. Legal

2 http://www.wrm.org.uy/

Table 9.1. Approaches to multilevel governance

	Policy objectives driven from above ←		→ **Policy objectives driven at the local level**
Type of governance	**Nested institutions**	**Deliberative networks and institutions**	**Legal pluralism, including Community-Based Natural Resource Management (CBNRM)**
References	Ostrom (1990, 2005)	Hajer and Wagenaar (2001); Agrawal (2005)	Robbins (1998); Schroeder (1999)
Main mechanisms	Actors create rules for enforcement and monitoring, in coordination with higher authorities (Common Property Regime)	Policy is shaped by open discussion and participation by various stakeholders, aiming to empower localities to take responsibility for policy	Recognise coexistence of formal and informal governance regimes at different scales, as practised by communities
Main advantage	Clearly defined rules	Dynamic, localised and encourages learning	Reflects the complexity of local rule making
Main disadvantage	Does not always acknowledge local perceptions of forests or local political processes	Civil society might be dominated by elites and the state	Does not always relate to urgent 'global' tasks, such as controlling emissions
Implications for 3Es+	Can be effective and efficient where rules are agreed; but all 3Es+ can be compromised where local practices are ignored	High potential for 3Es+, but if process is slow and conflictual, efficiency is low and equity can be low because of a lack of legitimacy of network participants	Equity might be high, but effectiveness low

pluralism, in contrast, is the coexistence of various forms of governance at any one time, across a variety of scales. The different forms of governance may be formal (such as state legislation) or informal (such as traditional village practices). In The Gambia, for example, Schroeder (1999) describes how rural communities protected woodlands near villages for religious and ceremonial purposes. In Rajasthan, India, Robbins (1998) describes how state forest rules overlapped with local district (*panchayat*) and village rules for regulating land use, and with traditional religious understanding.

Legally pluralistic types of governance, such as CBNRM, differ in important ways from nested institutions. First, they acknowledge the different political processes adopted by different cultural groups and political organisations. Second, they also acknowledge differing views of the resource and land use. CBNRM often have little to do with commercial incentives, such as carbon credits. Consequently, if traditional practices are not taken into account when developing new forest protection mechanisms they will fail, because they do not acknowledge local values or decision making. Proponents of legal pluralism believe that it is a realistic and workable form of multilevel governance in complex resource landscapes, such as where forests and smallholder agriculture coexist.

Deliberative

The middle column of Table 9.1 is an approach to multilevel, multiactor governance that embraces both local concerns and 'global' environmental problems, such as climate change. Many critics of CBNRM argue that it is not efficient to take account of how local people value and use forests because they have little engagement with 'global' environmental problems, such as rising concentrations of greenhouse gases. The approach to governance in the middle column of Table 9.1 focuses on how global concerns about greenhouse gases can be reconciled with local concerns about forests and land use. This kind of approach might also be called 'deliberative' because it allows stakeholders (both local and policy advisers) to negotiate (or deliberate upon) common objectives and practices for environmental policy.

For example, stakeholders could agree to classify forest into production, conservation and community zones which could, therefore, allow different forms of forest use simultaneously. This kind of approach, however, is likely to create disagreement about where the boundaries should be drawn between forest zones where agriculture or community use will be allowed, and where they will not. This approach might also be influenced by the stage that the country has reached on the Forest Transition curve. In countries where much forest is still open to agricultural use, there will be disputes about the extent to which communities can use forest, and to what extent this has to be controlled by forest law. What often happens in these cases is that laws have to be introduced quickly and are controversial.

In Thailand, for example, community forestry laws have evolved since the 1990s, restricting agricultural activities and sometimes even relocating villages from gazetted zones. There has been much disagreement about how the various forest zones should be demarcated (Forsyth and Walker 2008). An inclusive approach may take longer, but may also build public consensus. Agrawal (2005), for example, describes how the Kumaon State Government in northern India, through a long process of consultation and public deliberation, persuaded highland villagers to accept pine and fir plantations on land that they used for agriculture. Agrawal (2005) calls this process 'intimate government', because it allows people to feel included, rather than feeling that rules are imposed from above. The risk in the nested institution approach is that, although it might effectively reduce and remove greenhouse gases, it might not be perceived as equitable by local forest users. The deliberative approach to forest governance could be more equitable, and generate co-benefits such as better livelihoods and political goodwill toward the REDD+ process. But this approach may take time, first to establish an understanding of the objectives of REDD+ and then to devise ways to bring diverse stakeholders – such as smallholder agriculturalists and government ministries – together. Moreover, civil society or dominant social groups might not always be representative of local forest users. A long-term, consultative and learning process involving diverse groups may be more successful than negotiating with specific NGOs.

Cross-sector partnerships (CSPs)

One way of implementing multilevel, multiactor governance is cross-sector partnerships (CSPs). CSPs involve different actors, with different levels of influence and power, who come together to implement policy. It is now widely agreed that CSPs have evolved since the 1990s when they resembled orthodox public–private partnerships (Nelson 2002). CSPs have moved toward more deliberative forms of governance that include citizens in shaping the objectives of projects (Linder 2000; Ählström and Sjöström 2005). Indeed, one Indonesian NGO (cited by Tahmina and Gain 2002) said, 'By creating partnerships, we also are trying to encourage greater equality and to promote values such as social justice'. Proponents of CSPs have argued that they address three 'policy deficits': the regulatory deficit of influencing non-state actors; the implementation deficit of allowing different stakeholders to carry out policy; and the participation deficit of increasing the representation of less powerful actors, such as local forest users (Biermann *et al.* 2007; Glasbergen 2007). In this sense, CSPs can address both horizontal and vertical integration in REDD+ (see Forsyth 2007 and Benecke *et al.* 2008 for discussions concerning CSPs and the Clean Development Mechanism).

Some examples of cross-sector partnerships in forests

CSPs could take into account two important aspects of REDD+, *transaction costs* and *assurance mechanisms* (Weber 1998; see Table 9.2). Transaction costs include financial costs, time and conflict arising from collaboration. Assurance mechanisms, however, are practices that keep different sectors within a partnership happy. These mechanisms might be formal, such as contracts and laws, or informal, such as incentives paid by companies or NGOs to facilitate collaboration, or coverage of partnership activities in the media. Collaboration also depends on the ability of the parties to cooperate and communicate successfully, legal knowledge, a long-term perspective, and sufficient capacity within each organisation to deliver what has been agreed. This, in turn, also implies the capacity for deliberation.

Griffiths (2008) investigated the *transaction costs* and *assurance mechanisms* of multilevel, multiactor carbon-offset schemes. Initial evidence suggests that transaction costs are very high when there are attempts to include forest dependent communities. For example, Granda (2005) assessed a monoculture tree plantation sponsored by the Dutch government in Ecuador. Communities claimed that the carbon forestry company never told them what payments they would get per hectare. Local people did not understand carbon credits and ran into debt because they claimed they did not know about penalty clauses. Villagers felt aggrieved because they had to pay unforeseen costs, such as replacing seedlings that failed or due to fire damage.

Another report by Greenpeace (2007) on schemes in the Democratic Republic of the Congo argued that World Bank strategies there increased rather than avoided deforestation because they encouraged logging as a form of economic

Table 9.2. Conditions influencing the emergence and sustainability of collaboration

Assurance mechanism	Transaction costs of alternative decisions		
	High and applicable to all stakeholders	High for most stakeholders, but not all	Low
None	No collaboration	No collaboration	No collaboration
Partial	Collaboration possible, but not sustainable	Highly unlikely	No collaboration
Full	Sustained collaboration	Collaboration possible, but not sustainable	No collaboration

Source: Weber (1998)

development. Logging titles were often allocated without acknowledging local land rights. The report claimed that community leaders only received salt and beer in return for logging rights. In another study of World Bank schemes in Guyana, Griffiths (2008) argued that 'the national REDD+ concept submitted to the [Forest Carbon Partnership Fund] … contains misleading and inaccurate information on land tenure, governance and deforestation'. In Peru, the World Bank's technical advisors explicitly refused to acknowledge forest peoples as key rights holders in REDD+.

These case studies suggest that it is difficult for forest people to fully understand carbon credits and comply with the requirements of carbon schemes unless there is a long-term effort to help them understand and involve them in deliberation. What assurance mechanisms can overcome these difficulties, and ensure learning and commitment by stakeholders?

Critical NGOs, such as the Forest People's Programme (Griffiths 2008), propose that measures such as making land tenure secure and acknowledging community rights to forest resources can enhance the equity and efficiency of multilevel, multiactor governance. Community representatives need better negotiating skills and there need to be transparent procedures for addressing grievances and distributing benefits, and mutual agreement on what is meant by the terms 'forest' and 'degradation'.

Many support the concept of Free and Prior Informed Consent (FPIC) (Forest People's Programme 2007; Global Witness 2008; Wilson 2009). FPIC implies consultations with local people that lead to consent, rather than just contact. Indeed, Griffiths (2005, 2008) has argued that the World Bank approach to forest-related climate investment has used the term 'consultation' to imply more participation than actually happened. But it is worth noting that the cases cited involved a change in land use or expansion of plantations into agricultural areas. Protecting standing forests will require different rules and regulations and might be less confrontational.

Other studies suggest that deliberative and inclusive practices are already being developed. Wilson (2009) describes how one investor (Veracel) in Brazil has set up a social networks programme (to engage communities) and a social inventory (to map communities), allocated positions to local people (to allow company employees to work with communities) and begun talks with local governments and neighbouring landowners. Veracel's main interest is in eucalyptus plantations, but it also engages in environmental restoration of degraded land.

Conclusion

Multilevel, multiactor governance is necessary to ensure that REDD+ will achieve the 3Es plus co-benefits. Reducing and removing greenhouse gases through REDD+ is urgent. But this objective will not be met if stakeholders lose trust in REDD+ policy processes, or if there is no attempt to coordinate and integrate different actors, scales and interests. Indeed, if trust is lost, and REDD+ is seen to be invasive and imposed from above, then it might take years to regain trust and get full participation.

This chapter argues that REDD+ requires coordination among different stakeholders, such as agriculture and forestry ministries, in order to reduce deforestation from agricultural expansion. Multilevel, multiactor governance is perhaps most needed where REDD+ involves changes in land use, especially where agricultural land and community-managed forests overlap. REDD+ can succeed if stakeholders share a common understanding of appropriate forest and land use, a shared and trusted way of negotiating agreements about REDD+, and if local users derive co-benefits.

Despite the time and cost, there is a need to invest in new political processes that will encourage transparent and accessible deliberation, learning and agreement about forest management. Where there are large differences between stakeholders, short-term efficiency might have to be sacrificed in order to achieve equity and long-term effectiveness. But achieving trust is a sensible objective. If inclusive and accountable ways of sharing benefits are found, and if different stakeholders can agree on appropriate forest use and policy objectives, then the result will be long-term efficiency and effectiveness in reducing and removing greenhouse gases, as well as equity.

Part

3

Enabling REDD+ through broad policy reforms

Chapter 10

Policy options to reduce deforestation

Arild Angelsen

- Four types of policies could reduce deforestation: policies to depress agricultural rent, policies to increase and capture forest rent, policies that directly regulate land use, and cross-sector policies that underpin the first three.
- While payments for environmental services (PES) have clear advantages, in the early stages of REDD+ implementation, broader policies which address underlying causes are more feasible and likely to be more successful.
- REDD+ is a new direction in forest conservation. This means that countries need to take into account research on deforestation, and lessons learned from previous forest conservation policies, when developing national REDD+ strategies.

Introduction

A key feature of REDD+ provides incentives and compensation to forest managers (carbon rights holders) to reduce deforestation through payments for environmental services (PES). However, full-scale implementation of a PES system faces a number of obstacles: unclear and contested land rights, inadequate monitoring, reporting and validation (MRV), inadequate administrative capacity, poor governance, corruption, and so on. Since reducing emissions from deforestation (RED) was launched at COP-11 in 2005, it has become increasingly clear that to successfully implement REDD+, governments need to put in place a broad set of policies that go well beyond PES.

The first step in designing and implementing forest conservation polices is to understand the causes of deforestation. This chapter analyses deforestation in the framework of the von Thünen land rent model that assumes that people use land in a way that brings them the highest land rent (surplus). Farmers, companies and other land users deforest land because non-forest uses such as agriculture, is more profitable (has a higher rent) than using the land for forests.

Within the land rent framework four sets of policies could reduce deforestation: policies to bring down agricultural rents at the forest frontier; policies to boost and capture forest rents; policies that directly regulate land use (for example, that protect forest and regulate land use planning); and cross-cutting policies, such as good governance and decentralisation. This chapter gives a broad overview of these policies in the framework of the land rent model. Several of the policy options are discussed further in subsequent chapters.

Frameworks for understanding deforestation

Hierarchy of causes

One framework for understanding deforestation distinguishes between causes at different levels, as shown in Figure 10.1 (Angelsen and Kaimowitz 1999). At one level are the *sources* of deforestation, i.e., the agents (individuals, households or companies) responsible for clearing the forest.[1] The main agents of deforestation are subsistence farmers practising shifting cultivation, cash crop smallholders and large companies that clear land for crops and cattle. Together, these account for three-quarters of all tropical deforestation (IPCC 2007).

At another level are the prices, access to markets, agricultural technologies, agro-ecological conditions and so on that influence the choices made by these agents of deforestation. These decision parameters constitute the *immediate or direct causes* of deforestation. At a third level, these decision parameters are in turn affected by broader national and international policies,[2] the *underlying causes* of deforestation.

1 The terms used in the literature are far from uniform. 'Proximate causes' is sometimes used for the immediate or direct causes, while the term 'drivers' is used for both agents and underlying causes.

2 For the sake of simplicity, Figure 10.1 implies that causal effects flow in only one direction. But important effects also flow in the opposite direction. For example, agents will make decisions that have important feedback effects on market prices (general equilibrium effects). Agents' collective actions, political pressure and demographic behaviour also affect underlying causes.

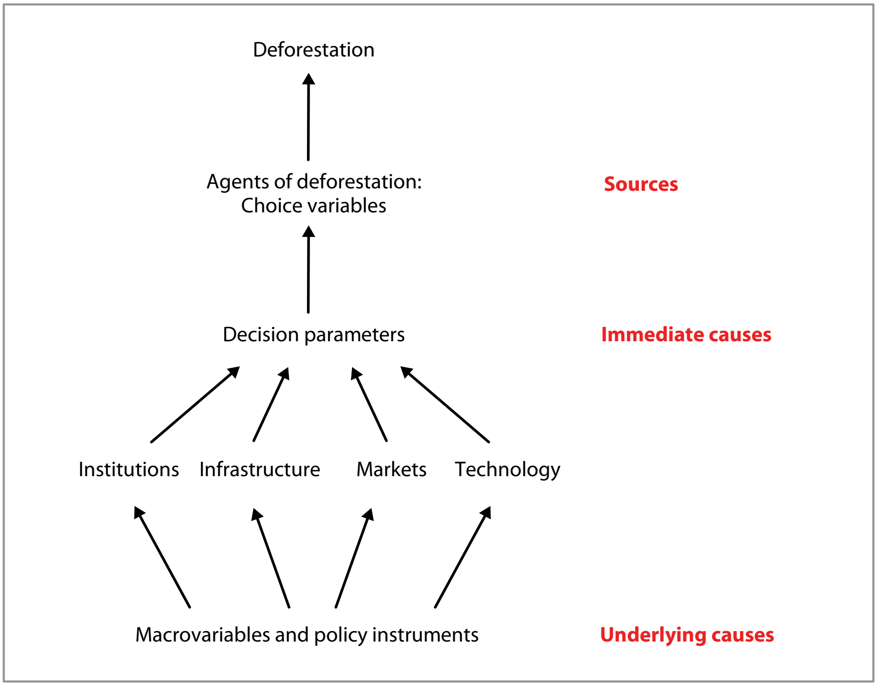

Figure 10.1. Sources, immediate causes and underlying causes of deforestation
Source: Angelsen and Kaimowitz (1999)

In this framework, policies to reduce deforestation would address the decision parameters by restructuring markets, disseminating new technologies and information, and developing infrastructure and institutions. These policies would change the way agents use land. The next section analyses these policies in the framework of the von Thünen land rent model.

Land rent (von Thünen model)

The economics of land use assume that *land is allocated to the use with the highest land rent* (surplus or profit). A number of factors, many directly or indirectly dependent on location, such as crop prices, labour costs and accessibility, determine the rent for different land uses. A key aspect of location is remoteness, as measured by the distance to markets or cities. The von Thünen model shows how land rent – as determined by distance from a commercial centre (markets) – shapes land use.

The von Thünen model is a key to understanding deforestation (Box 10.1). When applied to two land uses, agriculture and forest, the model shows that anything that makes agriculture more profitable stimulates deforestation. Anything that makes forests more profitable (brings higher forest rent) has the opposite effect. Calculating the forest rent is, however, more complicated than calculating the agricultural rent because property rights are often unclear

Box 10.1. The land rent model from von Thünen

Farmers, companies and other land users deforest because nonforest uses are more profitable (i.e., have a higher rent) than forest uses. A key determinant of land rents is location, most typically measured by the distance to markets or cities. This is the approach proposed by Johann von Thünen in 1826 (von Thünen 1966), when he asked: 'Under these conditions what kind of agriculture will develop and how will the distance to the city affect the use of land if this is chosen with the utmost rationality?'

As an analytical simplification, consider a model where land has only two uses, agriculture and forest (Angelsen 2007). First, we can define the land rent as:

$$r_a = p_a y_a - wl_a - qk_a - v_a d$$

Agricultural production per ha (yield) is given (y_a). Output is sold in a central market at a given price (p_a). The labour (l_a) and capital (k_a) required per ha are fixed, with input prices being the wage (w) and annual costs of capital (q). Transportation costs are the product of costs per km (v_a) and distance from the centre (d). The rent declines with distance, and the agricultural frontier is where agricultural expansion is no longer profitable, i.e., where $r_a = 0$.

Thus, the frontier is defined at:

$$d = \frac{p_a y_a - wl_a - qk_a}{v_a}$$

This model is illustrated in Figure 10.2 and yields several key insights into *the immediate causes* of deforestation. If we ignore forest rent, deforestation will take place up to the distance A. Higher output prices, and technologies that increase yields or reduce input costs, make expansion more attractive, i.e., they move the agricultural rent curve to the right. Lower costs of capital in the form of better access to credit and lower interest rates pull in the same direction. Higher wages work in the opposite direction. Reduced access costs (v_a), for example, new or better roads, also provide a stimulus for deforestation. A survey of more than 140 economic models of deforestation finds a broad consensus on three immediate causes of deforestation; higher agricultural prices, more and better roads and low wages coupled with a shortage of off-farm employment opportunities (Angelsen and Kaimowitz 1999; Kaimowitz and Angelsen 1998).

Forest rent can be defined as:

$$r_f = (p_t y_t - w l_t - q k_t - v_t d) + p_l y_l + p_g y_g$$

We distinguish between three types of rent. First, there is *extractive* forest rent for forest products, such as timber and non-timber forest products. This is similar to agricultural rent and expressed within the brackets. Second, there is *local protective* forest rent ($p_l y_l$), which is the local public goods that standing forests provide, such as water catchment and pollination services. Third, there is *global protective* forest rent ($p_g y_g$), which is the provision of global public goods, such as carbon sequestration and storage, and maintaining biodiversity.

Forest rent is not necessarily taken into account by agents of deforestation. In open access situations, without any *de facto* property rights to forests, no forest rent will be taken into account. (Point A in Figure 10.2). In a system with private property, the extractive forest rent is incorporated (Point B). Community forest management (CFM) should, in principle, include the local protective forest rent (Point C). If local land users also receive payments for environmental services (PES), and capture global protective forest rent, this combination could reduce deforestation even further (Point D).

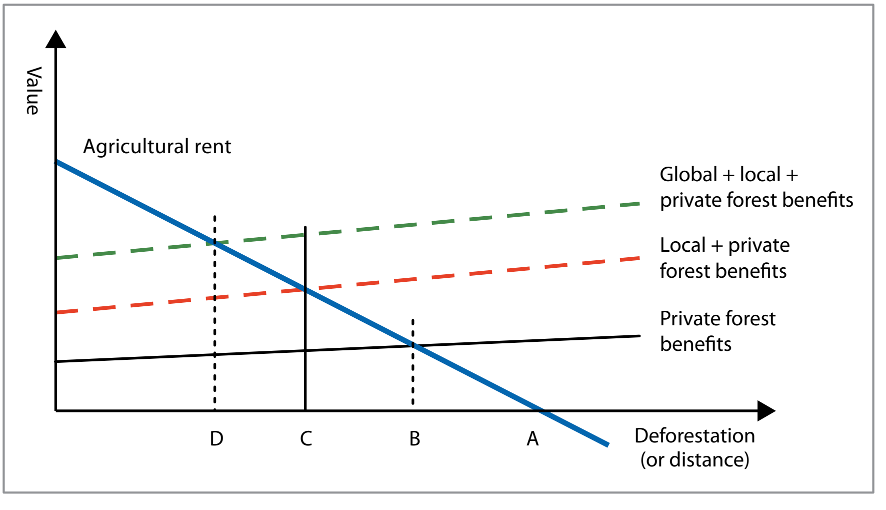

Figure 10.2. Agricultural and forest rents

and because key elements of the forest rent, such as environmental services (including carbon sequestration and storage) provided by forests, are considered public goods. Thus when making decisions about forest conversion, it is more important to explore how the forest rent should be captured by land users than it is to determine the actual forest rent.

Agricultural policies to reduce deforestation

Reduce agricultural rent

Understanding agricultural rent is critical to understanding deforestation rates. Keeping agricultural rents low can be very effective in saving forests. This has been called 'the "improved Gabonese recipe" for forest conservation' (Wunder 2003). The main ingredients of this recipe are heavy taxes on export crops and neglect of rural roads and support to smallholders. Such policies run counter to mainstream policy recommendations for agricultural and rural development (World Bank 2007), and conflict with the objectives of reducing poverty and increasing agricultural production. They are blunt policy instruments with perverse side effects (Kaimowitz *et al.* 1998). They also are likely to be politically controversial, although for decades policies have had a strong bias against rural development and agriculture in many poor countries in an attempt to keep urban food prices low (Krueger *et al.* 1988).

Agricultural rent can be lowered by raising the opportunity cost of labour (better employment opportunities off-farm). Forest cover in a country might, over time, go through forest transition (see Box 1.2). Better off-farm wages, and employment opportunities that pull labour out of agriculture, can be major drivers of a transition to stable forest cover and are often referred to as 'the economic development path' (Rudel *et al.* 2005). Economic development is, however, not a policy instrument, but the aggregate outcome of, amongst other things, a basket of policies. Targeted policies can stimulate nonfarm employment in rural areas, but they do not guarantee forest conservation. Although higher nonagricultural incomes will tend to pull labour out of extensive agriculture, the higher wages earned might be invested in ventures that deplete forests, such as cattle ranching (Vosti *et al.* 2001). Win-win outcomes seem more likely in labour-intensive than in capital-intensive agricultural systems (Angelsen and Kaimowitz 2001). In the latter, any stimulus to the local economy will help relax capital constraints that currently slow otherwise profitable agricultural expansion.

Support intensive agriculture and technological change

An important extension of the von Thünen model distinguishes between intensive (lowland) and extensive (upland or frontier) agriculture, where 'intensive' is understood to mean intensive in productive inputs other than land. Spatially targeted policies to stimulate intensive agriculture can be an effective forest conservation policy. The logic is similar to that for off-farm employment. By making the alternatives to extensive agriculture more attractive, labour is pulled out of deforesting activities. For example, better small-scale irrigation systems in the Philippines pushed up demand for labour, boosted wages and pulled labour out of extensive agriculture. More and better paid jobs in lowland agriculture nearly halved the rate of upland forest clearance (Shively 2001; Shively and Pagiola 2004). Adding to this, higher productivity in the intensive sector can push domestic agricultural prices down, further reducing the agricultural rent of extensive agriculture and thereby deforestation rates (Jayasuriya 2001).

Policies to intensify agriculture in specific areas are discussed in depth by Rudel in Chapter 15 under a new term: reduced emissions agricultural policy (REAP). They include credit programmes, subsidised fertilisers and seeds, assistance in marketing and agricultural extension programmes.

Although these policies might reduce deforestation, there is no guarantee. If the main crop is traded internationally, an increase in supply may only have a small effect on the price that farmers get for their produce. If policies save labour or encourage technological change, the pull effect on labour may be weak or even negative (Angelsen and Kaimowitz 2001). In addition, higher profits in intensive agriculture could be invested in clearing more forest for extensive crops and cattle production. This happened in Sulawesi, Indonesia, in the 1990s. Mechanisation of lowland rice freed up labour and produced more rice, and the profits were used to expand cocoa cultivation in forested uplands (Ruf 2001).

Ignore extensive agriculture?

Policies stimulating intensive agriculture in certain areas might ignore agriculture in remote forest areas where poverty rates are typically higher (Sunderlin *et al.* 2008b). Is it possible to raise productivity, boost output prices by improving access to markets, and support extensive agriculture without increasing deforestation? A summary of more than a dozen studies on the effect of technological changes on tropical deforestation (Angelsen and Kaimowitz 2001) concluded that 'tradeoffs and win-lose between forest conservation and technological progress in agriculture in areas near forests appear to be the rule rather than the exception'.

Certain technologies and market conditions may produce win-win outcomes. New labour-intensive or capital-intensive technologies could slow rates of deforestation and increase profits. Most farmers have labour or capital constraints and could be expected to adopt technologies that save labour or

Table 10.1. Policies to reduce deforestation

Policy	Effectiveness of forest conservation	Direct costs of policy (efficiency)	Effect on inequality or poverty	Political viability
1. Reduce (extensive) agriculture rent				
Depress agricultural prices	High	Negative	Negative	Low
Create off-farm opportunities	High	Medium – high	Neutral – positive	High
Support intensive agricultural sector	Moderate – high	High	Uncertain	High
Selectively support extensive agriculture	Uncertain – moderate	High	Positive	Moderate
Ignore extensive road building	High	Negative	Negative	Low – moderate
Secure property rights	Uncertain	Medium	Uncertain	Moderate – high
2. Increase forest rent and its capture				
Higher prices for forest products	Moderate	Low	Positive – uncertain	Moderate
CFM – capture local public goods	Moderate	Low – medium	Positive	Moderate
PES – capture global public goods	Potentially high	Medium – high	Uncertain – positive	Moderate – high
3. Protected areas	Moderate – high	Medium	Uncertain	Moderate
4. Cross cutting policies				
Good governance	Low – moderate direct effects	Low or even negative	Positive	High
Decentralisation	Low – moderate direct effects	Low – medium	Positive	High

capital. But, with some important exceptions, we are *not* likely to get the kind of technological change that would save the forests (Angelsen and Kaimowitz 2001). For example, it is technically possible to make more intensive use of pastures throughout Latin America, but farmers typically do not do this until there is no more forest to be cleared (Kaimowitz and Angelsen 2008). This confirms Boserup's (1965) hypothesis that farmers will exploit the extensive margin before they exploit the intensive one.

A more likely win-win way to help farmers in remote areas would be in situations where they are involved in both intensive and extensive production systems side by side, and the extensive system being the principal source of deforestation. In Zambia, high-yielding maize varieties introduced in the 1970s lessened the need for extensive shifting cultivation and slowed down deforestation (Holden 2001). Similarly, more recent and widely adopted programmes on 'conservation agriculture' in the country have the potential to reduce the pressure on natural forests (Ibrekk and Studsrød 2009).

Roads

Constructing new roads or improving existing ones opens up new areas, brings down transport costs, makes markets more accessible and makes deforesting activities more profitable. In general, improving roads and infrastructure is a main cause of deforestation. This led Eneas Salati, a respected Brazilian scientist, to conclude, 'The best thing you could do for the Amazon is to bomb all the roads' (cited in Laurance 2009).

Roads are particularly important in the early stages of forest transition as they open up new areas (Weinhold and Reis 2008). In later stages, in a best-case scenario, roads encourage agricultural intensification and economic development that lessen pressure on forests, and provide incentives (such as opportunities for tourism) to manage forests better and the means to do so, namely better access. Further, the role of the state in building roads, and in other large-scale undertakings such as colonisation programmes, has weakened since the 1980s (Rudel 2007). Still, no forest conservation policy can be considered comprehensive unless it provides clear guidelines on transport infrastructure.

Reform tenure

An analysis of the effects of property rights (to agricultural land) on deforestation must distinguish between exogenous and endogenous tenure (Angelsen 2007). If exogenous, the question is, What is the impact of insecure tenure on deforestation? If endogenous, the question is, How do the actions of land users to secure tenure affect deforestation?

The effect of *exogenous* tenure insecurity on deforestation in an extended von Thünen model is straightforward: a land user will invest by clearing more forest and converting it to agriculture (Angelsen 1999; Araujoa *et al.* 2009). This is the opposite of what is commonly assumed. Insecure tenure should slow deforestation whereas more secure tenure should increase the value of the investment and encourage forest clearing. Forest protection is, from a societal perspective, an investment for the future. In contrast, from the individual's point of view, deforestation is an investment in future income.

As usual, the reality is more complex. For example, in a shifting cultivation system, security of tenure varies depending on the stage in the cultivation cycle. Farmers may have fairly secure tenure over plots they are currently cultivating, but weak tenure for fallow plots. The longer the plot has been fallow the less secure the tenure, which may lead to inefficient, short fallows (Goldstein and Udry 2008). Moreover, insecure tenure means farmers invest less in the land and exhaust the soil more quickly which, increasing in turn the need or the incentives to cut down more forest to replace degraded land. This is the 'land degradation-deforestation hypothesis' (Angelsen and Kaimowitz 2001), but is only valid under certain assumptions about behaviour and markets (Angelsen 1999).

The effect of *endogenous* tenure is that land users act to make tenure more secure. Forest conversion, according to both customary and statutory law, often establishes or strengthens existing land rights. Deforestation therefore becomes a way to establish title. This could lead to a 'land race' or 'race to the frontier', where forest is cleared in order to establish property rights. This is particularly the case in the Amazon, where clearing strengthens claims by landowners and squatters in conflict (Araujo *et al.* 2009).

Policies to increase and capture forest rent

Increasing forest rent over time is the second way to protect them: 'the forest scarcity path' of the forest transition (Rudel *et al.* 2005). High demand and a limited supply of forest products stimulate stabilisation of forest cover and regrowth. Policies can influence forest rent in similar ways to agricultural rent, e.g., through taxes and marketing arrangements that affect the prices of timber and other forest products, or by promoting new technologies. While historically this path has been driven by forest extractive rent (rent from forest products), the fundamental idea of REDD+ is to stimulate forest cover stabilisation through an increase in the protective rent (rent from environmental services). An increase in forest rent, however, will not affect deforestation unless land users can capture a share (and include it in deciding how to use land). There are two main ways of 'internalising the externalities' for optimal forest use: by moving decisions to a greater scale at which the effects are occurring and therefore can be incorporated, and by creating a market for the public good (i.e., environmental services provided by standing forests).

Large tracts of tropical forests are characterised by weak, unclear and contested property rights, making them *de facto* open access (Sunderlin *et al.* 2008a, see also Chapter 11). In these areas land users have no economic incentive to factor forest rent into their decisions about forest conversion. A higher extractive forest rent will not, in itself, affect agricultural expansion. But, better infrastructure and roads lead to more logging, and often logging and expansion of agricultural land go together (Geist and Lambin 2002). If we also consider forest degradation, higher timber prices might lead both to more intensive logging in production forests and to an expansion of the area being logged (Amsberg 1998).

In a context of private property rights to the forest land, a higher forest extractive rent implies more forest will remain (Figure 10.2). But if we take degradation and changes in overall forest carbon stocks into account, the effects are more complicated. In general, higher timber prices will shorten the rotation period and therefore reduce the average carbon stock.

Assigning individual property rights to forest is often put forward as a solution to excessive deforestation. Individual property rights alone will not solve the problem of local and global externalities, but clear and secure property rights, either at the individual or the community level, are a necessary to establish PES systems. They will also encourage more sustainable management of forests compared with an open access regime, with positive effects on degradation and carbon emissions.

Community forest management (CFM) moves decisions from the individual to the community to compensate for negative externalities from deforestation (C in Figure 10.2). The success of CFM depends on the ability of the community 1) to make decisions that take account of externalities, and 2) to enforce the rules effectively among members and to exclude outsiders. Chapter 16 reviews experiences with CFM, and the lessons that need to be carried forward into the REDD+ debate.

The key proposal in the REDD+ debate is to create a multilevel (global–national–local) PES system for carbon sequestration and carbon storage in forests (Angelsen 2008b). The PES experiences and challenges are reviewed in Chapter 17. PES systems assume that tenure, MRV, administrative capacity, governance, corruption and so on have been addressed. But in most deforestation hotspots, land rights are unclear, overlapping and contested. This means that it will be more difficult to use PES as the main instrument to achieve REDD+ than policy makers commonly assume. In the short to medium term, national REDD+ strategies will have to rely heavily on policies other than PES.

Protected areas (PAs)

Forest protected areas (PAs) in IUCN categories 1 to 6 make up 13.5% of the world's forests (Schmitt *et al.* 2009), the share being significantly higher (20.8%) in rainforests. Chapter 18 reviews experiences with PAs and integrated conservation and development programmes (ICDPs) and their effectiveness. A key question is whether PAs do in fact protect forest. There is broad consensus in the literature that the degree of protection is not 100%, but that rates of deforestation within PAs are lower than outside. This is still true after controlling for 'passive protection', that is, allowing for the fact that PAs are often located in remote areas with less pressure on forest (Bruner *et al.* 2001; DeFries *et al.* 2005). Recent studies also attempt to estimate spillovers or 'neighbourhood leakage', i.e., where deforestation activities shift from inside to outside the PAs. Studies from Costa Rica (Andam *et al.* 2008) and Sumatra (Gaveau *et al.* 2009) find these effects to be small, and not easy to detect (See Box 22.2).

Studies have also shown significantly less deforestation in various types of protected areas in the Amazon (parks, indigenous lands, extractive reserves and national forests). Indigenous lands account for one-fifth of the Brazilian Amazon. Nepstad *et al.* (2006) find the inhibitory effect (the deforestation ratio between 10 km wide strips of land outside and inside the PA border) for the period between 1997 and 2000 to be 8.2. These and other results reviewed by the World Bank suggest that 'protected areas may be more effective than is commonly thought' (Chomitz *et al.* 2007).

Cross-sector policies

Poor governance, including corruption, affects forest conservation in several ways, as discussed in Chapter 13. Corruption at high political level, often called 'grand corruption', directly affects the design of policies. Timber politics in South Asia involve not only rent seeking, but also rent creating, i.e., actively manipulating the rules to generate benefits for powerful groups (Ross 2001). The land use planning process is potentially a strong tool for forest conservation, but is also susceptible to manipulation by dominant individuals and groups (Chapter 13).

Corruption will, in general, weaken policies seeking to conserve forests. Petty corruption abounds in the forestry sector in the form of bribing local officials to ignore violations of forest regulations, harvesting timber without legal permits (Smith *et al.* 2003a) and harvesting outside concession boundaries (Friends of the Earth 2009). But corruption may in some cases also slow deforestation and degradation, for example, bribes to allow illegal harvesting could be a deterrent 'tax' which makes harvesting less profitable and so reduce harvesting rates.

Similarly, decentralisation of forest governance, discussed at length in Chapter 14, is not a straightforward recipe for reducing deforestation and forest degradation. Some decentralisation reforms have had positive results on deforestation while others have had the opposite effect. Decentralisation, like CFM, could help deal with the negative local externalities of deforestation and degradation, and encourage more forest conservation. But, it is often the extractive activities (logging) that boost local incomes, thus outcomes can be mixed.

Decentralisation may be a way to implement other REDD+ policies more effectively, efficiently and equitably. By 'bringing the state closer to the people', decentralisation can increase local participation and build social capital (World Bank 1997). However, as concluded in Chapter 14, forestry decentralisation has in the past often been weakly or partially implemented, and under inequitable rules of participation and power sharing, although REDD+ has the potential to change this.

Selecting policies

Research on the underlying causes of deforestation (UCD) in the past 25 years has found that broad societal forces and nonforestry policies play a critical role (Kanninen *et al.* 2007). Thus, much of the focus has been on the causes shown in the lower half of Figure 10.1. The REDD+ debate so far has taken a different approach, namely to provide direct incentives and compensation to the actors (i.e., a PES or PES-like approach). The focus has shifted to the upper part of Figure 10.1.

There are several advantages in a PES-like approach. In general, targeting a problem directly is the most effective and efficient option. This also makes sure that those who lose out from forest conservation will be compensated for the opportunity costs. PES-like systems are also less likely to conflict with other policy goals.

But, as noted in this chapter and elsewhere in this book (particularly Chapter 17), there are a number of challenges in establishing PES systems. This means that direct payments to farmers and other forest users are unlikely to become the main REDD+ policy in the short to medium term in most countries. REDD+ policy makers should, therefore, think broadly and look beyond the forestry sector. Some of the policies reviewed in this book can be very effective. They can also be relatively low cost, or in some cases even have negative costs such as when subsidies that encourage deforestation and degradation are removed.

Countries developing their REDD+ strategies should, therefore, consider a wide range of policies and take national circumstances into account. These include the particular agents and causes of deforestation, the stage in the forest transition, administrative capacity and previous experience with forest conservation policies. REDD+, with its strong emphasis on payment for performance, is in many ways a new game in town, at least at the national level. Yet, there is a significant risk that valuable lessons from previous policy interventions and from research on the causes of deforestation will be overlooked when designing REDD+ strategies and policies.

Forest tenure rights and REDD+

From inertia to policy solutions

William D. Sunderlin, Anne M. Larson and Peter Cronkleton

- In many developing countries, tenure in forests is not clear and subject to dispute. This will place limits on the effectiveness, efficiency and equity (3Es) of REDD+.
- In spite of the attention paid to the problem of insecure tenure to date, there has been little progress toward clarifying tenure arrangements.
- National governments need to take proactive steps to clarify tenure.

Introduction

Insecure forest tenure has long been associated with deforestation and degradation (Southgate and Runge 1990; Brown and Pearce 1994; Kaimowitz and Angelsen 1998). But secure tenure may also lead to more forest conversion, unless there are changes in other incentive structures (Tacconi 2007a; see also Chapter 10). REDD+ seeks to put in place incentives to reduce deforestation and degradation. Policy papers on forests and climate commonly assume that resolving problems of ill-defined or weak tenure[1] is key to REDD+ success.

1 In this chapter, we define forest tenure as the right, whether defined in customary or statutory terms, that determines who can hold and use forest lands and resources, for how long, and under what conditions. The term 'property rights' is analogous, though it tends to focus more narrowly on ownership.

According to the Stern Review (2006), 'At a national level, defining property rights to forestland … and determining the rights and responsibilities of landowners, communities and loggers, is key to effective forest management. This should involve local communities, respect informal rights and social structures, work with development goals and reinforce the process of protecting the forests'. Similarly, Eliasch (2008) states, 'Only when property rights are secure, on paper and in practice, do longer-term investments in sustainable management become worthwhile'. Multilateral, bilateral and national policy documents on REDD+ readiness also stress the need to clarify tenure before implementing REDD+.

Nevertheless, there is a noticeable gap between what is said and what is done. Most countries have not paid serious attention to reforming forest tenure. This suggests that countries believe that tenure reform is not that important to REDD+ outcomes, that it is politically sensitive or that they do not know what should be done. This chapter argues that weak and ambiguous tenure is detrimental to the effectiveness, efficiency, equity and benefit sharing of REDD+, and may threaten forest communities. We propose concrete steps to address the problem.

Four sections follow. The first discusses tenure reform in relation to REDD+. The second asks why tenure is important for REDD+ outcomes. The third suggests processes and policies for assuring that tenure receives greater attention. The final section draws conclusions.

Tenure reform and REDD+

Some proactive efforts to address forest tenure problems and lay the foundations for REDD+ have been taken. For example, the negotiating text in the COP deliberations refers to the importance of resolving tenure issues (e.g., UNFCCC 2009c: 45, 109). A review of 25 Readiness Plan Idea Notes (R-PINs) shows that almost all the countries reviewed recognise the need to clarify land tenure in preparation for implementing REDD+ (Davis *et al.* 2009). Many REDD+ projects have gone for third party certification according to Climate, Community and Biodiversity Alliance (CCBA) standards. These require that 'In the event of unresolved disputes over tenure or use rights to land or resources in the project zone, the project should demonstrate how it will help to bring them to resolution so that there are no unresolved disputes by the start of the project' (CCBA 2008).

In spite of these positive signs, there is general inertia on resolving forest tenure. In spite of much discussion,

> many R-PINs suggest a very limited analysis (and in some cases understanding) of the existing situation with regards to conflicts over tenure

> and potential obstacles to reform and implementation. Issues such as the source and location of land use conflict, the role of judicial or alternative mechanisms for resolving conflict, and the nature of customary practices and indigenous rights are not consistently addressed. Furthermore, few countries address the need to clarify carbon rights within existing tenure systems. Given the strong consensus amongst participating countries that improving tenure security is critical for REDD, a deeper and more practical discussion of how these issues may be resolved will be needed in the R[eadiness]-Plan. (Davis *et al.* 2009)

How will tenure affect REDD+ outcomes?

The importance of tenure for REDD+ is obvious. REDD+ is essentially a broad set of policies to prevent or slow deforestation and degradation, and increase forest carbon stocks. A subset of these policies allocates rewards to carbon rights holders who achieve REDD+ objectives, either as measured directly by changes in forest carbon stocks or by proxies for those changes (Meridian Institute 2009b). But who are the legitimate carbon rights holders? In most developing countries, the answer to this question is not always clear – forest tenure is contested, rights overlap and are not secure. Tenure must be clarified, not only to create incentives for those managing the forests and to properly assign benefits, but also to protect people whose rights could be usurped if REDD+ leads to a rush of command-and-control measures to protect forests, or if REDD+ leads to a resource race when the value of forests increases.

In principle, the right holder to carbon need not be the right holder to forest land and trees. This implies that carbon rights can be assigned without reform of forest tenure. But, in practice, if carbon rights and tenure rights are two different things, this could favour those seeking to capture carbon rents, and block or decrease benefits to local people. Separating tenure rights from carbon rights could complicate already complex and contested arrangements, and could be an excuse not to make necessary reforms.

Contested and overlapping claims

A fundamental reality of contemporary forest tenure in developing countries (and some developed countries) is that it involves contestation between the state and civil society (Ellsworth and White 2004; Fitzpatrick 2006). In developing countries, the state claims ownership over most forests. Colonial and postcolonial state policies usurped, or at least failed to recognise, the rights of forest dwellers (Peluso 1995; Pulhin *et al.* in press). Today, people living in forests continue to claim customary rights, even though states often do not recognise such claims to vast areas of forest. Likewise, indigenous people and other traditional forest dwellers reject state control over forests they view as their own (Lynch *et al.* 1995; RRI 2008; Sunderlin *et al.* 2008a).

Forests are also subject to multiple and overlapping claims. In some regions, forests are often considered to be unclaimed 'wastelands', and are open to both spontaneous and planned colonisation for agriculture. Clearing forest is often seen as a way to demonstrate and defend property claims. Peasants, loggers and wealthy agriculturalists continue to occupy many forests, such as the vast lowland areas of the Amazon. Forest dwellers may already claim customary rights over these areas and conflicts may arise over whose claim will be formally sanctioned by the state. The less powerful claimants, such as indigenous or other marginalised groups, often lose out (Toni 2006a; Larson *et al.* 2008; Cronkleton *et al.* 2009).

In recent decades there has been a partial, though still somewhat limited, attempt to recognise or restore tenure rights to forest peoples. Between 2002 and 2008, the area of the global forest estate administered by governments decreased from 80.3% to 74.3% in 25 of the world's 30 most forested countries. There have been corresponding increases in the area of forest designated for use by communities and indigenous peoples, and the area owned by communities, indigenous peoples, individuals and firms (Sunderlin *et al.* 2008a).

In spite of this move forward, REDD+ schemes are getting underway in a world where forest tenure is not generally clear and where people who live in forests are often at a disadvantage. Not only are customary claims mostly unrecognised in many countries but, even where there are clear statutory rights or title for local people, they may not be enforced (Larson *et al.* 2008, in press-a).

Given the history of contested and overlapping rights, it is clear that there may be difficulties when REDD+, a major new economic opportunity in forestry, gets underway. It is easy to imagine that the less powerful stakeholders could be sidelined in conflicts over resource tenure. It is also easy to imagine that states could find it desirable or necessary to impose a command-and-control forest protection approach to maintain the stream of national REDD+ income if REDD+ fails to allocate benefits and management responsibilities successfully.

REDD+ is still in its early stages, so concerns about tenure have not fully emerged. Some demonstration sites do not have problems with tenure because they are showcase projects located in places where tenure is not ambiguous. Scaling up REDD+ in countries where tenure is contested will inevitably be difficult. REDD+ benefits have not yet begun to flow and, in most cases, arrangements for sharing the benefits from REDD+ have yet to be defined. Many stakeholders are not fully aware of what is at stake. Once benefits start to flow, those left out will start to protest. The larger the income from REDD+, the greater will be the dissatisfaction. The marginalisation of forest dwellers in most countries – and the insecurity of their tenure – risks leading to a situation where their share of national REDD+ income will be small.

Tenure and the 3Es

If REDD+ is scaled up before tenure is clarified, and particularly before there is formal recognition of local property rights, the 3Es of REDD+ will be undermined in a number of ways.

Limit policy options. Unclear or contested tenure limits policy options. For example, REDD+ projects based on payments for environmental services (PES) or on community forestry are riskier without secure tenure. This means REDD+ might have to rely mainly on other kinds of policies and measures (e.g., enforcement). In this case, capital cities and central bureaucracies could reap a large share of REDD+ benefits, and those whose rights and livelihoods are neglected may be dissatisfied and even retaliate. All these policy limitations reduce attainment of effectiveness, efficiency and possibly also equity.

Share REDD+ benefits unequally. Unclear or contested tenure mean that contracts and benefits could accrue to relatively few large forest owners, local or national elites, or non-forest stakeholders. This will increase inequity, and trigger resentment and conflict, especially if REDD+ funds are captured by powerful elites.[2] Unequal distribution of contracts and benefits could also mean sub-optimal REDD+ coverage, a loss of legitimacy and a failure to convince forest resource users to change their behaviour. A skewed system could produce a run on forest resources as powerful claimants take control of areas claimed by communities or smallholders. Those who have been left out could retaliate and sabotage projects, further reducing effectiveness and efficiency.

Increase conflict. Governments could renew and increase state control of forests to expand the area covered by REDD+. This could cause or aggravate a 'guns and fences' model of forest conservation that excludes people. More state control might also mean that people are evicted from forests they depend on for livelihoods. More violation of customary tenure and other rights, more conflict over forests, and retaliation by those whose rights and livelihoods are neglected will reduce the effectiveness, efficiency and equity of REDD+.

Clarifying tenure

The acknowledged need to clarify forest tenure should motivate states to move ahead on reform, but as yet this has not happened. Why is there a gap between

2 Local stakeholders could receive an inadequate share of REDD+ benefits either because they are left out entirely (i.e., not recognised as right holders or are not granted benefits because they are protecting rather than damaging forests). Or they could get a minimal share because they have no leverage to demand a larger share, in part because of the history of rights dispossession.

Box 11.1. Insecure tenure limits REDD+ payments for environmental services schemes

Payments for environmental services (PES) schemes require certain fundamental preconditions, one of which is 'the exclusiveness of rights to the land providing the service in question' (Börner *et al*. in press). That is, land holders – those receiving payments – have to have the right to exclude other people who could use forest and land resources in ways that are incompatible with providing the contracted service.

Börner *et al*. assesses the outcomes of PES schemes in a variety of land tenure categories in the Brazilian Amazon: indigenous land, protected areas, formal rural settlements and private land, as well as unclassified public land. They point out that 'land-tenure chaos … represents the single largest impediment to our analysis, and to REDD implementation'. In particular, even if lands are well defined in practice, land registries are often inaccurate and outdated; hence there is no way to distinguish the areas that are poorly defined from unclassified public land. Unclassified public lands account for 24% of Amazon lands, and do not qualify for REDD+ payments because those who live there cannot usually guarantee the exclusion of third parties.

The result is that 'pre-existing ill-enforced environmental legislation, undefined tenure and tenure insecurity' mean that PES schemes will only work in about one-third of the area where deforestation is a threat. In the other two-thirds, there is no clear information on tenure and so it is not possible to identify who should receive payments.

But the problem of tenure is not limited to unclassified public land. Even in areas where communities have *de jure* exclusion rights they are not always able to exercise them. That is, they 'lack the control and government support to effectively prevent invasions by powerful commercial interests'.

The study shows that it is important to assess *de facto* land tenure rights as well as the dynamics of deforestation, arguing that deforestation can be stopped only by actions that *de facto* delimit land tenure and 'effectively stop invasions'. It also shows that it is important to clarify land tenure in order to increase the potential for REDD+.

what is said and what is done about forest tenure? Clarifying forest tenure and tenure reform have been bogged down for years in most developing countries. Efforts to resolve tenure issues have been blocked by special interest groups, and hampered by insufficient funding and a lack of technical capacity (Sunderlin *et al.* 2008a). Two other factors are specific to REDD+: first, a lack of understanding of how tenure will constrain REDD+ implementation and, second, an international policy context that contributes to inertia. For example, the Forest Carbon Partnership Facility (FCPF) has been criticised for working without participation and consultation, and for implying that control of national forests should rest with governments (Forest Peoples Programme 2008). As explained by Griffiths (2008), 'Existing intergovernmental proposals on decisions on REDD contain no clear commitments to address rights and equity issues'.

We believe that political will is the key to resolving tenure rights. In other words, if leaders at the national and international levels are convinced that clarifying tenure is necessary for REDD+ to succeed, then they will allocate funds for this to happen, develop the capacity and clear the institutional blocks. With this in mind, we propose processes and policies to clarify forest tenure.

Processes

Clarifying forest tenure for REDD+ can be advanced in five ways:

1. **Analyse the consequences of inaction.** National tenure experts can qualitatively envision and quantitatively analyse the consequences of inaction on forest tenure reform. Experts can construct scenarios starting from the assumption that REDD+, when scaled up, will usually be implemented where disputes and lack of clarity about tenure clarity are the norm. These exercises should attempt to specify, in particular, the costs of inaction in terms of the 3Es. The results should be open to public debate and response.
2. **Assess the obstacles to moving forward.** If the cost of doing nothing is found to be unacceptable, the next step is to understand the obstacles to forest tenure reform. A useful starting point would be to ask to what extent obstacles, such as manipulation by special interests, lack of funds and insufficient capacity, do or do not apply in the national context.
3. **Create, resuscitate or improve national planning for forest tenure reform.** The assessment of obstacles to moving forward will suggest some ways to set reform of forest tenure in motion, or revive or improve it. This exercise should go beyond describing the obstacles and identify what will encourage and assist reform of forest tenure. This process should be bottom-up and consultative to ensure that constraints and opportunities for reform are fully informed by local voices. Moreover, attempts should be made to ascertain whether or not there are government ministries or departments that will be involved in REDD+ and could assist in the tenure reform process, but are not part of the discussion.

4. **Generate or improve national information on forest land tenure.** Most countries lack information, such as reliable maps, on national forest tenure. In preparation for its Forest Resources Assessment 2010, the FAO has been encouraging governments to substantially improve data on national forest tenure. This is an opportunity for governments to develop information on forest property rights and maps of likely REDD+ areas, disseminate them widely and make them publicly accessible. Efforts should include generating 'counter maps' of the claims and land uses of marginalised people (Peluso 1995; Chapin *et al.* 2005).
5. **Public consultations on REDD+.** As countries move from the R-PIN to the readiness plan (R-Plan) phase, they are encouraged to hold public consultations on the implementation of REDD+. At these meetings the government should present detailed proposals for REDD+ implementation, together with the results of the visioning exercise, assessment of obstacles, options for tenure reform and information on national forest tenure. The government should invite public input – seeking informed consent for the implementation of REDD+ and local involvement in shaping REDD+ design and implementation – based on a thorough understanding of the tenure situation.

Policies

We assume that taking these steps will stimulate national political will to resolve tenure issues in advance of REDD+ implementation. In this case, it will be important to reinforce the momentum by implementing national policies to reform forest tenure, national policies that complement and reinforce clarification of tenure, and international policies.

It is more than likely that REDD+ will get underway without thorough tenure clarification and reform. But, rather than deter governments, this should encourage them to introduce policies and practices that will move tenure reform forward. With long-term reform in mind, there is much that can be done in the short term. For example, policies can pay attention to the principle of Free Prior and Informed Consent (FPIC) and to the 2007 United Nations Declaration on the Rights of Indigenous People (UNDRIP). These are vital to assuring protection of local rights in the course of implementing REDD+.

A number of important issues should be taken into account in reforming and implementing national forest tenure policies (see Larson *et al.* in press-a).

Recognition. Models that recognise forest rights include, for example, indigenous territories, ancestral domain lands, extractive reserves, communal or community forests, concessions, and agroforestry communities. Choosing an appropriate model should be based on a thorough understanding of the options and should be negotiated with claimants.

Implementation. It has often been difficult to implement legal reforms. Ongoing political will is particularly important to support marginal groups. In a number of cases, inadequate resources or capacity, dragging feet and granting rights to competing claimants have impeded progress. Participatory mapping with experienced facilitators has proved effective in establishing local claims, although poor mapping can escalate, rather than resolve, conflicts (Walker and Peters 2001; Fox 2002).

Conflict resolution. Recognising the rights of one group may infringe on the rights of other customary users. This means taking care to understand and adequately address multiple and overlapping claims. Clear rules, fair recourse and ways of resolving conflict need to be established.

Representation. Recognising forest tenure rights, particularly in implementing REDD+, means identifying people who will represent groups that hold rights. This is often a difficult task that has less to do with choosing a representative who will be accountable, and more to do with facilitating the creation of institutions that represent rights holders.

Although tenure reform is critical to the success of REDD+, it is not sufficient. There are other factors related to governance that must be considered as well – transparency, accountability, financial due diligence and control of corruption. National policies should ensure that REDD+ monitors more than carbon (RRI and RFN 2008). Transparent, independent monitoring systems should also examine the effects of REDD+ on rights and livelihoods. Attention should also be paid to rights that complement and reinforce tenure (citizenship, civil rights, human rights, gender equity) (Colchester 2007; Brown *et al*. 2008; Seymour in press) and to removing constraints in the forest regulatory environment that affect options for the poor (RRI 2008).

Finally, policies and practices at the international level should stipulate clear forest tenure in both policy and practice. Among the most important steps that could be taken is putting in place a policy that makes the payment of REDD+ funds conditional on the recognition of rights and adequate forest governance (RRI 2008). The FCPF, Forest Investment Programme, UN-REDD, and REDD+ donor countries could take a leading role in making this happen.

Box 11.2. Titling indigenous territories in Nicaragua

The recognition of indigenous land rights in Nicaragua demonstrates some of the ways in which political will for reform is constructed, as well as several challenges for such reform. In 1987, as several decades of war came to an end, Nicaragua's new Constitution formally recognised the rights of indigenous and ethnic communities to their cultural identity, forms of organisation and property. Nevertheless, a law addressing indigenous land rights was not passed until 15 years later, after a prolonged legal and political struggle.

In 1995, the Nicaraguan Government granted a forest concession on lands claimed by the Sumu-Mayangna community of Awas Tingni without obtaining the prior approval of the regional council of the Autonomous Region, as required by law. The community filed suit, and the Supreme Court found the concession unconstitutional in 1997. The Government ignored this ruling, however, and Awas Tingni took its case to the Inter-American Court for Human Rights.

In 2001, the international court ruled in favour of Awas Tingni, finding that the Nicaraguan Government had violated the American Convention on Human Rights as well as the community's rights to communal property as guaranteed by the Nicaraguan Constitution. The court ordered the state to create an effective mechanism for demarcation and titling for indigenous communities 'in accordance with their customary laws, values, customs and mores' (judgment, cited in Anaya and Grossman 2002). It took 2 more years, significant grassroots lobbying and pressure from the World Bank to get the Communal Lands Law enacted, and another 2 years to get the government agencies responsible for demarcation and titling established and budgeted. Meanwhile, many communities and institutions sought funding from NGOs and donors to support participatory mapping processes.

The titling of indigenous territories did not progress until presidential elections in 2006 changed the party in power – the same party that had written indigenous rights into the Constitution as part of the peace process. Several titles have since been granted. Conflicts have increased over time, however, with the delays in the process (Finley-Brook 2007). These include conflicts between indigenous communities, as well as between non-indigenous colonists. The law guarantees rights only to those colonists living inside indigenous areas prior to 1987; for others, it requires indemnification for which communities have no funding. Some colonists have claimed rights to form their own territories as other 'ethnic communities' protected by the law.

Finally, there is the issue of representation. Communities come together to form territories and elect territorial authorities to represent them, but indigenous political leaders have sometimes refused to recognise the elected authorities and have promoted a different territorial configuration. Some believe that a few individuals are manipulating the process to gain political and economic control over the region (Larson *et al*. in press-b).

Conclusions: How tenure reform can support REDD+

Tenure reform (clarification of property rights including statutory recognition of customary claims) could improve REDD+ in terms of effectiveness, efficiency and equity.

If REDD+ is to be *effective* in increasing forest carbon sequestration in a reliable and lasting way, schemes must engage legitimate stakeholders whose claims to forest benefits are backed up by law and will be defended in the event of any dispute. If REDD+ is to be *efficient* in sequestering carbon at minimum cost, then responsibilities and rewards in REDD+ must be stable and predictable. If REDD+ is to be *equitable* and distribute costs and benefits fairly, then appropriate stakeholders and beneficiaries must be involved. Forest dwellers should not be disadvantaged by competition for resources as a result of insecure tenure. All these objectives presuppose a degree of clarity in statutory forest property rights that often does not exist.

Although there is widespread recognition of the importance of clarifying tenure before implementing REDD+, action has been worrisomely slow. There are several ways to move forward. These include measuring and anticipating the consequences of inaction, identifying the obstacles to clarifying tenure, reforming tenure, improving national tenure information and holding public consultations on REDD+.

Policies could incorporate FPIC and UNDRIP, put in place measures to reinforce governance of REDD+ (e.g., financial transparency and accountability), and make the flow of REDD+ funds contingent on the recognition of rights and adequate governance.

Forest tenure ambiguity and conflict have a long history in most countries. It is not a new issue. Tenure reform is important for reasons that transcend REDD+. It should be viewed as an end in itself, and not just as a means to help REDD+ succeed. Yet REDD+ has made the argument for resolving tenure issues even stronger. Now that REDD+ has given visibility to forest tenure issues on the international stage, it is hoped that political will and funds can be mobilised to address the issue in a comprehensive and durable way.

Chapter 12

Rights and REDD+

Legal and regulatory considerations

Charlotte Streck

- The clarification of forest tenure is essential for the sustainable success of REDD+. Successful tenure reform should be supported by a participative process and build on customary tenure systems. Tenure reform, however, is a long-term process that has to be implemented in parallel with other REDD+ policies.
- The allocation of carbon rights is a precondition for subnational carbon crediting. The allocation can in most cases be deducted from existing legal principles. The clarification of carbon rights is not a condition for REDD+ policies that are not associated with entity-level carbon crediting and trading.
- The discussion about sharing international benefits must go hand in hand with a discussion about sharing the costs and burdens of REDD+. It is important to manage expectations regarding benefits, in particular where the international incentive systems are still under development.

Introduction

Sustainable and long-term protection of forests requires a paradigm shift in the use of natural resources in developing countries. Land-use and forest-sector policies often date back to colonial times and continue to be designed to allow fast extraction and export of natural resources, as well as to promote land occupation in remote areas. REDD+ requires a shift in thinking and a turnaround in the way countries value their natural resources; countries must protect forests and lands that are traditionally valued only for their timber resources and agricultural potential, rather than for the services provided by standing forest. Neutralising the drivers of deforestation means removing pressure from forests and land. This requires a carefully designed package of policies that targets various drivers at the lowest economic, social and political cost.

REDD+ action includes a diverse set of interventions ranging from policies that can be implemented quickly and without too many legislative changes (e.g., lifting certain subsidies) to more complex and long-term interventions (e.g., land title reform). An impact assessment will have to review the costs and benefits of various competing or complementary policy proposals. While the international REDD+ debate often focuses only on costs of abating greenhouse gas (GHG) emissions, governments will have to take into account the impact of policies on vulnerable constituencies, lobby groups, overall policy coherence and social acceptability. A number of variables determine the scope of the policy debate and the likelihood of adoption of a particular policy. These include the technical and administrative complexity of particular policies, the distribution and timing (short versus long term) of a policy's costs and benefits for the society as a whole and the extent to which it encourages or limits broad participation.

Whichever REDD+ policies are chosen, REDD+ will affect the rights of those using the forest and forest resources or holding permits to clear forest land for agricultural or other purposes. Where REDD+ policies limit the exercise of existing statuary or customary rights, compensation for the loss of benefits is mandated by law as much as by equity considerations. The sharing of costs associated with REDD+ policies and the due compensation for such losses thus stand at the centre of the national REDD+ debate. Rights that will be affected by REDD+ fall broadly into the following categories:

- forest tenure and rights to the existing forest, timber and land resources;
- newly defined rights, such as carbon or carbon sequestration rights and rights to exploit the benefits of GHG emission reductions and removals in general; and
- associated rights to international payments for REDD+.

This chapter analyses the legal and regulatory relevance of these three categories of rights for the implementation of national REDD+ policies with a focus on 1) tenure reform; 2) allocation of carbon rights; and 3) establishment of benefit-sharing provisions. Tenure reform is relevant for the clear allocation of responsibilities and access to natural resources, and the discussion on carbon rights matters in the context of carbon markets and payment for ecosystem services (PES) schemes. The discussion on benefit sharing has become the proxy for discussing the domestic distribution of international REDD+ finance. The importance of these three issues is continuously stressed. However, the international debate and focus of donors and civil society on finding satisfactory solutions for these issues has often failed to clarify how they integrate into the broader process of REDD+ policy formulation. The objective of this chapter is therefore to elaborate on policy options and priorities in clarifying rights to land, timber, carbon and international REDD+ benefits in the national context of REDD+ implementation. Complementing the analysis on tenure included in Chapter 11, this chapter focuses on the legal and regulatory implications of the needed tenure reforms.

Rights to resources and tenure

Deforestation results from local activities such as agricultural expansion and logging which stem from deliberate land use decisions. As discussed more extensively in Chapter 10, the decisions to clear land involve a set of economic incentives, disincentives and constraints (immediate or proximate causes), which are further embedded within a context of government policies, market access, land tenure systems and the sociocultural environment in which local actors live. These constitute the underlying causes or driving forces, that is, the fundamental processes that underpin the proximate causes, and that operate at much broader scales (de Sherbinin 2002). Unclear tenure systems, along with other institutional factors such as the lack of adequate governance structures (manifested by corruption, lawlessness, cronyism and mismanagement of the forestry sector) facilitate deforestation (Chapter 13; de Sherbinin 2002).

Therefore, to succeed, an incentive system that reduces forest emissions has to address perverse incentives that result from unclear and ambiguous tenure of forest and natural resources. A number of legal interests over forested land are relevant to REDD+ policies, including:

- land ownership which includes full property rights that can be held against third parties, including governments, and includes the right to use and transfer the land;
- tenancy of the land which includes the right to use the land without holding full property; relevant rights include usufruct, leases and traditional or indigenous land rights;
- formal or informal harvesting rights of timber and other forest products;
- the right to manage land to extract timber (e.g., concessions); and
- mining (exploration) rights.

These rights can be bundled into the broad concept of forest tenure, which includes ownership, tenancy and other arrangements for the use of forests (FAO 2009c). Forest tenure determines *who* can use what resource, for *how long* and under *what conditions*.

Property rights in most developing countries reflect a diversity of tenure regimes. Customary regimes based on local traditions, institutions and power structures such as chiefdoms and family lineages may exist alongside the formal legal tenure system sanctioned by the state (Elbow *et al.* 1998). In many African countries, formal tenure covers only 2–10% of land; this small percentage relates mostly to urban land. In Cameroon, only about 3% of the land has been formally registered and is held under private ownership, mainly by urban elites such as politicians, civil servants and businesspeople (Cotula *et al.* 2009). Customary systems are often composed of several different kinds of tenure, each of which defines different rights and responsibilities for the use of diverse resources. Clear individual or household rights are generally allocated for more or less exclusive use of arable and residential land, while group rights may prevail for use of pastures, forests, mountain areas, waterways and sacred areas (WRI 2009).

In Latin American countries in particular, deforestation has traditionally served as the very instrument to claim, and obtain, legal title. This 'race for title' is particularly relevant in countries where frontier areas were essentially open to anyone who wished to stake a land claim. Although this has become less common in the past decade, parts of the Brazilian and Ecuadorian Amazon continue to be settled in this way (Geist and Lambin 2001). The Brazilian Land Statute of 1964 demonstrates how land tenure insecurity can lead to increased deforestation. The Statute, which was recently amended by the Public Forests Act and the property regularisation decree to avoid abuse, allows farmers who do not have title but who make 'effective use' of the land to claim its holding. Clearing the forest is usually considered as proof of land development and is thus encouraged by this Statute. The deforestation incentive goes in both directions: large landowners seek to avoid occupation by spontaneous settlers and clear their forest in order to protect and maintain their rights to the land.

Unclear tenure systems may also lead to diluted responsibilities, which in turn may spur deforestation. For example, a complicated system of diverging rights to land and timber in Ghana creates incentives for farmers to log high-value trees on their farmland to prevent logging companies from invading the land, felling the trees and causing considerable damage to cocoa or other crops (Hansen and Treue 2008). National REDD+ policies should therefore rectify tenure systems that impede clear responsibilities toward land and natural resources.

However, the reform of tenure systems poses a formidable challenge for many developing countries. The root causes of this challenge are the general weakness of institutions, administrative capacity and legal systems paired with a complicated set of overlaying and contradicting (e.g., land cadastres) existing legal interests. Tenure reform is only as good as the institutions that implement and enforce it, and its legitimacy depends on the social and legal acceptance of the legislative process supporting that reform. A clear allocation of rights prevents dispute between competing stakeholders in the forest; the effectiveness of such allocation depends, however, on the social and legal recognition of these rights and their enforceability.

Recognition of rights. The allocation of forest resources and land needs to consider customary tenure systems. State-sanctioned tenure systems often reveal a bias toward allocating title to individuals or households that contradict a rural community's customary tenure systems. The dual nature of land tenure arrangements persists whether national policies explicitly recognise customary tenure systems, ignore them or actively work to dismantle them. Attempts to completely overturn customary tenure systems and replace them with formalised systems of purely individual property rights have rarely been effective, prompting a shift in approach from replacement to adaptation (Bruce 1998).

Enforceability. The feasibility of tenure reforms depends on the robustness of the underlying system of rights and the supporting legal system. In many REDD+ countries, the rule of law is weak, corruption rampant and the judiciary inefficient and partial.[1] Court rulings are further complicated by lack of registration and cadastral maps. Enforcing legal title through judicial means is therefore difficult.

For tenure reform to be a viable part of a national REDD+ strategy, it therefore has to establish clear title to forest resources so that users feel that their obligations for managing and maintaining the resources are matched by corresponding rights. Rules governing the use of forest resources have to be vetted through a participative process and reflect national and local realities. Taking into account the general weakness of legal systems in many REDD+ countries, tenure reform should as much as possible build on existing and recognised customary title and enforcement systems. It is also important to recognise the challenge that comes with tenure reform: it must support REDD+ to ensure long-term sustainability of reformed tenure systems, but in itself may not be the most obvious way to reduce emissions in the short term.

1 For the World Bank's governance indicators, see http://info.worldbank.org/governance/wgi/index.asp (1 November 2009).

Box 12.1. REDD+ as natural resource?

The reduction of emissions or increase of removals – or the forest carbon pool itself - is sometimes compared to natural resources, such as oil, gas or minerals. The experience in the natural resources sector suggests that governments should manage funds and ensure equitable and sustainable use of these funds to the benefit of the whole community. However, this comparison is not fully accurate. First, while natural resources are usually traded internationally at prices that guarantee healthy profit margins, the same is not yet clear for REDD+. For many countries it may take years to get ready to participate in a global carbon market and this is against the prospect that there is no guarantee of price, predictability or stability of the market. Second, natural resources are legally regulated and in almost all jurisdictions the state has a legal claim over such resources. The state can give out concessions to allow private actors to mine the resource, but often retains the overall control over the resource. In the case of REDD+, the targeted forest (the one under threat) – whether under government, community or private ownership – is a resource that is already used, divided and exploited. Payments will therefore primarily be needed to compensate for the loss of income and rights, rather than to contribute to public funds that can be used for the community benefit. Third, the service to be traded – emission reductions and removals against an agreed reference level – is much more elusive than a barrel of oil or an ounce of gold. Whether they come as carbon credits, emission rights, or allowances, tradable REDD+ benefits are always politically constructed commodities that confer an intangible rather than a tangible right.

The situation is slightly different when countries seek compensation for projected future emissions. Countries with high forest cover and low deforestation rates argue that their forest resources could be considered as a saving account which would be monetised at will, once investments are flowing, or the government opens up the resource for exploitation. These countries argue that REDD+ payments are needed to remove future (rather than actual) pressure from the forest and that funds are needed to ensure low-carbon development. In these cases, REDD+ carries little actual costs, payments are not required to compensate lost income and benefits by implementing REDD+ policies are not needed. In these cases, REDD+ payments indeed are more akin to natural resource payments which can be used for the benefit of the community at large.

However, two important lessons from the management of state-owned natural resources hold for REDD+. First, whenever the state is negotiating access to resources, multiple stakeholders wish to benefit from it, whether they have a right or not, and whether they bear the costs or not. Second, a REDD+ scheme can only work if it is supported by a large consensus in the population, not so much because of the sharing of benefits, but because of the sharing of costs associated with a new land use system which protects forest resources at the cost of short-term interests.

Although tenure reform is a condition for the sustainable success of REDD+, it is a long-term process which has to be supported by participative processes and consultations to ensure legitimacy and recognition of the allocation of rights. The process has to go hand in hand with measures that strengthen the judiciary to enhance trust in the legality of the system and the enforceability of rights. Governments and countries engaging in this process will have to allocate time and resources to this process, which has to become an integral part of the long-term vision of the country. As tenure reform takes a long time to be fully implemented, it cannot be a precondition for REDD+ implementation. Instead, it must be one of the policies that ensure the eventual sustainability of REDD+.

Allocation of carbon rights

The implementation of REDD+ at the national level involves more than just clarifying existing rights to resources; it also creates a set of new legal rights that relate to the reduction of GHG emissions and sequestration potential of a particular activity. Such 'carbon rights' describe the right to exploit the climate benefits of an activity, that is, its emission reduction or sequestration potential. Carbon rights are defined at different levels: through international law as in the flexible mechanisms of the Kyoto Protocol; through nationally binding legislation as in the European Union Emission Trading Scheme (EU ETS); or through private legal contracts as in the voluntary carbon market (Wemaere *et al.* 2009).

Carbon rights that may be defined in the context of an international REDD+ mechanism under international law, the UNFCCC or the Kyoto Protocol are assigned through treaty to the various state parties. Through legislation that transposes international legislation into national law, a government may decide to pass on and regulate ownership of carbon rights in the national context. The simple fact that a country participates in an international trading scheme, however, does not mean its government must create national carbon rights.

The Kyoto Protocol may serve as an example of a treaty that assigns carbon rights in the form of assigned amount units (AAUs) to parties and allows the creation of credits via the Clean Development Mechanism (CDM) and Joint Implementation (JI). While most industrial country parties to the Kyoto Protocol have authorised private entities to participate in CDM or JI projects, only New Zealand and Australia foresee the holding of AAUs by private actors. The countries of the European Union do not authorise private trade in AAUs, nor have they regulated ownership of forest carbon or allocated the right to removal units, the Kyoto unit for land use, land use change and forestry (LULUCF) emission reductions and enhancement in carbon stocks.

A country can receive incentives to increase storage of carbon in forest and agricultural systems in the form of tradable carbon, but it does not necessarily need to pass these rights (as tradable carbon rights) on to those that hold national entitlement over forest resources. If a country, however, decides to authorise private actors to participate in carbon trading, title over the currency of the trade – the carbon rights – needs to be established.

Although many REDD+ policies can be implemented without allocating carbon rights, the clarification of these rights is essential where governments authorise the implementation of carbon projects and the subnational generation, crediting and trading of carbon rights. Very few countries have adopted legislative definitions of carbon sequestration rights or integrated the concept of the CDM's Certified Emission Reductions (CER), Verified Emission Reductions (VER) or other carbon rights into national law. In the absence of a clear legislative framework defining principles of ownership for emission reductions, uncertainty exists as to how legal title to these rights can be securely established and transferred. To eliminate ambiguity, countries may also decide to adopt laws to allocate carbon rights. The allocation of carbon rights can go along with the setting of national and subnational reference levels. Another way to allocate entitlement to carbon is to design a national REDD+ scheme that sets regional-level or project-level reference levels, on which regional governments could base the allocation of carbon rights. Allocating rights to district administrations, projects or forest owners on the basis of subnational reference levels can therefore be a way to establish, quantify and clarify carbon rights, and to determine the potential size of any benefits the carbon rights holders will receive from a carbon credit scheme.

For developers of forest carbon projects, it is crucial to establish, as a first step, the legal entity or natural person authorised to explore the benefits associated with a particular activity. If carbon ownership is not regulated, there is a legal assumption that emission reductions and enhancement in stocks would be treated like any other economic benefit of a particular activity. The entity that has a right to the forest land is usually recognised as the owner of the primary carbon rights. Assuming that the right to the carbon follows the right to the land and to use the forest, carbon rights would rest with the government where the government controls both land and forests. Where local communities or indigenous people have a right, customary or codified, to use the forest, they would also hold rights to the forest carbon. The primary right to the forest carbon of private land and forest rests with the owner of that land.

Allocation of international REDD+ payments

National REDD+ efforts are likely to be supported by international incentive schemes. Such schemes foresee the rewarding of GHG reductions through

Box 12.2. REDD+ risks: Managing expectations

A number of international initiatives have emerged following the mandate included in the Bali Road Map for supporting REDD+ demonstration activities, over and above ongoing activities in the area of forest protection. Around 40 developing countries are now engaged in REDD+ strategy development and pilot activities.

REDD+ readiness is often initiated by the national forestry or environmental agencies, which, as a first step to build national consensus, have to get attention and elevate REDD+ to a Cabinet-level priority. For most countries, the implementation of REDD+ policies means a substantive shift in the way land and natural resources are managed and involves a new consensus for sustainable land use – a consensus that forest authorities cannot forge alone. Involving the relevant ministries and government agencies whose decisions affect land use decisions (agriculture, finance and infrastructure) is therefore a first priority in the readiness process.

While attention from line ministries may be hard to get, nongovernmental stakeholders in many REDD+ countries are well aware of REDD+ and associate the emerging mechanism with opportunity and threat in equal measure. However, knowledge of the emerging REDD+ mechanisms is often sketchy, based more on political fears than analysis backed up by facts. The perceived political risks often precede any consideration of what REDD+ means in the national context. The demands by international donors to hold extensive consultations as early as at the stage of preparing a REDD+ proposal do not necessarily help in rationalising the debate. Without a definition for an international REDD+ mechanism or national implementation measures, consultations tend to revolve around broader political issues, general injustices related to land tenure systems and the recognition of indigenous and other rights of local stakeholders, rather than on specific REDD+ actions.

Developing countries have shown extraordinary leadership in moving the REDD+ negotiations to their current position and in showing willingness to engage in REDD+ readiness long before adequate funds have been pledged to support these efforts. The engagement of all levels of society, from the treasury to forest dwellers tends to create expectations which, on the one hand, present national and international leaders with a unique opportunity to seize the moment and start implementing REDD+. On the other hand, the same engagement creates risks: If REDD+ funds are not forthcoming – or not fast enough – national leaders will have a hard time justifying to their constituencies their country's engagement in yet another mechanism that falls short of delivering real finance to support developing country action. It is the responsibility of politicians of countries that implement REDD+ and those that provide financial support alike to ensure that these expectations are managed.

market-based or fund-based solutions, possibly in a phased approach (see Chapter 2). Where entity-level trading is established, those that participate in emission reduction activities earn carbon credits, which they may sell on domestic or international carbon markets. The main proposals for the global REDD+ architecture are, however, for a national approach; that is, most international payments will eventually go to national governments, which will use them to support national REDD+ policies. Provisions regarding the domestic allocation of such REDD+ payments are often referred to as 'benefit-sharing' provisions.

An underlying idea of REDD+ is compensation for those that reduce forest emissions and increase removals; however, the strong focus on benefit sharing might disguise that REDD+ will primarily bring costs rather than benefits. When deciding appropriate REDD+ policies, governments will have to decide how to distribute the burden of reducing access to forest resources among groups and members of society. Governments may seek ways to limit the social, economic and political costs of REDD+ implementation by allocating the burden of REDD+ to actors that are able to bear them. Where REDD+ policies curtail and limit existing rights to forest resources, the government could compensate the loss of access. Such compensation can take the form of direct payments of opportunity costs, but it can also take the form of allocation of noncash benefits to the affected individual or community.

Moreover, REDD+ raises the question of who has the right to be compensated. There is general agreement that any government intervention that directly limits either a property right to land or a right that authorises tenancy and use of forest resources should be compensated to mitigate the negative effect of the measure. Things get more complicated if policy interventions have indirect negative effects, such as the reduction of land value by changing zoning laws or removing agricultural subsidies. While the decision regarding the need and degree of compensation will be answered in the light of the respective legal system, there are some generally accepted limitations to the right to be compensated. For example, limiting forest emissions by reducing illegal activities should probably not be compensated, but determining what constitutes an illegal activity is a political decision.

Whether REDD+ policies restrict access to forest resources to local communities or restrict the right to exploit forests to private landowners, those that suffer a loss will have to be integrated into REDD+ regimes. Where the government takes forest carbon under central management, private owners of the land and forests will have to be compensated for what the government takes. Where restriction in access leads to a loss of income or livelihood, development programmes will have to be set up to guarantee for local populations alternative sources of income, energy, food or shelter.

Where the government limits access to forest resources – in particular where such access builds on rights established by formal law, custom or tradition – compensation is mandated, whether by law in liberal systems that protect private property, or for social and equity reasons. In particular in countries where the relationship between the state and the nongovernmental sector (private sector, communities, individuals, civil society) is characterised by mistrust, fair compensation schemes are needed to create confidence among various actors, and generate valuable data and lessons learned. The discussion on benefit sharing should therefore be replaced by a debate on the design of appropriate incentive and compensation schemes that are essential to mobilise forest carbon emission reductions.

Outlook

The discussion on benefit sharing, expected revenues and the generation of carbon credits has generated a mixture of expectation and fears which constitute an increasing challenge for REDD+ implementation at the national level. Expectations of significant REDD+ benefits have led to covetousness at various levels of government and to concerns among local forest stakeholders that they could be left carrying REDD+ costs without sharing in REDD+ benefits (Box 12.2).

A variety of policy options are available to achieve REDD+, and they have different needs in terms of the right definition and allocation, for example of carbon rights. The clarification of forest tenure and carbon rights is essential for the sustainable success of REDD+. Recent literature on REDD+ further suggests that the clear allocation of carbon rights is equally a prerequisite for REDD+ actions, even though it does not itself ensure a reduction of deforestation (UN-REDD Programme 2009). The underlying assumption is that REDD+ implementation would consist of PES schemes that make forests economically competitive by paying those who reduce deforestation and degradation and enhance forest carbon stocks. Without clear title to land, trees and carbon, it is difficult to establish a PES or REDD+ payment system. While it is important to clarify carbon rights in entity-level carbon finance transactions, the implementation of many, if not most, REDD+ policies does not require establishing title to the forest carbon. Hiring additional forest rangers, removing subsidies for biofuels or reforming environmental impact laws for infrastructure projects may all make viable REDD+ policies. None of these interventions requires the clarification of carbon rights.

Furthermore, until reliable MRV systems are in place, it will be difficult to monitor, verify and reward GHG emissions reduction and removals at the level of the individual land or forest owner. Payments may therefore be linked to the adoption or omission of certain practices, or for payments for GHG emissions reductions at higher geographical scales rather than at individual levels. Activity-based subsidy and payment systems therefore do not require clarification of title to carbon rights.[2] The establishment and registration of forest carbon rights as part of a domestic emission trading scheme are required only where domestic or international emission trading schemes authorise the entity-level transfer of forest carbon rights, such as in the systems established in Australia and New Zealand. However, where a government claims international benefits for activities implemented by local, private actors on nonstate land, it would have to establish compensation schemes that allow those owners to participate in the international financing for REDD+.

The debate over appropriate benefit-sharing regimes stands in contrast to the notion of cost-efficient climate benefits associated with the low abatement costs for REDD+ (McKinsey *et al.* 2009). While the discussion of benefit sharing assumes REDD+ transfers above actual costs, traditional transfers for climate mitigation and adaptation traditionally limit the international contribution to the 'incremental' costs of a particular measure. Larger rents due to forest carbon can accrue only if the government overcompensates those bearing the costs of REDD+, which is unlikely, or if REDD+ carbon is being traded on international markets above opportunity costs. Taking into account that most market advocates see REDD+ as part of a global market of fungible carbon units, it is not unlikely that REDD+ units can be sold above costs. While this carbon market link may create a stable and predictable income, it creates a headache for those aiming to reduce the overall costs of climate change by achieving emission reductions at as close as possible to abatement costs (Project Catalyst 2009). Such large-scale international trading of carbon credits from REDD+ is most likely a few years away, and the details of how REDD+ is to be included are yet to be worked out. In the meantime, it is important to maintain realistic expectations about the benefits to be shared and not lose sight of the overall climate goal.

2 In Costa Rica, for example, PES systems can be implemented without clarifying who owns the forest carbon.

Chapter 13

Anti-corruption policies in the forest sector and REDD+

Luca Tacconi, Fiona Downs and Peter Larmour

- The design of anti-corruption policies should take into account whether a country has bad, fair or good governance conditions.
- Anti-corruption policies limited to the forest sector are unlikely to work in countries with high corruption levels, which require systemic institutional changes.
- REDD+ is likely to be affected by corruption, but REDD+ monitoring, verification and reporting mechanisms can also contribute to reducing corruption.

Introduction

Corruption is widespread in most countries that are expected to become eligible for reducing emissions from deforestation and degradation (REDD+) schemes. There are, therefore, concerns that unless corruption is controlled, it would be difficult for countries to implement REDD+ in an effective, efficient and equitable manner. How can the impacts of corruption on forests and on REDD+ be controlled?

Corruption and illegal forest activities (IFAs) are both governance problems. IFAs (commonly referred to as 'illegal logging') are a broader set of illegal activities than corruption, which is often listed as one of the illegal activities in the forest sector.[1] Several works have extensively considered the various policies that could be implemented to control IFAs (Tacconi *et al.* 2003; Colchester *et al.* 2006; Tacconi *et al.* 2007c), but they have paid relatively little attention to specific anti-corruption policies. The latter are, therefore, the focus of this chapter.

There are several international conventions on corruption, but there is no single definition of the term (Larmour 2007). The definition *misuse of public office for personal gain* is widely accepted, but it excludes the private sector and NGOs. Due to space limitations, in this paper we mostly focus on the bribery of public officials. As regards the value of the sums exchanged, corruption may involve large sums (*grand corruption*), or relatively small amounts (*petty corruption*). Transparency International distinguishes between corruption *against the rule* and *according to the rule*. Against the rule corruption involves receiving bribes to perform functions against the law, or to refrain from performing actions established by the law.

This chapter presents an indicative listing of the possible impacts of corruption on forests and REDD+, and a preliminary identification of anti-corruption policies. Research on the impacts of corruption on the forest sector is in its infancy. We therefore lack information on the amount of greenhouse gas emissions (GHG) from deforestation and forest degradation attributable to corruption. The impacts of corruption may be positive or negative, depending on how a landowner or forest enterprise reacts to the demand for a bribe (e.g., by over-harvesting to recoup the additional costs or by restraining from such investment). This information is needed to provide firm recommendations on anti-corruption policies and their prioritisation in a country.

Corruption in the forest sector and in REDD+

The impact of corruption on deforestation may start with the design and implementation of land use plans. Land use plans classify forests for various uses, such as conservation, production and conversion to other uses. The land use allocation process should take account of ecological criteria to identify areas that are significant for conserving biodiversity (i.e., allocation to conservation class) or where soils are not suitable for conversion to other uses (i.e., allocation to production forest). Damania *et al.* (2003) show that corruption weakens

1 See Tacconi (2007a) for a definition of IFAs. Governance is a broader concept that refers to how government and non-government actors coordinate their needs and interests, how decisions are made, who is responsible for them, how they wield power, and how they are held accountable (e.g., UNDP *et al.* 2003). The World Bank's six indicators of governance are: 1) voice and accountability; 2) political instability and violence; 3) government effectiveness; 4) regulatory burden; 5) rule of law; and 6) control of corruption (Kaufmann *et al.* 2006).

environmental regulation under certain circumstances. This suggests that corruption could lead to deforestation by undermining the land use allocation process and the enforcement of land use plans. Overlaps between production and conservation uses have been documented (e.g., Wells *et al.* 1999), but there is a lack of knowledge as to whether this was due to corrupt behaviour or other causes – for example, poor coordination of activities between government officials. If land is put to unsuitable use as a result of corruption, then corruption is a cause of the emissions associated with the change of land use. However, corruption is not a cause of deforestation when it affects the allocation of, for example, agricultural concessions (to one company instead of another) in areas that have been allocated to conversion through due process. Grand corruption is likely to influence land use planning because decisions are made at high levels of government and large sums of money (or political support) are required to manipulate the people involved. Petty corruption is likely to occur when local officials allow illegal encroachment on forest areas.

Corruption can result in forest degradation in a number of ways. First, logging operators bribe forestry officials to allow them to harvest timber without a legal permit (Smith *et al.* 2003a). This also makes legal logging less competitive. Second, bribes may be paid to officials to allow the transport of illegally logged timber (Southgate *et al.* 2000). While this type of corruption takes place after the degradation of the forest, it contributes to degradation because if loggers could not transport the logs they would not harvest them. Third, logging operators bribe local officials to obtain logging permits that are not recognised by the forestry regulatory framework (Casson and Obidzinski 2007) or that are really for other purposes (REM 2006). Fourth, logging concessionaires pay bribes so that over-harvesting on their concessions, or harvesting outside the boundaries of their concessions are not monitored (Barnett 1990; Friends of the Earth 2009). Fifth, bribes contribute to degradation by increasing logging costs, thus leading loggers to over-harvest their concessions to recoup the costs of bribes (Richards *et al.* 2003).

Corruption can also affect deforestation and degradation indirectly. First, corruption can have an effect by directing agricultural subsidies. Subsidies influence land use and decrease the efficiency with which land is used (Bulte *et al.* 2007). Bulte and colleagues show that large-scale farmers make political contributions and give outright bribes to politicians in exchange for subsidies. These farmers deliberately use land inefficiently so that it attracts subsidies. The empirical evidence from Latin America shows that governments perceived to be more corrupt increased subsidies to large farmers. These subsidies reduced agricultural productivity which, the authors argue, resulted in higher rates of deforestation. Second, corruption is thought to have negative impacts on long-term economic development, because it limits private investment (Mauro

1995).[2] In this scenario, corruption protects forests by limiting investment in agricultural land (Gupta and Siebert 2004), at least in the short term, but it could also slow down forest transition, which eventually might stabilise and increase forest cover.

Several reports and papers have highlighted cases of corruption in the forest sector (e.g., Contreras-Hermosilla 2000; Le Billon 2000; Smith *et al.* 2003a). However, there is considerable lack of knowledge about the actual extent of deforestation and forest degradation that might be directly or indirectly attributed to corruption. For instance, a statistically significant correlation between perceived corruption and the management of natural forest was not found for Africa (Smith *et al.* 2003b). However, a global, multi-country econometric study found that a 1% reduction in perceived corruption may be associated with a lower deforestation rate of between 0.17 and 0.30% (Barbier *et al.* 2005). The problems associated with corruption data, including whether corruption is perceived or experienced (Treisman 2007), and cross-country analyses of deforestation (Scrieciu 2007) imply that studies, such as those noted above, will need to be assessed for their sensitivity to the data, specific model and regression methods used, as well as assumption of causality. In relation to degradation, the apparent large extent of illegal logging in some countries is often taken as an indication of the impact of corruption (e.g., Kolstad and Søreide 2009). While the connection is possible, it has been shown that in some countries the supposedly high rates of illegal commercial logging are either: 1) not supported by the evidence – such as in Cameroon (Cerutti and Tacconi 2008); or 2) are due to government policies that support the industrial use of forests, such as in Indonesia (Tacconi 2007b).

Corruption will affect the implementation of REDD+. *Grand corruption* could lead to a weakening of support for REDD+ at the national level, or to the official promotion of fraudulent REDD+ schemes (e.g., Grindneff 2009). To weaken support for REDD+, large agricultural or timber conglomerates, with an interest in continuing in their current activities, could bribe national politicians and high-level bureaucrats to undermine the establishment of a national REDD+ mechanism. The same conglomerates could bribe sub-national government politicians and bureaucrats to induce local governments to opt out of implementing REDD+ in their area (if this is allowed by the national-level REDD+ architecture), or to weaken local REDD+ policies. *Petty corruption* could affect verification and reporting mechanisms, if project implementation activities are part of the REDD+ architecture. Project implementers would have an interest in overstating avoided emissions and in understating problems with the permanence of the carbon stocks for which they had received credits. Corruption could also affect the administration of the revenues generated

2 Whether and how corruption reduces investment and growth is still debated in the literature (Rock and Bonnett 2004; Méndez and Sepúlveda 2006).

by the sale of REDD+ credits, in the same way that corruption affected the administration of the Reforestation Fund in Indonesia (Box 13.1). *Grand corruption* could be involved if large sums were secretly given to politicians and top senior bureaucrats. *Petty corruption* could lead to a leakage of funds for environmental service schemes aimed at benefiting local communities. If this form of corruption is widespread, it could result in significant misallocation of funds and undermine the effectiveness of the schemes they are designed to support.

Anti-corruption policies

Two significant areas of uncertainty affect the design of anti-corruption policies. First, there is an ongoing debate (Sachs 2005; Kaufmann *et al.* 2006) about whether policies directed at improving governance should be prioritised to stimulate economic development, or whether development should be supported regardless of governance because the latter improves with development. Second, the inflection point of the forest transition curve is uncertain as regards both the extent of forest cover remaining and the level of economic development at which it would occur (Culas 2007). Australia, for example, has a very low corruption index, but deforestation has continued even at an advanced stage of development (FAO 2006). Controlling corruption does not necessarily lead to lower deforestation rates, but can rather be seen as a way to make REDD+ policies more effective, efficient and equitable.

The first step in developing anti-corruption policies is to assess whether, and to what extent, corruption causes deforestation and forest degradation. This step is necessary because the presence of corruption does not necessarily imply that REDD+ will be unsuccessful. Efforts to reduce carbon emissions have already generated a 'carbon conservation industry' that seeks to profit from generating REDD+ credits. The profit motive driving the carbon conservation industry is no different from that of other industries that have managed to develop and prosper in business environments which involve corruption, such as palm oil and soya production.

If corruption is shown to affect the forest sector, the drivers behind corrupt behaviour will have to be assessed to decide how they can be used and controlled to maximise the effectiveness of anti-corruption policies supporting the successful national implementation of REDD+. Corruption is a deliberate, rational action. For corruption to take place, the benefits from giving and receiving bribes need to be higher than the possible costs, such as loss of income and business following conviction. The costs may be less than the benefits if the anticipated benefits from corruption are large (such as significant extra profit for companies and significant extra income for public servants), penalties are low, and/or the likelihood of being discovered and

Box 13.1. Governance of forestry revenues in Indonesia

The Reforestation Fund (*Dana Reboisasi* or DR) is financed by a volume-based levy on timber. The DR is a multi-billion dollar national fund with a mandate to support reforestation and the rehabilitation of degraded land and forests. Its experience is relevant to tropical forest countries which may implement REDD+ through a national forest fund.

Commissioned by the Government, Ernst & Young conducted a financial audit of the DR in 1999. The audit documented systematic financial mismanagement, fraudulent practices by recipients of DR subsidies, and routine diversion of funds for uses that were not consistent with the DR mandate. Losses of US $5.2 billion in public funds were documented for the 5 financial years between 1993 and 1998, approximately half of which were lost after the revenues entered the Ministry of Forestry's accounts.

Since the fall of the Soeharto regime in 1998, the Government of Indonesia has taken significant steps to improve state management and governance of financial assets. These have improved accountability in DR administration. The incorporation of the DR into the State Treasury has been an important step in the creation of a Single Treasury Account, and has meant that DR receipts and expenditures are now consolidated into the state budget. Similarly, the strengthening of the Supreme Audit Board as the sole external auditor resulted in at least 29 audits related to the DR between 2004 and 2008, all of which are publicly available on the Internet. Anti-corruption initiatives, including the creation of an independent Corruption Eradication Commission and Corruption Court, have resulted in a few high-profile prosecutions of DR-related corruption. In spite of these improvements during the post-Soeharto period, the Ministry of Forestry has been unable to recover approximately US $65 million of the DR-related debt still outstanding.

Since 2007, the Ministry of Finance has transferred DR funds earmarked for the national government to a new financial intermediary, over which the Ministry of Forestry exercises far-reaching control. This new financial intermediary is the Forest Development Funding Agency Public Service Unit (known by its Indonesian acronym BLU-BPPH). Over the next few years, the BLU-BPPH is expected to allocate some US $2.2 billion in DR funds to forest enterprises and rural communities for developing commercial plantations. Authorised to manage DR revenues as a 'revolving fund', the BLU-BPPH appears to be designed to leverage potentially substantial amounts of co-financing for investments in Indonesia's forestry sector from private sector banks, and from bilateral and multilateral lenders. However, the BLU-BPPH's bylaws raise potential concerns about how the DR funds (and any additional funds leveraged) will be administered, as they explicitly allow the BLU-BPPH to exercise a high level of 'flexibility' in financial management and to circumvent general administrative practices for public finance.

Source: Barr *et al*. (in press)

convicted are low. Attention needs to be given, therefore, to both the benefits and costs for the bribe givers and takers (Becker 1968).

Some of the changes required to control corruption need to take place throughout society and are therefore beyond the scope of REDD+ implementation. These include changes to how political parties are financed, regulating lobbying, judicial reform, the establishment of anti-corruption commissions and freer media (Office of the Co-ordinator for Economic and Environmental Activities no date). Anti-corruption policies need to be tailored to the specific conditions in each individual country (Shah 2006) (Table 13.1). This has two implications. First, it is not possible to prioritise anti-corruption policies and assess how effective they are likely to be, as this will depend on country-specific factors. Second, the most corrupt countries are usually in the initial stages of development and in the initial stage of forest transition, for example, Cambodia, the Democratic Republic of the Congo and Myanmar. In such countries, introducing anti-corruption policies in the forest sector only is likely to have limited success, as exemplified in Cameroon (Box 13.2). This means that policies that can be implemented by the parts of government that are closely associated with REDD+ (considered below) are more likely to be effective in countries with medium to low corruption, such as Indonesia, Mexico and Zambia. Before considering these policies, however, it is useful to note that decentralisation has a direct effect on the forest sector (see Chapter 14). Indirectly, decentralisation can increase the level of corruption (Smith *et al.* 2003a; Fan *et al.* 2009). Decentralisation initiatives will, therefore, need to take into account the implications for corruption and forests.

Table 13.1. Priorities for anti-corruption programmes

Incidence of corruption	Governance quality	Priorities for anti-corruption programmes, based on drivers of corruption
High	Poor	Establish rule of law; strengthen institutions for participation and accountability; limit government interventions to core mandate.
Medium	Fair	Decentralise and reform economic policy; introduce results-oriented management and evaluation; introduce incentives for competitive public service delivery.
Low	Good	Establish explicit anti-corruption programmes, such as anti-corruption agencies; strengthen financial management; raise public and officials awareness; introduce no bribery pledges, fry big fish, etc.

Source: Huther and Shah (2000)

Box 13.2. Improving transparency in the allocation of logging concessions in Cameroon

Paolo Omar Cerutti

In 1994, Cameroon passed a new forest law that introduced public auctions for logging concessions. International donors pushed for an auction system based on transparent financial and technical selection criteria. The new system replaced the old system of discretionary attributions, which encouraged corrupt practices to access timber. Lack of a strong domestic commitment to the new system meant that in 1996 and 1997 the auctions were marred by irregularities and discretionary attributions. Logging titles were not awarded to the most technically competent companies nor to the highest bidders (Collomb and Bikie 2001; Cerutti *et al*. 2008).

In 2000, the Cameroon government accepted World Bank demands for an independent observer on the Inter-Ministerial Committee which oversaw the allocation of concessions. Six auctions have taken place since then, and by 2006 all 101 concessions available were contracted.

The auction system has had some positive effects. The fees that logging companies pay to acquire logging rights have gone up, directly raising state revenues. Although the link between higher bids and less corruption is not easy to establish (as competition might also have increased bribes), the system probably allowed more professional logging companies from abroad to break old-established vested interests and penetrate the Cameroon forestry sector. This may have had the side effect of improving management practices.

On the negative side, the auction system and the presence of an independent observer have not been a guarantee against corrupt practices. Between 2000 and 2005, the observer reported numerous doubtful practices that threatened genuine competition and confidentiality. There is little evidence that any of these issues were seriously taken into account or that bidding practices were modified. In 2006, when all available concessions were already allocated, it was once more an external actor – the World Bank – that requested the government to investigate weaknesses and improve the auction system.

There are many options for improving the auction system, such as appointing a government body to act upon and implement the observer's recommendations and concerns (Cerutti *et al*. 2008). However, for any reform to succeed there needs to be recognition by the Cameroon government that reforms are needed and could bring positive impacts for Cameroon and its people.

Increasing accountability and transparency (which supports accountability) raises the likelihood of uncovering corrupt behaviour, thus reducing the net benefits derived by those involved. Bolivia provides an example of structural reforms aimed at increased accountability and transparency (Box 13.3). The impact on corruption of an increase in transparency depends on various factors, such as the capacity of the recipients of information to process it (e.g., their education) and their ability to act on the information (e.g., capacity to hold those in power to account) (Kolstad and Wiig 2009). Accountability and transparency in land use planning, to minimise *grand corruption*, can be improved by increasing ministerial oversight, allowing stakeholders to participate in planning processes, and making land use plans and resource inventories widely available (Transparency International 2002). A clear and, if possible, simplified forest regulatory framework that reduces the subjectivity of bureaucratic decision making (FAO 2001; Kishor and Damania 2007) contributes to accountability and transparency (Magrath *et al.* 2007). Auctions can increase transparency in allocating logging concessions and reduce rents, thus further reducing the incentive to bribe (Contreras-Hermosilla and Vargas Rios 2002; Gray 2002). If auctions specified technical criteria that concessionaires must meet, the more technically competent would win concessions, thus reducing the risk of forest degradation.

A reduction in rents in the forest sector can also be achieved by reforming national forestry taxation systems which have allowed companies to make excessive profits (Repetto and Gillis 1988; Contreras-Hermosilla 1997; WRI 2000), although it seems that this is no longer the case in African countries (Karsenty personal communication). Reducing profits to an unrealistic level could mean that the more reputable companies leave the sector (Contreras-Hermosilla and Vargas Rios 2002). The impacts of changes in forestry taxation systems on forestry management are difficult to predict and depend largely on local conditions and production parameters (Karsenty in press).

Reducing excessive rents derived from land uses that replace forests, such as oil palm plantations, is also fundamental in reducing the influence of corruption on deforestation. Excessive rents imply significant potential benefits from corruption aimed at changing the land use allocation of forests. These rents can be reduced by appropriate taxation and a cut in subsidies to agroindustries that cause deforestation.

Box 13.3. Forest governance reforms in Bolivia

In 1996, following broad structural reform in Bolivia over the previous two decades, the government passed Forest Law 1700, which introduced sweeping changes to the regulatory framework of forest management. Many of these changes were designed to minimise political interference and the use of public office for private purposes, as well as corruption and forest crime. The implementation of the reforms has had some problems, but corruption appears to be less than before.

The head of the forestry agency, the *Superintendencia Forestal*, is selected from a list of three names provided to the President by a two-thirds senate majority. The Superintendent's assignment lasts for 6 years, thus straddling the 4-year presidential term, and may only be removed by the Supreme Court through due process. Financing for the Superintendent is independent from the National Treasury.

To make decisions more transparent, the Superintendent holds annual public hearings to report to the public on the agency's progress. The Superintendent is empowered to consult with stakeholder groups, thus limiting the exclusive influence of bureaucrats and ensuring that decisions are open to participation and public scrutiny. An independent international third party controls the transit of wood, although the government carries out parallel verification.

Previously, volume-based charges encouraged private sector operators to gain control over as much forest land as possible. This resulted in the politically influential gaining the upper hand and concentration of operations. Now, the adoption of a uniform area charge (US $1 per hectare of concession) has reduced the discretionary power in awarding concessions. The public forest administration, previously dominated by vested interests and whose decisions were shaped by short-term political considerations, was reformed. Logging concessions are now awarded through international, public processes. Licences are awarded for a 40-year period, subject to favourable 5-year audits. The responsibilities for field operations were transferred to private firms.

Management plans that follow government guidelines are now prepared by independent forest professionals. These professionals are also held legally responsible for the implementation of the plans and they are independent of the concessionaires. The Forestry Law also provides specific controls regarding the examination of these planning documents and the use of independent inspection agents. Random inspections, of forests, at roadsides, or of stockyards and sawmills, are required to ensure compliance. Routine 5-year audits are required to prove that the plans are being implemented.

Sources: FAO (2001, 2005); Contreras-Hermosilla and Vargas Rios (2002)

Conclusion

Corruption needs to be taken into account in developing REDD+ policies and measures.

First, the larger the share of REDD+ revenues controlled by government officials the greater the incentive will be for corrupt behaviour. Therefore, assigning the rights to REDD+ credits to individuals, communities and companies may reduce the incentives for corrupt behaviour in the public sector. This could, however, simply displace corruption from the public sector to the private sector – to lawyers, auditors and surveyors, for example. Similarly, NGO employees could use their positions for their own benefit. Appropriate mechanisms for accountability and transparency of payments would, therefore, still be required, and they would need to cover non-government as well as government stakeholders involved in REDD+.

Second, if REDD+ revenues are channelled through the government system, appropriate financial oversight will be required to avoid a leakage of funds (see Box 13.1). Assessing the risk of leakage could inform the development of appropriate management systems for REDD+ funds, which could take the form, for example, of trust funds similar to those used for biodiversity conservation (see Chapter 8 in this book).

Third, the concept underpinning REDD+ is that it should offset the opportunity costs of alternative land uses. The design of a national REDD+ architecture should ensure that those who lose from not practising alternative land uses receive sufficient compensation for their potential losses. Otherwise, they would have an incentive to bribe officials to give them the right to carry out alternative land uses. On the other hand, if they stand to benefit from REDD+ more than from the alternatives, they may be tempted to bribe to be given the right to implement REDD+.

Finally, REDD+ could help reduce corruption. Ministries of economy are not usually involved in forest sector management. For example, in Indonesia, the Ministry of Trade has responsibilities for pulp and paper production, but the rest of the forest sector comes under the Ministry of Forestry. More involvement by ministries of economy can be expected to lead to greater scrutiny (i.e., more accountability), thus encouraging more and better reporting on the performance of the forest sector (i.e., more transparency). Introducing monitoring, verification and reporting mechanisms would contribute to better transparency, which would support accountability.

In conclusion, corruption can be expected to pose a significant risk to the implementation of REDD+ in highly corrupt countries. In those countries, sector-specific anti-corruption policies are less likely to be effective. In less corrupt countries, sectoral anti-corruption policies are more likely to be successful and can have synergies with REDD+ monitoring, verification and reporting mechanisms.

Chapter 14

Lessons from forestry decentralisation

Anne M. Larson and Jesse C. Ribot

- REDD+ is more likely to be just and locally legitimate if the design, implementation and allocation of benefits represent local needs and aspirations.
- Decentralisation of meaningful decisions to locally accountable and responsive (e.g., representative) local authorities would promote local engagement in REDD+ decision making.
- The level at which rules are made and benefits distributed will be a key issue in the legitimacy, effectiveness, efficiency and equity of REDD+.

Introduction

Decentralised decision making is critical for three aspects of reducing emissions from deforestation and forest degradation (REDD+) schemes:

1. overall design process,
2. protection of local people from exploitation and abuse, and
3. decision making on implementation and benefit allocation.

Decentralisation is a way of establishing local representation, an institutionalised mechanism for promoting local voices and engagement in decision making. This chapter explores the role of decentralised decision making in establishing representation in the design and implementation of REDD+.

What can we learn from experiences in decentralisation in the forestry sector that will help in the design of policies for REDD+? Decentralisation typically refers to a transfer of powers from central authorities to lower levels in the political, administrative and territorial government hierarchy (Mawhood 1983). This chapter refers primarily to democratic decentralisation, where the emphasis is on citizen participation through empowered, representative local government. Devolution policies that transfer powers from the state to non-state bodies (such as stakeholder groups or NGOs) can also facilitate the participation of individuals or communities in REDD+, for example, through community forestry (see Chapter 16).

REDD+ will intervene at multiple scales. But, if global carbon markets and the vagaries of Wall Street become more important than local needs, there is a risk that REDD+ will recentralise forestry and land-use decision making. How will REDD+ shape local participation in decision making? What kinds of institutions will best ensure that REDD+ interventions operate for and with the support of forest communities? Establishing representative and accountable authorities with meaningful decision making powers is an enormous challenge. Central governments often fail to implement democratic decentralisation. Local governments often find it difficult to take on new responsibilities that come without extra budgets. Local elites may usurp decisions and benefits. But REDD+ could help to overcome these problems in decentralisation. REDD+ provides two new points of leverage – a way to address multiscale drivers of deforestation, and a financial mechanism to attack those drivers by shifting economic incentives. Decentralisation of REDD+ could empower representative local decision making bodies to address the drivers of deforestation and provide them with the means to do so.

Lessons learned

One of the most important findings in the literature on decentralisation of forest management is that democratic decentralisation, even where legislated, is rarely implemented well. Decentralisation either transfers too little power (decision making authority and resources) to be meaningful, or transfers these powers to local authorities that are not representative (Ribot 2004; Ribot and Oyono 2006; Larson and Ribot 2007; Tacconi 2007a; Larson and Soto 2008; cf. Wittayapak and Vandergeest 2009). While there is progress, there is also retrenching (Ribot 2004; Ribot *et al.* 2006; Larson and Ribot 2007). Policies that reversed decentralisation in Indonesia have resulted in forest fragmentation, with important implications for REDD+ (see Box 14.1). Decentralisation, and devolution, within the REDD+ framework risk duplicating these failures. REDD+ could set up an inclusive and empowering policy that turns out not to be inclusive or empowering in practice.

What are the constraints for implementing an inclusive and empowering REDD+ policy? Rather than promoting representation, the aims of decentralisation in forestry are often to reduce costs (Colfer 2005), boost forestry department revenues (Pacheco 2003) or even gain more control over local communities (Becker 2001; Contreras 2003; Sarin *et al.* 2003; Elías and Wittman 2005). State forestry personnel are reluctant to relinquish power and resources, and often find ways to retain these even when discourse and policies direct otherwise (Larson and Ribot 2005; Ribot and Oyono 2005; Ribot *et al.* 2006; Pulhin *et al.* in press). Some observers suggest that it is unlikely that democratic decentralisation could ever be fully implemented (Tacconi 2007a) and that more attention needs to be paid to the political incentives that would make a closer approximation more likely (Larson and Soto 2008; cf. Wittayapak and Vandergeest 2009).

The commitment of international REDD+ partners and central governments to decentralisation, together with training, will be needed if decentralisation is to be designed, implemented and monitored so as to be effective. A political incentive is demand 'from below' (Larson 2005b). Local governments are more likely to be given power by state forest agencies if they insist and, likewise, they are more likely to be accountable if local citizens have not only the right but also the capacity to hold them to account. Decentralisation legislation provides an infrastructure to support such demands and to set out clear channels of recourse if representatives are not accountable or transparent. Civic education can help local citizens articulate their concerns (Ribot 2003).

With regard to outcomes, there is no established correlation between policies that have been implemented in the name of decentralisation (or devolution) and better forest management or improved livelihoods. Many variables affect outcomes (Agrawal 2001; Dachang and Edmunds 2003; Djogo and Syaf 2003; Namara and Nsabagasani 2003; Gebremedhin *et al.* 2003; Ribot 2004; Andersson and Gibson 2004, 2007; Larson 2005a; Jagger *et al.* 2005; Resosudarmo 2005; Colchester 2006; Wollenberg *et al.* 2006; Palmer and Engel 2007; Tacconi 2007a; Moeliono *et al.* 2008; Jagger 2009; see also Larson and Soto 2008 and Ribot 2009 for reviews). Box 14.2 discusses the limited livelihood and detrimental sustainability outcomes of forestry decentralisation in Uganda and the implications for REDD+. Some partly implemented forestry decentralisation schemes have, however, been responsible for better

Box 14.1. Decentralisation, recentralisation and devolution in Indonesia

Moira Moeliono

Almost a decade into Indonesia's extensive forestry decentralisation, good forest governance remains elusive. The underlying struggle for control of and access to forest resources remains unresolved. The national government is trying to regain control of the sector, and, at the same time, conflict is escalating with the introduction of carbon values and REDD+ schemes.

In a move toward recentralisation, Law 32/2004 severely curtailed the 'all inclusive' authority of districts. Provinces regained responsibility for supervision and monitoring, and authority for specific sectors was recentralised. In the forestry sector, for example, Technical Implementation Units which account to and are funded directly by the Ministry of Forestry (MOF) are now responsible for many functions. The law provides for forests to be managed as Forest Management Units where district governments have only technical responsibilities while decisions regarding design and establishment are made at higher levels. Despite what is laid down by law, many districts still lay claim to control of forests and REDD+ is likely to sharpen this conflict.

In general, however, even limited district autonomy seems to be profitable for local government. Central government is creating more and more districts and providing most of their budgets. This political and territorial fragmentation, however, is likely to have a significant effect on the way forest resources will be managed and how benefits will be shared under schemes such as REDD+. Some forest-rich districts have chosen to join the voluntary carbon market and have contacted brokers while others, foreseeing little benefit from REDD+, are trying to convert forest land to other uses for 'development' purposes.

Meanwhile, the MOF is experimenting with social forestry and community forestry programmes and, to some degree, reform of forest tenure. The law allows local people – individually or through cooperatives – to request different types of permits for varying degrees of access, e.g., for harvesting non-timber products, providing forest environmental services or tourism. A new community forestry scheme gives long-term (35-year) leases to villagers – usually in forests where, *de facto*, the community has taken control. The village forest concept, whereby a forest area is managed by the village for the benefit of the villagers, is also being revived as a strategy for empowering local people and improving access to forest resources. The people's plantation forest is another new initiative that gives individuals or cooperatives the right to use the timber planted for up to 60 years. This 'devolution process' however, only covers use and access rights, not decision making or ownership and, so far, has not addressed how local people can be involved in REDD+.

management and more equity (Ribot 2004). Three main factors appear to shape outcomes: the political environment, legal bounds and incentives for forest use.

The political environment is the way in which local governments are embedded in and supported by the government hierarchy, and how local governments relate to local populations (Chhatre 2007). For decentralisation to work in forestry, the responsibilities transferred to local authorities must be matched by funds or benefits (Wily no date; Larson 2002; Ribot 2002, 2004; Larson and Ribot 2005). Local governments need ongoing support and training from strong central government (Larson 2003). Multiple measures are needed to make local decision makers accountable to citizens (see Ostrom 1990; Conyers 2001; Ribot 2001; Shackleton and Campbell 2001; Wollenberg *et al.* 2001; Larson 2003; Wittayapak and Vandergeest 2009). Local elites are more likely to capture benefits in regions where power relations are highly skewed, for example, along conflictive agricultural frontiers in some parts of Amazonia; marginalised groups may be further excluded if decisions are made locally without national protection (Toni 2006b).

Legal bounds determine what can and cannot be done with forests and place boundaries on local discretion. Some rules are always set at national level, such as minimum standards for sound forest use (Ribot 2004). These rules should be minimised so as to maximise the decisions that can be made locally. Rules also include measures to redress the exclusion of indigenous populations, women or the poor, protect tenure rights and ensure human rights are respected. When designing decentralisation, inequalities must be taken into account and equity standards must actively counterbalance inequities – a neutral stance simply prolongs inequality (Bandiaky 2008; Dahal *et al.* in press). Well designed and enforced minimum standards permit greater local discretion and hence allow local leaders to make decisions that reflect the wishes of their people.

Incentives for forest use are influenced (to some degree) by legal bounds or rules, the likelihood and consequences of enforcement, and economic opportunities. They are also shaped by markets. Devolving decisions without changing incentives is unlikely to decrease deforestation (Larson 2002). REDD+, by providing economic incentives, has an advantage over forestry decentralisation policies to date: REDD+ could change the economics of maintaining forests. However, economic incentives alone are not enough for REDD+ success. REDD+ incentives and opportunities could make the rich richer rather than reducing deforestation or improving the lives of the poor.

Box 14.2. Forest sector reform in Uganda: Implications for REDD+

Pamela Jagger

Uganda underwent a major forest sector reform in 2003, as part of a government-wide decentralisation programme to reduce the cost of government services and bring government closer to the people. The specific objectives of the forest sector reform included: addressing high rates of deforestation and degradation; increasing the role of forests in improving rural livelihoods; and engaging a larger number of rural households in forest product markets. The centralised Forestry Service was abolished and two new organisations were created: the District Forestry Service (DFS) oversees forests on private land (70%) and the National Forestry Authority, a for-profit parastatal, oversees forests gazetted as reserves (15%). Each of Uganda's 79 districts is expected to have at least a District Forestry Officer and additional forestry staff where forests are more important.

Nevertheless, districts are generally understaffed and have limited resources, for example, not enough vehicles or inputs to help farmers who want to plant trees. Given the pressure to earn revenues for local governments, the DFS primarily focuses on collecting taxes on timber and charcoal transported to major domestic markets.

The effect of the reform on rural livelihoods has been limited. An analysis of 180 households living near private forests in western Uganda found that the contribution of forests to household incomes declined slightly 4 years after implementation of the reform. Forest income increased for relatively wealthy households, whereas forest fragmentation impeded access to forest products for poor households. Fuel wood, wild fruits, vines and poles traditionally harvested by poor households from forests are now more frequently collected from fallow and bush land. In contrast, wealthier households can afford to maintain forest areas, and have the financial and social capital to deal in higher-value product markets, specifically for sawn wood.

Changes in the indicators of forest sustainability were striking. Households perceived a major deterioration in both forest cover and quality since the reform. Logging and clearing forest for agriculture are the major drivers of deforestation and degradation; forest sector decentralisation failed to address the incentives underlying these drivers. Agricultural commodity prices are high, increasing the opportunity cost of maintaining land under forest, and households establish property rights by clearing and cultivating land. Most logging is illegal, but continues unsanctioned because the DFS does not have the capacity or the incentive to monitor and enforce rules.

Uganda's experience with forest sector decentralisation has implications for REDD+. Efficiency and effectiveness will be determined largely by changes in incentives at the forest gate. Decentralised authorities charged with monitoring and enforcing rules to reduce deforestation and degradation must have enough resources to be effective. These include vehicles, technical knowledge and access to inputs, as well as appropriate salaries and recognition. From the equity point of view, project proponents, donors and other vested interests should be aware of the potential impact of REDD+ projects on poor households, and should make an effort to understand project outcomes not only in aggregate, but also as they affect different wealth categories.

Sources: Jagger (2008, 2009)

Options for REDD+

A decentralised REDD+ process could represent local needs and aspirations at all scales. But how this plays out in practice will depend on how participation in REDD+ is designed and implemented, and how decisions are made about allocating benefits. There is an enormous amount of room for exploitation and abuse of poor and marginal forest-based populations. Hence decentralised REDD+ decision making must have multiple checks and balances that include guarantees for democratic process, basic human rights, and procedural and distributional equity. Checks and balances must also include appeal processes that enable local women, minorities and whole communities to make abuses visible nationally and internationally.

Decentralisation of a national REDD+ infrastructure must consider *what* can or should be decentralised, and *to whom*. Determining *what* can be decentralised requires the development of principles and guidelines for forestry subsidiarity (see Ribot 2004, 2008). We consider two important options: rules for forest use and distribution of benefits. *Who* should have decentralised powers should be based on guidelines for choosing appropriate institutions (see Ribot 2003, 2008; Ribot *et al.* 2008).

With regard to forest use regulations, decentralisation would establish nested rules, under the umbrella of minimum national standards. Broad national standards to protect valued forest attributes would support decentralised flexibility (see Ribot 2004). More detailed standards could then be designed at the regional level and, in turn, appropriate rules and standards could be developed locally.

Decisions regarding REDD+ funds – who receives them and how they are spent – can be similarly distributed. The central government could make payments to subnational entities, for example, by establishing a system for states, provinces, municipalities or other entities to be paid based on their REDD+ efforts (Brown *et al.* 2008). Guidelines for the use of funds could be designed in the same way as forest use rules, through a nested approach, under the umbrella of national standards for equity.

Under previous decentralisation or devolution policies, many kinds of local authorities have been given powers: elected local governments, local forestry offices, traditional authorities, committees established for the purpose, forest user groups and NGOs, among others. REDD+ architects must choose between centralised and decentralised approaches, and among local actors. Each option has tradeoffs, which will be considered in the following section.

Analysis of centralised and decentralised options

Table 14.1 summarises the pros and cons of centralised and decentralised scenarios for effectiveness, efficiency and equity. Due to lack of space, the table and discussion primarily consider the option of setting rules and making decisions about compensation at the *same* scale. Each potential level of decision making is considered in turn with regard to effectiveness and efficiency, and equity is discussed at the end.

Effectiveness and efficiency

Central government. National policy reforms are recognised as a necessary, important and probably low-cost way to address deforestation. But implementing REDD+ initiatives centrally has important implications for effectiveness. First, decisions made by central institutions and imposed locally are more likely to meet resistance than decisions made locally. Second, if decisions are implemented without an understanding of local conditions (such as many place-specific drivers of degradation) they may have unintended effects or fail to meet goals. Even if central government institutions have a better understanding of technical aspects of forest management than local institutions, they are unlikely to grasp the importance of local social, political, economic, cultural and livelihood issues. Third, institutional mechanisms by which citizens can hold national officials accountable are rare. Corruption is often a serious problem in natural resources management (Kolstad and Soreide 2009). Fourth, forest services worldwide have an entrenched history of disrespect for local people. Finally, if central forest services do not deliver appropriate compensation, local people are unlikely to change their behaviour.

Decisions about rule making and payments do not have to be made at the same scale: rather, a decentralised payment system could be based on centrally determined rules. In that case, local people would make decisions about the distribution of benefits, but would not make decisions about compensation. In this case, they might be somewhat more likely to comply, but the problems with centralised decisions still hold.[1]

Elected subnational government. In general, decentralised implementation by subnational governments can be expensive because of the need for capacity building and external support. Nevertheless, approaches decentralising powers to subnational governments allow for differentiated and targeted forest management and compensation payments, and a closer match between responsibilities (or the costs to forest users of new rules) and benefits.

Under a decentralised system, subnational governments could work with local citizens and forest communities to set targets for carbon reductions and develop rules and innovative initiatives – based on a collective understanding of local ecological, socio-economic and cultural characteristics – to meet them. Subnational governments typically include states in federal systems and municipalities, but they could also include indigenous territorial authorities chosen by local people.[2] Though elected governments are not always accountable in practice, the main difference between these institutions and those discussed below is that they have a legal mandate to represent all citizens within a territory and to be accountable to them.

Forest user groups and stakeholder committees. User groups and stakeholder committees usually involve a subset of the population that organises or is being organised around a particular interest, such as community forestry (Manor 2004). Such groups can be effective resource managers when they are cohesive or well organised, and empowered to make and enforce rules. Nevertheless, devolving rule making and benefits directly and only to this scale could undermine the effectiveness of reducing emissions for several reasons. Such committees do not involve or represent all local citizens; nonmembers may be unwilling to follow rules and are unlikely to receive benefits. The rules they set would only apply to a small area and leakage is more likely. Also, it should not be assumed that the leaders of such groups are representative of their members or accountable to them. Such groups are often constituted by outside projects and represent the interests of those projects rather than those of the local population.

1 Deconcentrated decision making (which refers to decisions made by central authorities at smaller territorial scales) also faces similar drawbacks.

2 Some marginalised groups may feel that other authorities reflect their interests better than elected local governments (Larson 2008). Traditional forms of decision making, such as through consensus, may have greater local legitimacy than governments elected on the basis of party politics.

Table 14.1. REDD+ decentralisation options

Level of rule setting and compensation	Effectiveness (including governance)	Efficiency	Equity
Central government		**Positives**	
	In macro context, driving forces of deforestation addressed	Lower transaction costs, economies of scale	Potential national protection for marginalised groups Indigenous organisations may have more influence
		Negatives	
	Imposed rules ignored and locally inappropriate Respect of rules unlikely without compensation or benefits Difficult to hold authorities accountable, fight corruption	Imposed rules not implemented if not appropriate, legitimate and compensated	Potential to favour elites and ignore marginalised groups
Elected subnational governments		**Positives**	
	Greater acceptance of rules if local citizens participate More targeted, locally relevant policies and compensation Better use of local knowledge (In theory) accountable to electorate	Differentiated incentive payments Lower local transaction costs for knowledge and labour mobilisation	Universal suffrage in choosing decision makers Potential for broad participation Potential for recourse and accountability
		Negatives	
	Technical support needed Leakage due to weaker rules in neighbouring areas Potential governance failures (corruption)	High transaction costs to set up nationally and monitor	Potential undue burdens on marginalised groups Could favour elites

Level of rule setting and compensation	Effectiveness (including governance)	Efficiency	Equity
Forest user groups, stakeholder committees, some traditional authorities		**Positives**	
	Greater acceptance if direct participation in rule setting Rules and compensation sharply targeted Self enforcement if group cohesive	Differentiated incentive payments	Direct participation of interested groups
		Negatives	
	Not representative of all local citizens Leaders not necessarily accountable Technical support needed Leakage due to weaker rules in neighbouring areas Rules cannot include larger-scale influences People outside group not subject to rules	High transaction costs to set up nationally and monitor	Potential undue burdens on marginalised groups Interest group capture of public resources Could favour elites
NGOs and projects		**Positives**	
	Rules and funds targeted Technically sound rules Less potential for corruption	Less bureaucracy, more efficient National coordination transaction costs depending on scale of project	Potential to protect marginalised groups
		Negatives	
	Imposed rules ignored Not representative or accountable to citizens Could usurp significant benefits Project timeframe rather than permanent institutionalised change	National coordination transaction costs depending on scale of project	Could favour special interests Could burden marginalised groups Likely more responsive to funders than local people

Projects and NGOs. Projects and NGOs have an advantage over the public sector in that they are often more efficient, more technically capable and have a better control of corruption (cf. Chapter 5). Nevertheless, they are likely to have some of the same disadvantages as central control and user groups. Projects and NGOs may also be short term, driven by external aid and therefore less sustainable.

Traditional authorities. In some forestry decentralisation schemes, traditional authorities that have not been chosen by local populations and that are not accountable to them have been given important powers over natural resources or income from resources (van Rouveroy van Nieuwaal 1987; Porter and Young 1998; Brock and Coulibaly 1999, 152; Ntsebeza 1999, 2002; Manor 2000; Marfo *et al.* in press). This appears to be an expedient way to distribute powers, but may be completely ineffective as benefits seldom reach the intended recipients. Many of the limitations of user groups and NGOs also apply to traditional authorities.

Equity

Equity is a concern whether rules and compensation are centralised or decentralised, but marginalised groups, such as indigenous organisations, may have more influence at the national – and international – scale, rather than in contested forests. Research demonstrates that equity is unlikely to be taken into account unless it is an explicit, planned priority, and unless the design, implementation and monitoring of schemes actively take equity into account (Dahal *et al.* in press; also see Crook and Sverrisson 2001; Bandiaky 2008). Certainly, the main concerns in REDD+ are that elites will capture benefits, that marginal groups will be excluded and that forest peoples will be exploited.

Conclusion

Open and equitable forest management is critical for REDD+. Financial incentives and rules, rigorously applied, could change the status quo and promote substantial local engagement in forestry decision making.

The scale at which decisions are made will not, alone, guarantee effectiveness, efficiency or equity. Ensuring representative governance and preventing corruption and capture of benefits by elites are important both centrally and locally. Local people may have a better understanding of the incentives and management alternatives than central agencies, but they may still decide to deforest if deforestation is a lucrative option. Further, local and remote vested interests in deforestation, or local biases against the poor, may be hard to overcome locally without higher-level support. Hence, generally accepted minimum standards for forest management, and for rights and wellbeing, must be established and enforced by central authorities.

If local needs and aspirations are to be taken into account, innovative REDD+ will transfer important aspects of design, implementation and benefit sharing to representative local authorities. Elected subnational governments, with the participation of local citizens, user groups and NGOs, could set targets and receive compensation based on their performance against agreed measures. The key to success lies in the process. The legitimacy of the whole REDD+ endeavour will depend on some kind of decentralisation, otherwise the fundamental goals of reducing deforestation and degradation will be compromised. In addition to broad participation in decisions regarding the structure of REDD+, decentralisation of rule making and distribution of benefits will be key issues in legitimacy.

Part

4

Doing **REDD+** by changing **incentives**

Chapter 15

Reinforcing REDD+ with reduced emissions agricultural policy

Tom Rudel

- A reduced emissions agricultural policy (REAP) can be an effective, efficient and, potentially, equitable REDD+ policy option.
- A REAP should prioritise agricultural assistance to growers in productive agricultural areas close to major centres of population.
- A REAP in forest-rich countries might feature low tariffs on agricultural products, while a REAP in forest-poor countries might emphasise biofuel production.

Introduction: The significance of agricultural policy changes

Agriculture and agricultural expansion account, directly or indirectly, for approximately 31% of global greenhouse gas emissions (IPCC 2007). Any attempt to reduce these emissions must acknowledge people's continuing need for food and fibre and, despite state and other efforts to curb it, the growing demand for animal protein among affluent consumers. To meet these competing needs requires both advances in technology to increase production from limited land, and political solutions that recognise and resolve potential conflicts between competing land uses.

Many of the most dramatic changes in the global landscape during the twentieth century had their origins in national policies. Decisions by the Brazilian government to prioritise the development of the Amazon basin region in the late 1960s accelerated the rate of agricultural expansion and deforestation around the edges of the world's largest tropical forest. When farmers in Niger perceived a shift in the state's tree tenure policy from the state to cultivators, they began to treat trees as valuable assets, and tree cover increased significantly in Sahelian Niger (Larwanou *et al.* 2006). After Mexico joined the North American Free Trade Agreement (NAFTA), the area of maize, soya, bean and cotton in Mexico declined by more than 1.2 million hectares, because competition with US growers became more intense. In pursuit of soil conservation and flood control objectives, China subsidised farmers to take marginal lands out of production during the 1980s and 1990s. In response to these policies, the area cultivated for wheat in China fell by 7.8 million hectares between 1990 and 2005 (FAO 2009a). Plainly, changes in agricultural policy can dramatically enlarge or reduce cultivated areas very quickly. Because the changes in land use driven by changes in agricultural policies affect greenhouse gas (GHG) emissions, they are clearly important for reducing emissions from deforestation and forest degradation (REDD+).

The following sections analyse recent agricultural policies and examine the connections between agricultural policies and REDD+, propose a reduced emissions agricultural policy (REAP), examine what the effects might be in forest-rich and forest-poor countries and, finally, assess the effectiveness, efficiency and equity of REAP policies.

Agricultural policies in the South: Historical patterns and the implications for landscape change

In the two decades following World War II, governments in the South adopted a series of policies that shaped national agricultural activities. With the goal of keeping food prices down for urban consumers, government marketing boards paid low prices for food produced by farmers for domestic consumption. To encourage domestic production under these conditions, governments tried to help producers cut costs by subsidising agricultural inputs, such as fertilisers, pesticides and credit. In some instances, governments subsidised inputs for export crops that they then taxed (Lopez and Hathie 2000). In Asian countries in particular, governments expanded irrigated areas to encourage domestic production of rice. In addition, governments established national agricultural research and extension services. Governments also pursued other policies which had important indirect effects on the agricultural sector. They imposed tariffs on agricultural imports and maintained overvalued exchange rates. The overvalued currencies boosted the prices of agricultural exports on the world market and, at the same time, reduced the cost of imported manufactured goods.

Beginning in the 1980s, neoliberal policies transformed national agricultural policies. Structural adjustment programmes (SAPs) curtailed overvalued exchange rates (Lopez and Hathie 2000). Taxes on export crops declined as SAPs prioritised the production of export crops as a way to ease balance of payments problems. SAPs, and a scepticism about government intervention in general, led to lower government expenditures on agricultural research and extension, particularly in Africa, but also in Latin America. Only in the rapidly industrialising nations of South and East Asia did the agricultural sector garner more support from governments (Anderson 2009).

Governments also pursued geographically targeted programmes of assistance to cultivators. Building on initiatives begun during colonial eras, governments established new land settlement schemes that promoted agricultural expansion in remote, usually forested, regions by building roads and settlements. Beginning in the 1960s, Indonesia's Transmigration Programme targeted the sparsely settled outer islands of Indonesia for agricultural development. A series of regional development programmes, *Poloamazonia*, *Polonoroeste* and, most recently, *Avanca Brasil* promoted agricultural development in the Brazilian parts of the Amazon basin. In the early 1970s, a newly independent Zambian government promoted a 'village regroupment' scheme (Moore and Vaughan 1994). These initiatives differed fundamentally from previous agricultural policies in their geographical focus. The new land schemes all identified high priority areas for agricultural development and concentrated expenditure for agricultural expansion in these regions. But, with the ascendancy of neoliberal political economies during the 1980s, these kinds of agricultural development projects targeting specific areas lost favour among policy makers in the South.

In different ways, these agricultural policies encouraged tropical deforestation and GHG emissions. Subsidies for agricultural inputs, such as fertiliser, encouraged cocoa growers in Cameroon to expand cultivated areas at the expense of forests (Wunder 2003). Subsidised credit programmes encouraged small-scale cattle ranchers in Ecuador to convert more of the forest on their land into cattle pasture (Rudel and Horowitz 1993). Government contractors built roads as part of new land settlement schemes. These roads opened up remote forested regions to settlement and agricultural expansion. In so doing, these programmes spurred deforestation and, with it, GHG emissions. Clearly, during the second half of the 20th century agricultural policies spurred the destruction of forests. Can they have the reverse effect? The proposal outlined below suggests that they can.

REAP: A proposal

Just as central place theory (von Thünen 1966) can be used to explain accelerated rates of deforestation during the second half of the 20th century (Angelsen 2007), it can also be used to provide the intellectual foundation for policies that reduce deforestation, as is done in Chapter 10. In a wide ranging survey, 'Agriculture for Development', in 2008 (World Bank 2008b), analysts noted that during the past two decades agricultural policies the world over have become 'placeless', i.e., applicable everywhere in a country. While credit, tax and price support schemes benefited many farmers, they also led to a relative neglect of various place-specific public works, like irrigation schemes or farm-to-market roads that would have promoted agricultural intensification in particular regions. Given the relative neglect of such agricultural infrastructure, World Bank analysts argued for more place-specific agricultural development policies (World Bank 2008b).

Extending this line of thinking, this chapter argues that agricultural policies intended to encourage REDD+ should be place specific, that is they should strengthen agriculture near central places (major centres of population). Such policies would resemble the new land settlement schemes of the 1960s and 1970s in focusing on building up agricultural infrastructure in particular places, but they would differ dramatically in the kinds of places that would be targeted. Rather than focusing on agricultural expansion in remote rural regions, these policies would promote agricultural intensification in peri-urban and interstitial rural regions close to cities. Intensification could take a variety of forms:

1. Irrigation of easily accessible land along roads to enable rice farmers to double or triple cropping in areas where they now grow only one rice crop a year.
2. Credit programmes and extension services that target peri-urban farmers and urban gardeners.
3. Support for organisations that facilitate direct marketing to consumers, like farmers' markets or community agriculture.
4. Agroforestry that takes advantage of large local markets to produce and sell a wide range of fruits.
5. More research and development on agricultural intensification.

For reasons that are spelled out below, these reforms represent a REAP. This package of policies assumes, reasonably, that most farmers in long-established agricultural areas close to cities have secure land tenure (Alston *et al.* 1999). The intense, peri-urban agriculture that REAP tries to foster is already practised around a wide variety of cities so, in this sense, REAP builds on existing trends in agricultural sectors of the South. REAP reduces emissions in a variety of ways, for example, by reducing 'food miles', the distances that foodstuffs travel from farms to markets. REAP could also encourage low input sustainable agriculture (LISA) through research programmes that, for example, try to extend the geographic and agronomic reach of techniques like no-till agriculture (Coughenour 2003; Holland 2004). REAP also reduces emissions by directing agricultural development, not to agricultural expansion along forest frontiers with its high cost in terms of GHG emissions, but to rural and rural–urban fringe areas that no longer have old-growth forests.

By focusing agricultural development on peri-urban environments, policy makers could reduce agricultural opportunities for landowners in remote forest-rich areas. The opportunities for agricultural enterprises in remote forest-rich environments might not disappear, but public support for extensive agriculture around the remote, rural margins of forests would decline. Intensive agriculture in remote regions that does not destroy forests (e.g., some kinds of aquaculture) and forest friendly agroforestry, like Açaí palm cultivation, would continue to receive support from the state (Brondizio 2008). But agricultural development policies that focus on areas around major centres of population (central places) should bring down the opportunity costs and make participating in REDD+ more attractive to cultivators in remote forest-rich regions. In this respect, there should be synergies between REDD+ and REAP.

Table 15.1. Reduced emissions agricultural policies (REAP) in forest-rich and forest-poor countries

Types of policies	Forest-rich countries	Forest-poor countries
Place-based agricultural policy	Focus on peri-urban areas	Focus on peri-urban and established agricultural areas
Agroforestry	Extensive agroforestry (e.g., 'jungle forestry')	Intensive, peri-urban agroforestry
PES (payments for environmental services)	Yes, to landholders in remote rural regions	Yes, especially for intensive, peri-urban agroforestry
Biofuels	No	Yes
Tree tenure	Strengthen in remote rural regions	Strengthen in remote rural regions
Agricultural zoning	Yes, for forests	Yes, for unprotected forest fragments and buffer zones around parks, reserves
Tariffs on agricultural products	Lower	Higher

The ways in which REAP would strengthen REDD+ depend on the country context, in particular on the stage of forest transition. Forest transitions occur when landscapes undergo large-scale, long-term changes in forest cover. During the 20th century in the South, these changes almost always involved large-scale losses of forest cover and tropical deforestation, followed, more recently, by smaller-scale recovery of forests in some places. Countries that have never undergone extensive deforestation and contain large tracts of forest are 'forest rich'. Other countries that were extensively deforested in the 20th century and where only small fragments of the original forests remain are 'forest poor'. In the following section, we outline what REAPs would look like in forest-rich and forest-poor countries, and how they might influence REDD+ programmes.

REAP and REDD+ in forest-rich and forest-poor countries

Policy options in forest-rich countries

A set of REAPs could help deliver REDD+'s '3 Es' (efficiency, effectiveness and equity) plus co-benefits in countries which still contain substantial areas of old-growth tropical forest that sequester carbon at relatively rapid rates. Countries that are rich in extensive forms of agroforestry, referred to variously as 'jungle rubber' (de Jong 2001), 'shaded coffee' and 'shaded cocoa', would also be compatible with REDD+, because they preserve the forest canopy and sequester significant amounts of carbon.

Policies that set low tariffs for imports of staples would reduce the opportunity costs of participating in REDD+ programmes to preserve old-growth forests. Imports of low-cost agricultural products from less forested countries would minimise the economic incentives for farmers to expand production of staples at the expense of old-growth forest. Such a policy would also hold down food prices for urban consumers and, for that reason, would be politically acceptable. While a policy setting low tariffs for staples would make REDD+ more effective and would reward agricultural efficiencies in the world market for food, there are two potential problems. First, such a policy could contribute to international leakage in REDD+ because low tariffs could encourage countries that participate in REDD+ to import low-cost wood from abroad, even as they preserve wood and sequester carbon in their own forests (Wunder 2008). This type of leakage is especially likely when countries, like Cambodia, with weak governance and unexploited forests, border countries, like Vietnam, that are trying to increase forest reserves and are sequestering carbon (Meyfroidt and Lambin 2009). Second, a low tariff policy would have inequitable effects within countries, because it would reduce economic opportunities for rural populations which are almost always the poorest segment of the population

(World Bank 2009e). To have equitable effects, this kind of policy must be accompanied by a REDD+ programme that returns a portion of the payments for carbon sequestration to the rural populace, even if the forests sequestering carbon are on publicly owned land. This would counteract the 'urban bias' in low tariff policies and provide some benefits to populations living near revenue generating natural resources (Bezemer and Headey 2008). It would also institutionalise recent political initiatives in oil producing states, like Ecuador and Peru, to provide streams of revenue for people who live in the often remote rural regions where oil is extracted.

Although experience with land use planning in the Brazilian Amazon has underscored the difficulties of enforcement (Mahar and Ducrot 1998), policies to zone forests could, like low tariff policies, reinforce REDD+. In many forest frontier contexts, where titles are uncertain and land clearing signals land ownership, forested lands risk being invaded, and zoning forests does not work. When landowners acquire titles to forested lands, they become more willing to defend these lands, and 'forest zones' begin to take on a practical meaning. In sum, for forest zoning to work, states must strengthen land tenure systems in remote forested areas.

Policies that focus agricultural research and development expenditures on crops that grow near urban centres could also reinforce REDD+. Otherwise, research and development could boost yields of crops in forest-rich zones, which in turn could increase incentives for farmers in these zones to convert forests into cropland. Any low tariff agricultural policy must be accompanied by educational policies that ensure that young people in remote forest-rich rural areas have opportunities to prepare for non-farm occupations.

Policy options in forest-poor countries

In countries with little forest cover and poor populations, REAP could focus on encouraging agroforestry. Policies could help smallholders in densely settled districts to acquire secure titles to their land, support research on new, more productive crop varieties, facilitate the creation of markets and establish low cost nurseries. Where there is little forest cover, wood and fruit produced in woodlots could make a significant contribution to household incomes (Cavendish 2000). In East Africa, this kind of policy would build on the tree planting campaigns initiated by Wangari Maathai and the Green Belt movement. It could also benefit smallholders in countries like El Salvador and rural communities in the interior of Vietnam. In these environments, compensation through REDD+ would probably focus on rehabilitating degraded forest.

The Chinese success with the 'Grain for Green' programme since the mid-1990s suggests that conservation 'set aside' programmes that focus on reforesting degraded agricultural land can quickly achieve impressive gains in forest cover. Upland farmers in interior China participated in the Grain for Green programme in much greater numbers than did farmers elsewhere in China (Xu *et al.* 2006). As its name implies, this programme provided participating farmers with a supply of grain proportional to the amount of land that they had taken out of production. In some instances, Grain for Green led to the creation of rubber plantations, dubiously defined as 'forests', on steep slopes (Fox 2008). These instances notwithstanding, the relative success of this programme suggests that large-scale payments for environmental services (PES) can be both effective and, in this instance, efficient. PES schemes convert the least productive agricultural land into reasonably efficient storehouses for carbon. The Chinese programme has also been equitable in that it has disproportionately benefited poorer upland farmers. Not all conservation set aside programmes will have such equitable effects. The likelihood that the benefits from PES programmes will be distributed equitably will depend on the pre-existing distribution of land ownership in a country. In a largely deforested country with an inequitable distribution of landholdings (like Paraguay), set aside programmes would benefit large landowners disproportionately if the programme pays benefits proportional to the area of land covered by the programme.

Subsidies for biofuel production on idle but deforested land could be part of REAP provided that analyses of the biofuel production life cycle include the indirect effects of biofuel production on land use and demonstrate net benefits in GHG emissions. These policies could only be considered effective if there are net reductions in GHG emissions. They could only be considered efficient if subsidies encourage biofuel crops on agriculturally underutilised land, as opposed, for example, to land that is used for growing staple crops. The equity dimension of a subsidy for biofuel crops would again depend on the pre-existing distribution of landholdings. The challenges of making the impact of these programmes equitable would be significant in Latin American countries with inequitable landownership. Again, the geographical focus for these programmes would be established centres of agricultural production, near population centres, if at all possible.

Finally, REAP in poor countries with largely deforested landscapes could focus on rehabilitating degraded land dominated by invasive species like bracken fern (*Pteridium aquilinium*). For example, incentivising cocoa production on the island of Sulawesi, Indonesia, might involve subsidising cultivators who try to restore old cocoa plots dominated by invasive species (Ruf 2001). This same type of geographical focus would extend to infrastructure projects. Port facilities for shipping crops overseas would target, for example, ports which serve deforested hinterlands.

Larger national budgets for agricultural research and development could complement REDD+ by boosting yields in domestic agriculture, thus reducing demand for agricultural imports. Because largely deforested poor countries often protect fragmented forest remnants, the risk of encouraging forest conversion from policies to boost domestic agricultural yields is not as great as in forest-rich countries.

Conclusion: Assessing the 3Es plus co-benefits of a REAP-assisted REDD+

Agricultural policy can best advance the objectives of REDD+ through a return to agricultural policies that focus on promoting agricultural production in particular areas. In contrast to earlier agricultural policies that promoted agricultural expansion in sparsely settled peripheral regions, REAP would promote agricultural production in already settled regions near major centres of population (central places).

Would REAP make REDD+ more effective?

The conservation set aside programme recently implemented in China suggests that REAP can quickly bring about major changes in degraded cultivated areas. This suggests that REAP is likely to be effective in reducing GHG emissions and facilitating REDD+.

Would REAP make REDD+ more efficient?

Clearly, REAP focusing on peri-urban and established agricultural zones should reduce the opportunity costs of enrolling forested land in a REDD+, provided that the land is in a remote forest-rich region. Rugged topography might increase enrolment rates in REAP and REDD+ programmes. In mainland southeast Asia, where upland areas have been periodically cultivated, a combination of PES and REAP could increase the opportunity costs of continuing to cultivate these areas. Because the yields from such uplands are typically below those of lowlands, PES and REAP programmes would increase the efficiency of agriculture in these areas and, depending on the rate of regrowth, conceivably increase the efficiency of REDD+.

Would REAP make REDD+ more equitable?

Whether REAP will make REDD+ more equitable will depend on the context and provisions in a REAP. History indicates that the impact of conservation set aside programmes in developed countries has not been equitable, largely because 1) payments were tied to the area of a farmer's land, and 2) farm workers did not receive any payments (Winders 2009). If the distribution of land is inequitable, a REDD+ reinforced by a REAP could produce inequitable benefits. A REAP-assisted REDD+ would probably produce inequitable benefits in Latin America, but more equitable benefits in Asia and Africa, given the more equitable distribution of landownership in these regions. A focus on agroforestry in a REAP would redress some of these inequities if there was some support for smallholders.

Finally, because biodiversity is typically higher in old-growth forests, and in mountain areas with their many micro-environments, a REAP which reinforced REDD+ would produce co-benefits, both better protection of biodiversity and, by assisting small-scale farmers on topographically marginal lands, some poverty reduction.

Chapter 16

Using community forest management to achieve REDD+ goals

Arun Agrawal and Arild Angelsen

- Policy makers can improve the likelihood of success for REDD+ initiatives by incorporating success factors identified through decades of research on community forest management. These include sufficient size and clear boundaries of forests, predictability of benefit flows, local autonomy in designing clear and enforceable rules for access and use of forests, and provisions for monitoring and sanctioning rule violations.
- REDD+ outcomes can be enhanced by selecting existing and new community forest management sites with user group and contextual characteristics associated with successful forest outcomes. These include a stable technological and policy environment, low levels of intergroup conflict, and small to medium-sized, forest-dependent user groups that have management experience.
- Community buy-in and participation increase the 3Es+ and therefore the sustainability of REDD+ projects.

Introduction

Who can manage forests better than those living within or beside them? Many have argued that greater recognition of community rights and more power over forests for communities can help achieve improved forest outcomes (Arnold and Stewart 1991; Charnley and Poe 2007). With REDD+ redefining the forest management and conservation landscape, community forest management (CFM) can contribute to reduced forest emissions and increased forest carbon stocks. Likewise, REDD+ can improve the chances of CFM success and make forest conservation on the ground more profitable. But there are also risks. Joining the existing goals of CFM to REDD+ may dilute the climate objective, and throwing big money into CFM might not necessarily improve cooperation – it might even stimulate opportunistic behaviour.

Communities in many regions of the world have always used and managed forests near their settlements. Recognising the potential of CFM, governments and NGOs have also formally supported different versions of CFM in many parts of the tropics during the past 50 years. On a global scale, communities today exercise use and management rights over a large forested area – at least 10%, or 400 million hectares (White and Martin 2002). Of this, more than half of the world's forests has come under their control during the past 25 years (Sunderlin *et al.* 2008). The area they use and manage is even greater if informal use and control are included (Agrawal 2007).

Historical experience with CFM provides valuable lessons for the REDD+ debate. This chapter distils lessons from studies of pre-existing and externally sponsored CFM, and discusses four clusters of factors that influence CFM success: biophysical, user groups, institutions, and context. We distinguish between exogenous variables based on, for example, natural endowments and design variables that can be influenced by policies. The distillation forms a valuable background to answer two key questions:

- Under what circumstances is community involvement, e.g., through externally sponsored CFM, likely to be viable?
- How can better design improve CFM interventions, or more generally REDD+ involvement of local communities?

What is community forest management?

Community forestry management (CFM) combines two things: a type of resource (forests) and a class of owner/manager (communities) (Chhatre and Agrawal 2008). We use the term CFM broadly to refer to many different, specific forms: participatory forest management (PFM), joint forest management (JFM), forest comanagement and community-based forest management (CBFM). The viability of each management approach depends on the characteristics of the resource systems and their contexts, formal property rights arrangements, informal practices of use and governance, and relations of power and inequality. These power relations interplay within communities, among them and between communities and higher-level actors (Ostrom 2003).

Community forests are often contrasted with forests under open access, government ownership or ownership by private actors. But forest management in practice is complex within these broad categories, and can combine elements across them (Schlager and Ostrom 1992; Agrawal *et al.* 2008).

Contemporary CFM approaches rest on two important insights. First, earlier studies suggested community management would inevitably lead to degradation and a tragedy of the commons. But recent scholarship has shown that communities can manage forests sustainably in different contexts, particularly when forestry policies at the macrolevel enable local governance efforts (Dietz *et al.* 2003; Ostrom 2009). Second, governments and international agencies now recognise that government forest departments often cannot manage resources sustainably and may fail to distribute forestry benefits equitably. In many parts of the world, lax enforcement coupled with the high value of forest products and the land on which forests stand, has led to corruption in the forestry sector and losses of revenue for governments and benefits for local communities.

CFM cannot solve all the problems of forest governance. Indeed, it is itself vulnerable to problems of corruption, political mismanagement and enforcement. But CFM can address several problems of centralised forest management. Many governments have therefore launched policy initiatives to recognise customary management systems, improve local participation in forest activities, increase benefits that communities receive from forests and address problems of enforcement, equity and livelihoods that plague poorly governed forests.

Community forests contribute substantially to the livelihoods of millions of rural people in the developing world. Development agencies have estimated that forests provide substantial livelihood benefits to more than half a billion people, many of them very poor (World Bank 2004; Eliasch 2008). Evidence is also mounting that community forests can deliver on multiple outcomes – carbon storage, livelihood benefits and biodiversity conservation (Chazdon 2008; Ranganathan *et al.* 2008). CFM can help sequester and store carbon without adversely affecting the livelihood and equity benefits that community forests generate (Chhatre and Agrawal 2009). Thus community involvement has the potential to improve effectiveness, efficiency and equity and provide more co-benefits (the 3Es+) from REDD+ projects.

Communities that rely on forests under national authority can undermine carbon storage goals if they are excluded from REDD+ projects focused on such forests. Excluding local communities is likely to work against community interests, and may provoke illegal harvesting, fire and arson in forests or other illegal activities that reduce carbon storage. Without strict monitoring and enforcement – forest management features often absent in the developing world – community-level resentment against REDD+ initiatives could thwart national and global goals.

Communities can help manage forests to improve efficiency by lowering the cost of forest carbon sequestration and storage. The labour and administrative costs that forest departments incur for governing forests are typically far higher than what is paid to community guards and decision makers for similar kinds of protection (Somanathan *et al.* 2009). Because CFM can help achieve the objectives of REDD+ initiatives by better addressing the 3Es+, REDD+ designers will benefit from heeding the lessons from CFM. The costs of monitoring forest carbon can also be substantially reduced by involving local communities (see Chapter 8).

Factors promoting success of CFM

Although CFM has long existed, research on the subject began to gain momentum only in the mid-1970s. Significant contributions from the fields of common property, political ecology, ecological anthropology and environmental sociology have offered insights into how different factors promote CFM success (Angelsen and Kaimowitz 1999; Charnley and Poe 2007; Ostrom 2007; Larson and Soto 2008). Common property scholarship is particularly useful for classifying the many factors that affect the success of CFM outcomes (Ostrom 1990, 2009; Baland and Platteau 1996; Agrawal 2001).

These success factors can be grouped into four clusters: biophysical; user group related; institutional arrangements; and external environment (Table 16.1). Biophysical factors relate to the resource system. The user-group cluster consists of local sociopolitical and economic factors. Rules and accountability mechanisms comprise institutional arrangements. Demographic, market and macropolitical variables are contextual factors (Agrawal 2001; Dietz *et al.* 2003; Ostrom 2007, 2009). Within each cluster, some factors can be influenced by design or through policies; others are resistant to change or are exogenously given.

Biophysical factors

Biophysical factors pertain to the resource system that community members use and manage. They include: resource size, clarity of its physical boundaries, whether resources are stationary or mobile, value of the resource, the extent to which resource units can be stored, rate and predictability of benefit flows

Table 16.1. General characteristics of successful CFM

Clusters of success factors	Factors generally contributing to successful CFM	Exogenous vs. design
Resource system • Biophysical	Medium to large community forests Well-defined, easily monitored boundaries Predictable benefit flows Value of the resource	Design Design Mixed Exogenous
User group • Socio-political • Economic	Small to medium-sized group (facilitating face-to-face interactions) Interdependent Homogeneous Relatively well-off Moderate dependence on resources No sudden shocks in resource demands Cultural valuation of forests Past experience with forest management	Mixed Exogenous Exogenous Mixed Mainly exogenous Mixed Exogenous Exogenous
Institutional arrangements	Rules are easy to understand and enforce Rules are locally devised Rules take into account differences in violations Rules help deal with conflicts Rules hold users and officials accountable Effective local enforcement and sanctions Tenure security Capacity to exclude outsiders	Design Design Design Design Design Mainly design Design Design
Context • Demographic • Market • Macro-political	Stability of demographic conditions Stability of market conditions Stability of policy conditions Stability of technological conditions Government support to reduce collective action costs	Mixed Mainly exogenous Mainly design Mainly exogenous Design

and ease of monitoring. Institutional arrangements, technological changes and shifts in relative prices may affect ease of monitoring, resource size and physical boundaries. But other characteristics – storage, predictability, and immobility – are likely to be inalterable or too costly to engineer.

Although research on deforestation and changes in forest condition has emphasised biophysical factors such as soils, topography, fire and pests (Geist and Lambin 2001; Tole 2001), CFM studies have focused instead on how property rights or socio-economic and political variables shape outcomes (Tucker 1999). More analysis that integrates the impact of biophysical, social and institutional factors is required (Agrawal 2001; Chhatre and Agrawal 2009; Larson *et al.* in press-a). Ostrom (2007; 2009) presents a clear framework for examining the relationship between biophysical and social – institutional factors.

Taking into account the different findings from research on resource system characteristics, we conclude that communities are likely to better manage medium to large community forests with well-defined and easily monitored boundaries and predictable benefit flows. The definition of a medium-sized or large forest depends partly on context; existing knowledge does not permit generalisations about effects of forest size beyond 5000 to 10 000 hectares (Chhatre and Agrawal 2009).

User-group factors

Studies of CFM have investigated how user-group characteristics affect forest outcomes. These factors include size, boundaries, heterogeneity, capacity (institutional, technical and economic), interdependence among members and members' dependence on resources (Agrawal and Goyal 2001; Poteete and Ostrom 2004; Charnley and Poe 2007). But the effects of several factors continue to be contested.

Greater interdependence among resource users, availability of resources to undertake monitoring and moderate levels of forest dependence are associated with greater capacity to manage forests. But the impacts of group size and heterogeneity on forest commons outcomes are uncertain (Agrawal 2001). Most resources are managed by groups divided along multiple axes, such as ethnicity, gender, religion, wealth and caste (Agrawal and Gibson 1999). Different dimensions of social versus political versus economic heterogeneity can have different effects on resource governance (Baland and Platteau 1999). The divergent conclusions of a large number of empirical studies suggest that similar group heterogeneities may produce different effects under different circumstances, but that characteristics such as gender, indigenous status, ethnicity, class and income are particularly relevant to explain outcomes (Larsen 2003).

In conclusion, small to medium-sized communities that are interdependent, are relatively well-off, have adequate technical and institutional capacity and depend on their forests are more likely to create and sustain institutions to regulate forest commons more effectively (Agrawal 2001). The effects of homogeneity among community members are less clear. Some of the above factors may occur together only rarely: well-off communities may not be highly forest dependent, and small communities may not possess large forests.

Institutional factors

Common property studies of CFM have shown how resource management is enhanced by three characteristics: tenure security for communities that can devise rules and exclude others; community rules that are easily understood and locally enforceable; and community institutions include sanctioning, conflict resolution and accountability mechanisms (Ostrom 1990; McKean 1992; Dietz *et al.* 2003). A key contribution from Schlager and Ostrom (1992) indicates that clear and enforceable institutional rules related to access, use, management, exclusion and alienation of natural resources are necessary to promote successful outcomes; their findings are equally relevant to CFM and REDD+. Research on decentralised resource governance, in exploring the relationship between local institutions and national policies, has also identified the critical importance of supportive and enabling national-level legislation (Chapter 14; Agrawal and Ostrom 2001; Ribot *et al.* 2006).

The meaning of local is contested (Raffles 1999). Local can be defined in terms of birth, residency, contiguity of location, degree of dependence on the resource or contributions to the creation of a local institution. Local can also refer to units at different levels: district, subdistrict, municipality or village. Local knowledge and engagement are necessary for designing rules and enforcing them (Gibson *et al.* 2005; Chhatre and Agrawal 2008). But some kinds of rules may be better designed and enforced by those beyond the local level, particularly when it comes to enforcement of rules against kin, or disputes across local units of management. Such concerns point to the need to reinforce local processes through supportive national legislation and extralocal policies.

In summary, findings on institutional arrangements for community forestry indicate that rules that are easy to understand and enforce, are locally designed and accepted, take into account different types of violations, help manage conflict and hold users and officials accountable are most likely to lead to effective community forestry management (Ostrom 1990, 2009). Many national policies either do not recognise the role that local institutions can play, or are difficult to understand, and use ‘one size fits all’ approaches. There is thus a clear need to reform national forestry legislation so REDD+ initiatives can be integrated with CFM.

Contextual factors

Community forests, user groups and community institutions occur within a context. The context is broadly defined by demographic, cultural, technological and market-related factors; the nature of state agencies; the involvement of NGOs; and international aid. Contextual factors help determine whether communities can manage their forest resources successfully. Most scholars of deforestation see market pressures and population levels and changes as key causal factors (Young 1994; Angelsen and Kaimowitz 1999), with rapid changes in population and market forces (rather than their absolute levels) having more significant impact on the success of CFM. Greater volatility typically implies more negative impacts (Bray *et al.* 2004; Brown 2000).

Market institutions are influencing what happens to forests as new exchange instruments for carbon and watershed services take shape (Taylor 2005). Better market access, resulting in higher farm gate prices for agricultural and forest products as well as greater off-farm employment opportunities, will have mixed effects on the forests. The land rent (von Thünen) framework presented in Chapter 10 can be used for a more detailed investigation. Higher demand for forest products is, however, a two-edged sword: it raises both the incentives for long-term management and the incentives for short-term exploitation and free riding.

Technological innovations that increase the benefit-cost ratio of harvesting forest products are likely to undermine the sustainability of resource systems and their governing institutions, unless they are accompanied by stricter regulatory interventions or alternative employment opportunities that reduce pressure on forests. Indeed, the role of the state and regulatory instruments is critical to the success of CFM. Decentralisation of forestry policies in the past two decades makes it increasingly important to analyse the effects of different authority regimes across levels of governance (see Chapter 13).

Making summary statements is the most difficult for this fourth cluster of context variables: market pressures, demographic shifts, technological changes and state policies. But to simplify greatly, a stable context coupled with government efforts to reduce the cost of community collective action are positively associated with successful CFM (Agrawal 2007).

Applying CFM success factors to REDD+ design

Many factors leading to successful CFM can be influenced by design, but not all. Table 16.1 draws on the large literature on CFM to distil factors that have been identified as leading to success. The last three columns in the table provides a summary assessment of the factors that can be shaped through forestry policies and others that are exogenously given, i.e., that are a result of pre-existing natural endowments, or otherwise difficult to influence through policies. This separation of potential success factors into exogenous versus design is crucial to address the two questions asked in the introduction:

- Under what circumstances is community involvement, e.g., through externally sponsored CFM, likely to be viable?
- How can better design improve CFM interventions, or more generally REDD+ involvement of local communities?

The need for REDD+ policies to adopt institutional design factors associated with success is a relatively clear lesson from our review of the CFM literature. REDD+ policies should promote CFM institutions that comprise equitable, easy to understand, locally devised and locally implemented rules. These institutions should promote accountability and should include sanctioning, conflict-management and adjudication rules. And these institutional arrangements should be promoted in collaboration and conversation with community members.

REDD+ decision makers can use knowledge about exogenous success factors to improve the chances of success of REDD+ projects relying on CFM. This can be done in two ways. First, REDD+ decision makers can use knowledge about the resource system and institutional arrangements to work with communities to create desired attributes for success: the size of community forests, their location and boundaries, and the level of potential carbon benefits. Working with communities to arrive at desired success factors has the advantage of local collaboration and longer-term success.

Second, success based on user group factors can inform the selection of sites for REDD+ interventions that rely heavily on community involvement. Project locations can be chosen so as to concentrate on communities whose features are associated with successful outcomes. For example, existing experience and studies suggest that under some circumstances CFM is likely to fail: large, poor, heterogeneous groups of forest users living in an unstable socio-economic, political and natural environment are unlikely to prove good candidates for CFM or REDD+ projects that aim to involve local participants and that rely heavily on such involvement for success. Other policy options would then need to be considered, such as reducing overall demand for new agricultural land and for products leading to forest degradation (Chapters 10, 15 and 19).

If localities with greater likely risk are selected for political or other reasons, REDD+ projects would need to find the resources necessary to address some of the above characteristics, for example, by focusing on smaller, more homogeneous groups or by providing resources so that poorer groups can undertake local monitoring and enforcement. Implementing REDD+ projects indiscriminately at the local level may lead to outcomes that are ineffective in sequestering carbon, costly to implement, and allocate benefits inequitably.

Differences between CFM and REDD+

In making decisions about how to pursue REDD+ objectives effectively through CFM, some key differences between CFM and local REDD+ projects need attention. These include the fact that carbon in belowground biomass and soil is invisible (unlike forest products used by CFM villagers), carbon storage is a global public good and carbon rights are not well established. Important factors to consider are greater attention to monitoring mechanisms to sanction rule violators and address intergroup conflicts when local rules are broken by powerful nonlocal actors, and judicious use of benefits generated through local REDD+ projects.

Because the amount of carbon sequestered through any single community-based REDD+ project is likely to be small, cost-effective technologies to monitor community forest carbon are critical to ensure the success of REDD+ community projects. Existing field studies already suggest that involving forest-dependent communities in carbon monitoring can be an effective and efficient way of measuring changes in carbon stock and of ensuring stable benefit flows from REDD+ to communities (Chapter 8).

Cash benefit flows from local REDD+ projects to local communities introduce a number of distinctions that set such projects apart from CFM projects. One major issue is the volatility and unpredictability of carbon prices. Such volatility makes for uncertain benefit flows. Although many other forest benefits – timber, fodder, firewood and non-timber forest products – are also subject to price fluctuations, most are valued for their local use. Carbon only has an exchange value. This calls for a credible national system of carbon payments to provide a buffer between international and local carbon prices, for example, through a national REDD+ fund (Chapter 6).

A related problem has to do with the double-edged sword of cash payments for carbon sequestration. On the positive side, such payments can redress the meagre economic compensation that CFM users often receive for restricting local use and managing forests more sustainably. REDD+ could quite substantially increase benefit flows to local users. Imagine that a community manages a forest patch of 200 hectares and can demonstrate that 1 tonne of carbon was sequestered last year in each hectare of its forest. A price of US $20 per tonne of CO_2 would yield close to $15 000 to the community (3.67 tonnes of CO_2 = 1 tonne of carbon). If the community has 100 households, each could increase its income by $150 annually just from the community forest – a significant amount for many poor households that depend on forests.

On the negative side, such high levels of carbon payments could dwarf existing benefit streams and create incentives for local elites to capture community-based carbon management institutions. Effective institutional arrangements that ensure continued equitable benefit distribution and prevent elite capture of community forestry resources become more important if benefit streams from CFM increase sharply. Otherwise, the sustainability of carbon stored in community forests will be threatened by those who do not receive benefits – in a way analogous to how national REDD+ initiatives are threatened if local communities and forest-dependent poor users are excluded from REDD+ projects.

Conclusion

The substantial literature on community resource management can guide the selection of communities and forest areas to improve carbon sequestration, carbon storage and livelihoods. Many factors that contribute to success and that have been identified in the CFM literature are also relevant to initiatives that include communities in forest carbon management, including externally sponsored CFM projects that make up part of a national REDD+ strategy. Particularly important are factors related to the size and boundaries of selected forests; predictability of benefit flows from forests and sequestered carbon; access, use, management (monitoring and sanctioning) and adjudication arrangements; and levels of local autonomy in designing rules and institutions.

Ignoring the lessons of CFM is likely to undermine carbon storage (effectiveness) and increase the costs of operation for national REDD+ projects (efficiency). It may also lead to ignoring poor forest users, which could undermine their livelihoods and increase economic inequalities. National REDD+ projects can secure higher levels of forest carbon-related co-benefits on multiple dimensions by taking the lessons of community forestry into account when designing REDD+ initiatives. Robust local participation and benefit-sharing mechanisms can improve equity as the benefits of REDD+ are distributed more widely. Involvement of local forest managers in monitoring and sanctioning can reduce costs of managing REDD+ projects. A share in benefits of REDD+ is also likely to reduce local resentments and improve the legitimacy of REDD+ projects, thus improving the likelihood that poor users and communities will not undermine carbon storage objectives of REDD+ initiatives.

It is also worth noting that success on the ground for REDD+ efforts can be secured only partly by design; actual outcomes will also depend in part on realities that policies cannot easily change. Indeed, this consideration makes it all the more important that governments seek local communities as active and willing partners to ensure the success of REDD+ activities.

Can payments for environmental services reduce deforestation and forest degradation?

Sven Wunder

- Payments for environmental services (PES) have the potential to become effective, cost-efficient and equitable instruments for implementing REDD+ on the ground.
- PES require certain preconditions to be satisfied, in particular land stewardship with 'the right to exclude third parties', which is not granted in many forest frontiers.
- Using spatial targeting toward high-threat, high-service and low-cost areas can dramatically improve PES carbon results. Failing to use these design features can make PES inefficient.

Introduction

Payments for environmental services (PES) schemes are mushrooming in many countries (Landell-Mills and Porras 2002; Porras *et al.* 2008). Few formal performance evaluations of PES schemes have been made so far, but there is already some evidence that well-designed PES schemes can result in efficient, cost-effective and equitable conservation (Wunder *et al.* 2008b). PES can be defined as voluntary, conditional transactions between at least one buyer and one seller for well-defined environmental services or corresponding land use proxies (Wunder 2005). Conditionality is the key feature of PES: payments will only be made if the service provider complies with the contract. In practice, imperfect 'PES-like' transactions are more common than 'pure PES' that meet all the conditions. But 'voluntary provider participation' and especially 'conditionality' are essential features: PES represent a new paradigm of 'contractual conservation'. Unlike regulatory approaches (e.g., command and control tools, protected areas), PES schemes incorporate direct checks and balances on welfare and equity: if local people feel they will be disadvantaged by a conservation deal, they can simply decide not participate.

The concept behind PES is straightforward. External beneficiaries (e.g., downstream water users or global carbon markets) pay land stewards to change their usual land use practices so that the land provides environmental services. But land stewards are only paid if they comply with the conditions in the contract. In other words, service users (buyers) rent certain land use rights uses from providers (sellers), usually for a specified period. This means that PES service providers have to be 'land stewards', such as legal landowners, informal but recognised occupants, communities with traditional rights, or long-term concession or lease holders (see discussion below). To date, PES transactions have included conserving watersheds, protecting biodiversity, preserving scenic landscapes and capturing and storing carbon (Landell-Mills and Porras 2002; Wunder *et al.* 2008b).

REDD+ is conceptualised as a system of international transfers for reducing emissions from deforestation and degradation – i.e., an 'international PES' system. The REDD+ criteria are similar to PES criteria: carbon services are voluntary, conditional and defined by forest conservation proxies and their carbon services. What was arguably the first REDD+ pilot venture, the Bolivian Noel Kempff project, can be defined as a PES transaction (Asquith *et al.* 2002). Hence, it seems logical to ask to what extent PES can actually buy and best achieve reduced emissions from deforestation and degradation.

Preconditions for REDD+ payments for environmental services schemes

Are PES a 'one size fits all' tool for forest conservation, and can they effectively mitigate forest clearing and degradation everywhere? The answer, unsurprisingly, is that they are not and cannot: for PES to be effective they need to meet certain preconditions as regards information, economics, culture and institutions, each of which I will now briefly discuss in the context of REDD+.

Information. Buyers of environmental services will normally want to know what services providers will deliver as a result of changes in land use. In watershed protection, for example, biophysical links can be complex and it is difficult obtain reliable information. In the case of REDD+ carbon, it will normally be easier to provide information, but giving users reliable estimates of business-as-usual baselines and carbon increments could be challenging (see Chapter 7). These kinds of requirements for information are in no way specific to PES, but usually need to be explicitly set out in PES schemes where services are directly traded.

Economics. Basically, the economic value of the carbon REDD+ saves has to exceed the total cost of providing the environmental service – i.e., the opportunity costs, and the protection and transaction costs of conservation. If this condition is not met, service providers will become worse off from PES, and are thus not likely to participate. Opportunity costs, i.e., the providers' marginal losses from foregoing planned deforestation or degradation, are usually the biggest cost, whereas protection costs (e.g., establishing firebreaks, monitoring intrusions) and transaction costs (e.g., area delimitation, contracting) are supplementary. Since the Stern Review, most REDD+ scoping studies have found that on average landowner opportunity costs are low and, in many but not all cases, could be 'bought out' at current carbon and commodity prices. As carbon and commodity prices obviously fluctuate over time, the bottom line is not fixed.

Culture. Service users need to develop a 'payment culture' for PES to thrive. For instance, irrigators could often benefit economically from watershed protection PES, but most places have a history of free water services, which means that entrenched attitudes that water should come at no cost prevail. For REDD+, willingness to pay for PES seems significant, though the scale of future payments still has to be confirmed.

Equally, service providers need to feel motivated by PES incentives to boost services. Landholders are seldom motivated purely by profit; they may also conserve forests for the common good and other motives. The psychology literature shows that offering small monetary rewards for 'privatised public-good provision', the core idea underlying PES, can sometimes be counterproductive because the rewards undermine the providers' pre-existing altruistic motives (e.g., Heyman and Ariely 2004). Thus, a lesson for REDD+ PES is to examine pre-existing local motives, and consider how payments could affect them.

Institutions. Institutional preconditions for PES are multifaceted. Here, I'll discuss four factors – markets, trust, transaction costs and land tenure.

First, PES are often mistakenly thought to require competitive markets. Yet, most PES are bilateral or multilateral contracts. Competition for providing services and, in particular, for buying services is limited. On the service provider side, there are some PES experiments with auctions. These 'simulated markets' aim to boost cost efficiency by keeping provider rents down through competition. Auctions have recently also been piloted in the tropics (Jack *et al*. 2009), but not, so far, for avoided deforestation.

Second, PES require trust between users and providers as they are entering into voluntary contracts. Especially in remote forests with weak governance – the main REDD+ scenario – service providers often suspect that PES contracts constitute hidden land expropriation. However, over time, intermediaries (e.g., NGOs, government agencies) may well overcome initial mistrust through negotiation and adaptive management.

Third, the institutional set up must keep seller and buyer transaction costs reasonably low (see 'Economics' above). Scenarios in which many smallholders hold complex, overlapping forest rights could be challenging for effective REDD+ PES schemes – unless these can be bundled into collective contracts, such as in Costa Rica (Box 17.2). One assessment of 13 PES schemes found that start up costs were relatively high, while recurrent transaction costs were moderate (<1–7% of total costs; Wunder *et al*. 2008b: 844–849).

Finally, service providers have to be, or become, land stewards with *de facto* exclusion rights. If they are unable to defend their land against third party intruders (e.g., loggers) or land grabbers (e.g., large-scale ranchers or squatters), then they cannot provide reliable services – and paying them may not buy the services stipulated. If land rights overlap, or are contested, similar problems arise. A worse scenario is where illegal deforestation is the first step in establishing *de facto* tenure rights on quasi open access public lands. In these cases, PES are simply not possible as there are no legitimate land stewards to pay.

This last institutional bottleneck is particularly binding in many forest frontier areas, where much of the deforestation worldwide is happening. A recent scoping study in the Brazilian Amazon found that only about one-quarter of threatened forest is governed by land tenure rules that are appropriate for PES (Börner *et al*. in press). However, Brazil recently accelerated clarification of land tenure in the Amazon. PES options might justify such acceleration, as in two Indonesian cases (Arifin 2005; Wunder *et al*. 2008a). However, clarifying land tenure on a large scale can be expensive, and if it is not effectively combined with other incentives, such as large-scale PES, it could *reinforce* deforestation by making investments in converting land use more attractive.

Lessons from PES experiences

How are PES programmes doing, and how can we learn from their experiences to inform REDD+? The previous section showed that PES is simple in principle, but can be institutionally demanding. This means that the distribution of PES programmes worldwide is uneven: PES have developed quickly in Latin America, are incipient in Asia and almost absent in Africa (Landell-Mills and Porras 2002; Huang *et al.* 2009; Ferraro 2009). In Africa, Ferraro (2009) cites obstacles on the users' side, such as the lack of water-user institutions and payment vehicles, and a low tax base that limits the funds available to implement public PES programmes. On the providers' side, rural population density in Africa is much higher than in Latin America (driving up transaction costs). In particular, there is less security of land tenure and there are more customary collective tenure systems with overlapping usufruct rights in Africa, which can make it more difficult than in Latin America to hold individuals accountable for complying with PES contracts. These factors may help explain why PES, like other more complex business arrangements, have not taken off in Africa. More generally, they may also indicate that forested countries and regions with under-developed institutions and weak governance will have difficulties in developing REDD+ PES systems.

Existing PES schemes range in size from 550 hectares, in Pimampiro, Ecuador (Box 17.1) to millions of hectares, such as in Chinese forest protection (56 million ha) and reforestation (24 million ha) programmes (Bennett 2009). Within PES schemes, there is a key distinction between user-led and government-led schemes, exemplified by Pimampiro (Box 17.1) and Costa Rica's national PES programme (Box 17.2), respectively. Most user-led schemes are small, whereas government-led schemes are usually nationwide. Table 17.1 summarises the features, and pros and cons of both types of PES schemes. Large-scale programmes tend to have lower transaction costs, affect larger areas, have better links with policies and deal more effectively with free riders, multiple-layer benefits and leakage – the latter being particularly important for REDD+. However, user-led, small-scale PES typically focus on specific services and do not get blown off course by political winds of change. They are usually designed through customised, participatory processes, and are thus more flexible and robust. Typically, they tend to be targeted to high threat, high value, low cost areas (see 'PES options for REDD+' below). Conversely, government-led PES schemes mostly pay a fixed amount per hectare, reducing cost efficiency. Government-led PES usually also have low conditionality and additionality. The overall advantage of government-led schemes over user-led schemes is in administrative cost efficiency; user-led schemes with high start-up costs can often only be sustained by external donors (Wunder *et al.* 2008b).

Box 17.1. User-led PES: watershed protection in Pimampiro, Ecuador

The 13,000 inhabitants of Pimampiro (northern Ecuadorian Andes) draw part of their drinking water from the 638 ha Palahurco upper watershed; however, advancing deforestation and degradation of forests and natural grasslands has been linked to increasing seasonal water scarcity and deteriorating water quality. Since 2000, a PES scheme has been set up jointly by the municipality, an NGO, a donor (which subsidised start-up costs, US $22,000) and a trust fund (US $15,000). Metered Pimampiro water users pay a 25% consumption surcharge. Although there are some free-riding water users, including irrigators, user fees still fully cover recurrent payments.

Nineteen upstream landowners – four-fifths of all families in the Nueva América Cooperative, representing 86% of the target area – have accepted quite low compensation payments to conserve natural forests and grassland. The payments are between US $6 and US $12 per ha per year, depending on the type of vegetation and the state of conservation. Given that remaining forest stocks are large (average contracted area is 29 ha) and that there has been slow previous clearing (about 0.5 ha/year), the payments seemingly make economic sense to them. The initial 5-year contracts were extended indefinitely in 2006.

The Pimampiro PES scheme fulfils the five criteria for a 'pure PES'. It is a voluntary agreement between at least one seller and one buyer over a well-defined service/land use proxy, in which payment is conditional upon delivering services. Initially, 23 of 27 upstream landowners joined the scheme. However, quarterly monitoring detected repeated non-compliance and nine landowners were excluded. Five of those have since rejoined.

One of the success factors is that the conditions that had to be met before payments were made very clear, compliance with the contractual conditions has been monitored and sanctions have been enforced with vigour when landowners failed to comply. Pre-PES (2000), 198 ha had been cleared or disturbed. By 2005, the area cleared or disturbed had been more than halved (88 ha) and timber extraction had ceased. In neighbouring areas outside the watershed deforestation has continued.

Interviews with participating households in 2002 indicated that they were better off because of the PES scheme. Water users also seemed satisfied that a potential threat had been mitigated. The co-implementing NGO (CEDERENA) withdrew some years ago, but has twice replicated similar small-scale municipal schemes in Ecuador (El Chaco, Celica), and has a handful of new schemes in the pipeline.

Sources: Echavarría *et al*. (2004); Wunder and Albán (2008)

Box 17.2. Government-led PES: forest conservation in Costa Rica

Costa Rica pioneered payments for conservation in developing countries. Forest Law 7575 (1996) had four purposes: 1) mitigation of greenhouse gas emissions; 2) maintenance of hydrologic services; 3) biodiversity conservation; and 4) protection of scenic beauty for recreation and ecotourism. The same law established a regulatory framework for contracting landowners to provide these services, as well as the semi-autonomous National Fund for Forest Financing (FONAFIFO) to manage the scheme.

To participate, landowners must submit a plan for sustainable forest management prepared by a licenced forester. Once the plan is approved, the conservation measures specified must be put in place. Conservation payments were initially fixed at US $64 per hectare per year in 2006, but higher payments were introduced for forests in strategic watersheds. After an initial upfront disbursement, all subsequent annual payments require verification of compliance.

Deforestation was already legally prohibited, but payments give incentives to go further than just obeying the law, e.g., for foregoing timber harvesting, area delimitation, firebreaks and active forest monitoring. To date, the programme has been funded primarily through a domestic fossil fuel tax (about US $10 million/year), topped up by a World Bank loan, grants from the Global Environment Facility and German Technical Cooperation and, since 2005, by a new water tariff.

About 10% of the country's forests are part of the programme, but the effects are difficult to assess. Deforestation had already levelled off before 1996, mostly because of less cattle ranching. Payments have been flat. The scheme did not initially target specific high-threat or high-service areas. Hence, several evaluations have found that the programme has not had much additionality: initially it has mostly paid for protecting forests that would have been conserved anyway. Nevertheless, the programme was politically tremendously important in making forest conservation more palatable nationally. As a pioneer case, it also served as a live laboratory, and over time has evolved significantly (more spatial targeting, differentiated rates) toward higher service effectiveness.

Sources: Pagiola (2008); Wünscher *et al*. (2008); Pfaff (personal communication)

Table 17.1. Features of user-led and government-led schemes for payments for environmental services (PES): pros (green) and cons (yellow)

Feature	User-led	Government-led
Design process	Participatory and negotiated	Top-down decision making
Flexibility	Locally customised, flexible solutions	Some standardisation of interventions necessary
Objectives	Clear focus on environmental problem facilitates targeted design	Political objectives (e.g., social, electoral) may overload goals and reduce environmental effectiveness
Transaction costs	Typically high, especially start-up	Typically enjoy administrative economies of scale
Impact	Innovations do not spread beyond the immediate area	Good ideas replicated and spread over large areas
Policies	Policy framework is imposed	Policies can be influenced by lessons learned
Effectiveness in going to scale	Ill-suited to deal with non-excludability (free riding, leakage)	Can charge 'wannabe' free riders, control for leakage and bundle/layer benefits to multiple beneficiaries

There is a partial overlap between these two PES types and the national architecture of external REDD+ funding mechanisms, i.e., fund-led versus market-based solutions (cf. Chapters 2 and 5). Most carbon market-led schemes have historically been 'user-led'. The Costa Rica government PES programme has, however, also attracted service user financing from the private sector (Box 17.2). Conversely, fund-led approaches could either finance discrete, location-specific programmes with clear carbon conditionality – in a similar way to user financing – or co-finance government PES programmes with multiple objectives. Hence, while most carbon market financing may be channelled through 'user-led' schemes, the two mechanisms are not clearly distinct.

PES options for REDD+

To what extent could PES become a major tool for REDD+ implementation on the ground? Assuming that governments get paid by global carbon markets or funds to reduce national deforestation, they might partially delegate reducing deforestation and corresponding carbon benefits to contracted landholders. PES could thus serve as decentralisation instruments for achieving targeted reductions in deforestation in forested regions. Present national-scale PES and PES-like schemes in developing countries, such as in China, Costa Rica, Mexico, South Africa, Vietnam and recently Ecuador – and even in developed countries like Australia, European countries and the USA – can provide countries implementing REDD+ with information on what works and what does not work in contract conservation (e.g., Karousakis 2007).

For countries to choose the PES route for implementing REDD+, some basic local preconditions have to be met. Changes in forest carbon stocks must be monitored, payments must more than cover the costs, and conservation payments must motivate land stewards. These are conditions to keep in mind, but perhaps none of them should worry us too much. The killer condition is institutional, in particular the challenge of identifying land stewards with reasonably good control over clearly delimited lands. Weak governance predominates in forest frontiers, be it in the Amazon, Borneo or Central Africa, and typically goes hand in hand with ambiguous and insecure land tenure. In cases where, for example, indigenous communities have *de jure* recognised tenure but *de facto* weak tenure, PES could be combined with command and control investments to consolidate local land rights. PES can help us reform policies characterised by regulatory excess. Yet PES still crucially depend on minimum governance conditions (Bond *et al.* 2009), and thus cannot fully substitute for command and control measures. Furthermore, on some frontiers, the conditions are such that no land stewards can possibly provide reliable services, and it is better just to forget about PES.

Once key PES preconditions are met, or can with reasonable effort be created, we can turn our attention toward the design of REDD+ PES. Should REDD+ PES be user-led or government-led? Initially, a good share of REDD+ PES pilot schemes are likely to be user-led, e.g., through NGOs or intermediaries. This could be good, since user-led programmes are typically adaptive, flexible and diverse – advantages when it comes to learning lessons about implementation. In the medium term, user-led pilot schemes could be linked in 'nested approaches' to national level accounting, or supplemented by government-led national PES schemes (or both). However, some developing countries will lack the preconditions to implement national PES systems soundly, or they will not be able to implement them because the government lacks the capacity (e.g., corruption, no authority or presence in remote forests).

Ideally, REDD+ PES systems would take the best elements from the two PES worlds: they would combine the best features of pre-existing government-led schemes that people already trust and that provide economies of scale, with the best features of flexible state-of-the-art user-led PES schemes that do not put political 'patron–client' relationships above environmental efficiency. Four key clear-cut lessons for designing and implementing effective and cost-efficient PES schemes emerge (Wunder *et al.* 2008b; Wünscher *et al.* 2008):

1. **Apply hard conditionality:** monitor performance closely, enforce explicit sanctions for non-compliance and pay according to performance, preferably *ex post* to maintain leverage on the suppliers of services.
2. **Target high-threat areas:** spatial modelling, or even certain proxies, e.g., nearness to roads or markets, can tell us where the risk of deforestation is highest. Only PES in areas that are truly threatened will mitigate climate change.
3. **Target high-service areas:** other things (e.g., threats, costs) being equal, give priority to forests with high carbon densities, to maximise the potential for mitigation.
4. **Differentiate payment:** set payment rates according to the opportunity costs of service providers, the threat to the forest (point 2 in this list) and the potential of services to deliver mitigation (points 2 and 3). Ideally, this should be done through procurement auctions (Jack *et al.* 2009), but other methods to approximate costs may also reveal true costs and thus help in differentiating payments.

What about equity and other issues, such as the benefits of maintaining or enhancing biodiversity? Conditionality is key to PES, and there is no excuse for deviation from this criterion. Targeting exclusively high-threat areas can sometimes create moral hazard issues by rewarding only 'the bad guys' for turning into good guys. Rewards for those who have been 'good forest guardians' can boost political acceptance of PES and prevent perverse incentives emerging, although the latter have not really been a problem in PES so far. However, payments to those who have been good stewards should probably be low, because their opportunity costs are usually zero or negative. Targeting forests that have high carbon densities does not raise any concerns about equity and the additional benefits for biodiversity could, for example, trigger schemes that integrate environmental services with capturing carbon. Payments that only cover the costs of providing services would mean that providers gain nothing. Typically, payments must be sufficient to interest providers and help alleviate poverty, so a margin over and above provision costs may need to be paid. Conversely, fixed rates could put large rents in the pockets of poor, low-cost service providers and improve their welfare substantially. But low-cost providers are not always poor, so fixed payments for PES is also not recommendable as a poverty alleviation strategy, and efficiency losses can be dramatic. Fixed rates are often erroneously seen as equitable. In fact, customising payments according to opportunity costs distributes net benefits more equitably across providers, although total provider rents (and thus aggregate provider welfare gains) may be lower. Three or four different rates, set according to the different circumstances of providers, could be a reasonable compromise between full differentiation (i.e., pressurising providers to receive the lowest acceptable payment) and fixed payments (i.e., maximising providers' welfare gains).

An additional concern with respect to equity and fairness is that tropical deforestation and degradation are often illegal *de jure*, but tolerated *de facto*. Hence, governments are understandably hesitant to pay landholders to obey the law, even one which does not work. However, the Costa Rican (Box 17.2) and other examples show that there are creative ways to circumvent this problem, such as subsidies for landholders who make efforts to comply with the law, even if they previously have not respected it.

Conclusion

Clearly, payments for environmental services can reduce deforestation and forest degradation. Payments for environmental services, or conservation by contract, prove to be fairly effective when payments depend on delivering results. If payment rates are set appropriately, PES can also be cost effective for reducing deforestation and forest degradation, although small-scale schemes may have high start-up transaction costs. Because they are voluntary and based on incentives, PES are more equitable for conserving forests than erecting fences or imposing fines.

That said, PES schemes must meet information, economic, cultural and institutional preconditions. In particular, forest stewards must have exclusive land rights. Many forest frontier zones, where deforestation is currently concentrated, do not meet this requirement. Where there is outright land grabbing, PES will not work. Clarifying land tenure can help establish conditions in which PES will work effectively. In some cases, a mix of collective and private incentives, and, in areas remote from markets, of cash and non-cash incentives (including enhanced land and resource rights), may be needed to customise PES to local sociocultural settings.

Like other conservation tools, PES face tradeoffs between effectiveness and efficiency on the one hand and equity on the other. A narrow short-term focus on 'the biggest carbon bang for the buck' could backfire by creating perceptions of unfair and unidirectional policies, and fostering political resistance. So far, in large-scale government-led PES, there has been too little focus on efficiency and effectiveness. The tendency is to get side-tracked by other objectives. REDD+ implementers can learn from past PES mistakes by putting the horse before the cart, while still striking a reasonable balance as regards equity and other objectives.

Chapter 18

Lessons for REDD+ from protected areas and integrated conservation and development projects

Katrina Brandon and Michael Wells

- Forest protected areas (PAs) could become a critically important element of tropical forest countries' efforts to implement and benefit from REDD+.
- There are important similarities and overlaps between REDD+ projects and integrated conservation and development projects (ICDPs) linked to PAs. Like ICDPs, REDD+ pilot and demonstration projects have generated considerable excitement and donor support, and very high expectations among stakeholders.
- ICDPs have generally performed poorly; although the reasons for this are well understood, avoidable mistakes continue to be made in their design and implementation. REDD+ projects should learn from these experiences.

Introduction

More than 102 000 protected areas (PAs) cover 12.2% of the Earth's land area and provide benefits such as protecting biodiversity and cultural values, and ecosystem services, including carbon storage. PAs support around 1.1 billion people, nearly one-sixth of the world's population, providing them with food, fuel, fresh water, fibre, shelter and genetic resources. PAs also store over 312 gigatonnes of carbon (GtC) (Campbell *et al.* 2008), around 15% of the terrestrial carbon stock, and cover 13.5% of the world's forests (Schmitt *et al.* 2009). Keeping PAs, especially forested ones, intact is an essential part of the effort to retain forest carbon.

While biodiversity conservation is the primary objective of most PAs, including forest PAs, their management has increasingly focused on relationships with local people. Increasing recognition that it was neither politically feasible nor ethically justifiable to exclude people with limited resource access from parks and reserves without providing them with alternative means of livelihood led to a new generation of projects that reached outside PA boundaries to focus on the welfare of local people by promoting social and economic development, referred to as integrated conservation and development projects (ICDPs) (Wells and Brandon 1992).

Experience with PAs and ICDPs offers important lessons for REDD+. First, PAs can be an effective way of conserving forests, and expanding PAs should be part of the overall REDD+ policy package. Second, ICDPs or similar approaches are a dominant strategy for mitigating threats to forest PAs. Third, ICDPs are relevant to REDD+ projects because both seek to preserve global public goods (biodiversity and carbon) by promoting social and economic development (i.e., livelihood co-benefits). Both PAs and ICDPs are controversial and many of the lessons they provide for REDD+ are along the lines of 'what not to do'. However, there are also promising experiences with ICDPs that provide positive lessons for REDD+.

This chapter briefly reviews the history of PAs and ICDPs, and then addresses three questions:

- What are the key similarities and differences between REDD+ projects and ICDPs?
- Which lessons from ICDP experiences are most relevant to REDD+ projects?
- What roles could forest PAs and ICDP approaches play in REDD+ strategies?

Evolution and effectiveness of PAs and ICDPs

Although there is still debate about the effectiveness and efficiency of protected areas versus nonprotected areas (Gaston *et al.* 2008), many countries have made global commitments to expand PAs to conserve habitats, ecosystems and biodiversity. The effectiveness of PAs has varied depending on whether the focus is on management (e.g., Leverington *et al.* 2008), the status of certain species, or changes in land use (Coad *et al.* 2008). Land use data suggest that deforestation is controlled more effectively in PAs than in areas surrounding PAs (Nagendra 2008; Naughton-Treves 2005; Adeney *et al.* 2009; Nelson and Chomitz 2009). There are, however, large differences between regions and between types of PAs; for example, indigenous and community-managed reserves appear to be more effective than other types of PAs in preventing fires (Nepstad *et al.* 2006; Nelson and Chomitz 2009).

Table 18.1 shows that strictly protected areas slow the loss of forest more than other types of PAs in most regions. Overall, rates of forest loss are highest in the neotropics and PAs are effective at reducing losses in this region. Tropical Asia has the next highest rate of forest loss. While PAs do reduce forest loss in this region, the overall loss of forest and carbon is substantial, accounting for about 990 million tonnes of CO_2, or about 3% of total emissions from tropical deforestation. Improving management of PAs, especially where forest losses are greatest, such as in the neotropics and tropical Asia, could make a small but vital contribution to reducing overall emissions.

As protected areas have expanded, their actual and potential contributions to society have been intensely scrutinised. This has led to an evolution in the philosophy and practice of PA management. PAs now address poverty, indigenous rights, tenure and a range of other social, economic and political issues (Brandon *et al.* 1998; Naughton-Treves *et al.* 2005). Many of these issues will also affect REDD+ projects. Key questions include the extent to which forest areas managed for carbon will compete with other land uses and livelihood needs; whether REDD+ will impose costs on the poor or provide them with new opportunities; and how conflict between local priorities and national policies can be resolved equitably and efficiently.

ICDP approaches began reaching a critical mass in the 1980s, consistent with recommendations from the 1982 World Parks Congress that communities living adjacent to parks should be supported through local participation, education, revenue sharing, development activities and opening park resources to local use. ICDPs have tried to reduce pressure on or divert threats away from protected areas by providing new livelihood opportunities in sectors such as agriculture, agroforestry and tourism. Many ICDPs also financed community services, such as health clinics and schools, to build goodwill and positive attitudes toward protecting forests. By the 1990s, ICDP approaches had become popular and attracted substantial support from international development agencies and large conservation NGOs. However, they began to fall from favour after early results proved disappointing and critical reports became widespread (McShane and Wells 2004). While the ICDP label is now less common, most internationally funded efforts to strengthen PAs, including

Table 18.1. Forest area and forest loss in humid tropical forests, by conservation status

Realm	All forests		Strictly protected areas IUCN I and II[1]		All protected areas		Total carbon in PAs (Mt)
	Forest area (000 ha)	Forest loss 2000–2005 (%)	Forest area (000 ha)	Forest loss 2000–2005 (%)	Forest area (000 ha)	Forest loss 2000–2005 %)	
Afrotropics[2]	185 752	0.24	9 184	0.12	22 697	0.31	7 750
Australasia	80 775	0.81	3 998	0.92	9 616	0.67	4 893
Neotropics	620 290	2.39	44 725	0.48	156 702	0.79	48 450
Tropical Asia	220 964	2.17	10 014	0.96	28 185	1.33	9 255
Total humid tropical forests	1 107 780	1.87	67 922	0.53	217 201	0.81	70 348

Source: Campbell *et al.* (2008)

1 IUCN Categories I and II are the most strictly managed PAs, such as national parks.

2 Afrotropics refers to Africa south of the Sahara desert. Australasia refers to the islands of the southern Pacific Ocean, including Australia, New Zealand and New Guinea. Neotropics refers to the region of plant and animal distribution east, south and west of Mexico's central plateau that includes Central America, parts of South America and the Caribbean. Tropical Asia refers to all Asian countries between the Tropic of Cancer and the Tropic of Capricorn.

conservation at the landscape scale, still implicitly espouse ICDP principles and approaches.

Whether, or to what extent, PAs help or harm people is a highly controversial topic (e.g., Naughton-Treves *et al.* 2005; Brockington *et al.* 2006; Agrawal and Redford 2009). Recent research shows that while people in and around PAs may be poorer compared to national averages, it is not the PAs that have made them worse off (Ferraro and Pattanayak 2006; Sims 2008; Andam *et al.* 2008; Andam *et al* 2009). These studies, however, do not include instances where people have been displaced. Comparable arguments over REDD+ rewards for performance and compensation have already emerged (Sander and Zeller 2007; Shrestha *et al.* 2007).

Comparing ICDPs and REDD+ projects

Most REDD+ demonstration projects aim either to sell carbon credits directly (through voluntary markets) or to seek rewards from their governments for contributing to national REDD+ goals. REDD+ demonstration projects have already taken several forms (Chapter 21). These range from payments for ecosystem services (PES) (Chapter 17) to more traditional forest management or conservation projects. These latter projects resemble ICDPs, although the areas they seek to conserve are not necessarily PAs.

A REDD+ project in its simplest conceivable form is a formal agreement to provide a stream of payments for meeting agreed upon targets to reduce local deforestation and degradation within a defined area based on the volume and value of reduced greenhouse gas (GHG) emissions. At local levels, this is conceptually similar to the ICDP concept of providing social and economic development benefits for reducing pressure on biodiversity in protected areas, even though ICDPs have rarely included such explicit contracts.

But ICDP and REDD+ objectives differ. ICDPs seek to conserve biodiversity in PAs, while REDD+ projects seek to reduce deforestation in specific areas, not necessarily or even primarily in PAs. REDD+ projects deal in carbon as a commodity in ways that PAs and ICDPs could never do with biodiversity.

Both ICDPs and REDD+ projects are concerned with *permanence.* Neither wants actions in one area to lead to negative effects elsewhere (*leakage*). Both want to reduce immediate threats to forest ecosystems and maintain their health so that they deliver sustainable ecosystem services and provide tangible benefits to local communities. Yet the anticipated scale of financing for REDD+ is much larger than ever imagined for biodiversity conservation, which may not matter for individual projects but will be important at broader scales.

While REDD+ projects are not linked to PAs in the same way as ICDPs are, ICDP experiences provide important lessons for designing and implementing efficient, effective and equitable REDD+ projects. Efforts to build the lessons learnt from ICDP experiences into REDD+ are now being made by the Climate, Community and Biodiversity Alliance (www.climate-standards.org), a partnership involving the private sector, NGOs and research institutes. Partners have implemented projects and developed principles and voluntary standards for forest carbon programmes that respect the rights of local and indigenous people, and also generate significant social and biodiversity co-benefits.

Balancing the requirements of REDD+ (storing carbon) and satisfying the expectations of local stakeholders may prove challenging. A key issue for REDD+ projects already encountered by ICDPs are whether individual households or local communities will be responsible for meeting contract conditions and what effects REDD+ funding will have on local development. Other key issues that a 'basic' REDD+ project that takes the payments for environmental services (PES) approach must resolve are:

- *how to monitor* forest carbon content (or an acceptable proxy) as a basis for claiming payment;
- identifying *who* to pay;
- determining *how much* to pay;
- working out *how to pay* (through transparent and accountable systems or funds) and *how to use* REDD+ payments; and
- how to ensure that REDD+ gains are *permanent*.

Additional challenges specific to REDD+ related to *leakage* and *additionality*, while critically important to REDD+ effectiveness overall, are arguably national or regional, rather than local issues.

While all these issues are important, the question of who should receive payments may be particularly problematic. Those holding rights to forest carbon should be rewarded to give them an incentive not to deforest. But identifying carbon rights holders is likely to be highly controversial. There are often disputes or ambiguity between legal owners (the *de jure* carbon rights holders) and the people, organisations or government agencies that actually manage the forests (the *de facto* rights holders). These tenure issues are explored further in Chapters 11 and 12.

The feasibility of carbon accounting at the project scale for REDD+ schemes is not yet clear. Monitoring changes in stored forest carbon and rewarding the appropriate rights holders might not seem to be difficult, and may involve communities themselves (Chapter 8). But tracking, verifying and rewarding thousands or tens of thousands of rights holders in countries such as India or Indonesia, or in places where ownership is disputed, poses huge challenges. The bureaucratic complexities may be more than many developing country governance systems can reliably handle. But that concern goes beyond the scope of individual projects.

Lessons from ICDP experiences for REDD+ projects

Although most proposals for global REDD+ mechanisms do not include standing forests, there are two main reasons why forest PAs and ICDPs should be considered when putting REDD+ into practice. First, countries hope to sell forest carbon credits earned from overall national REDD+ performance on compliance markets. PAs that avoid deforestation or degradation contribute carbon credits to overall national REDD+ credits. Making PAs more effective, including through ICDPs, thus appears a vital component of national REDD+ strategies, particularly as developing countries with the greatest areas of forest also tend to have large protected areas. Second, many early REDD+ demonstration projects share important features with ICDPs, particularly as regards REDD+ 'co-benefits', such as conserving biodiversity and generating sustainable livelihoods. Because of these similarities, ICDP experiences can and should inform REDD+ projects.

A major attraction of the ICDP approach – reconciling biodiversity conservation with social and economic development – proved more difficult than anticipated. The parallel challenge for REDD+ projects is linking carbon sequestration efforts with 1) incentive payments to protect forests, and 2) generating co-benefits. The risk with the former is that a REDD+ project could pay people or organisations lacking the legal rights or the capacity to protect the forest, or that *de facto* owners will be displaced; while the risk with the latter is that local people will not perceive that REDD+ offers a sufficient incentive for protecting forests. Both will be hard to avoid and either could lead to project failure.

With ICDPs, the links between conservation and development were often weak or lacking. Most investments in alternative livelihoods were insufficient and had little effect on the effectiveness of PAs, sometimes even leading to increased forest exploitation. Some studies even questioned whether ICDPs made any ecological or social contributions at all (Barrett and Arcese 1995; Ghimire and Pimbert 1997).

During the 1990s, it became evident that reported ICDP successes were based more on overoptimistic goals and expectations than on an analysis of actual experience, a mostly critical literature emerged and there were clear signs that 'establishing ICDPs that actually work has proven to be rather more challenging than marketing the concept and raising funds [and] nearly a decade after first popularized, there is still a notable lack of successful and convincing cases where people's development needs have been effectively reconciled with protected area management' (Wells *et al.* 1999). We hope the same will not be said about REDD+ and forest conservation.

We do not know whether or not ICDPs improve the effectiveness of PAs because too few projects were rigorously monitored or analysed. ICDPs do tend to be associated with the most high-profile and best-known PAs simply because donors support these sites, and because most donor support for biodiversity conservation during the last two or three decades has been invested in ICDP approaches.

What not to do

The main problems encountered by ICDPs were as follows.

1. Objectives were often unclear, incompatible, or poorly understood and interpreted differently by different stakeholders. Contradictions and tradeoffs between biodiversity goals, which can marginalise local stakeholders, and economic development goals, which can threaten biodiversity, were often glossed over or ignored.
2. Although planning stressed local participation and collaborative management, these processes were poorly understood and rarely implemented effectively. The 'project' approach was often unsuitable, with local actors expected to achieve 'ownership' and project activities expected to achieve 'sustainability' even with objectives, design, time-frame and budget largely determined by outsiders. In retrospect, the idea that a limited duration, stand-alone project could lead to large-scale, sustainable changes in human behaviour seems naïve.
3. Many ICDPs were overambitious and tried to address too many problems simultaneously, thereby ignoring one of the clearest lessons from earlier integrated rural development projects championed by international development agencies. Donors' expectations and assumptions in terms of contributions to mitigating rural poverty in and around PAs were often unrealistic.
4. The developing country institutions engaged to implement ICDPs (i.e., government agencies, NGOs and research organisations) often had a limited understanding of the ICDP concept. They also lacked the capacity to undertake complex sets of activities across disciplines and departmental jurisdictions.
5. While in principle committed to expanding local economic opportunities, ICDPs often did not create viable alternative livelihoods or boost household incomes in communities in and around PAs.

6. The activities of local people are less of a threat to many PAs than the development of infrastructure (roads, mines, dams, etc.) or the conversion of forest to agriculture by large enterprises. Most ICDPs or PAs have not successfully engaged with economic planning or land use decisions, thereby missing the main threats.
7. ICDPs were frequently frustrated by poor law enforcement in PAs. The importance of effective and equitable enforcement of PA laws and regulations as an essential element of ICDPs was not recognised. In particular, prevention of large-scale illegal logging or poaching by powerful commercial interests is well beyond the remit of projects, communities or PA management agencies.

These problems were compounded by:

- the reluctance of most organisations funding and implementing ICDPs to take account of the lessons emerging from early experiences (e.g., Wells and Brandon 1992);
- the belief that communities are homogeneous and harmonious and can meaningfully engage with external interests with little conflict; and
- a lack of accountability for on-site implementation with selective reporting on the part of NGOs and an apparent inability to learn among donors.

All of these lessons appear relevant to REDD+ demonstration projects.

Table 18.2. Main lessons from ICDP projects relevant to REDD+ projects

What not to do	What to do
1. Have unclear, incompatible and poorly understood objectives 2. Believe that stand-alone and time-limited projects can lead to large-scale sustainable changes 3. Establish overambitious goals, create high expectations 4. Commit to delivering livelihood opportunities where infeasible 5. Combine limited local capacity with complex activities and interactions 6. Focus on small local deforestation or degradation actors and ignore large-scale actors and land use planning 7. Maintain poor law enforcement inside PAs	1. Use adaptive management and actions based on problem identification and solving 2. Establish strong and flexible local management organisations 3. Get long-term funding, and communicate how it will be performance based 4. Enable local communities and institutions to participate in real decision making

What to do

ICDPs offer positive lessons for REDD+ projects, including the conclusion that it is not 'that the *principle* of linking protected area management with local social and economic development is flawed [but] the *expectations* and *implementation* that have been problematic' (Wells *et al.* 2004).

REDD+ projects may take on too much and fail as a consequence, especially where land and resource uses and tenure, including ownership of carbon rights, are not clear. REDD+ projects would be challenging enough if their only objective was to reduce carbon emissions. But, as REDD has become REDD+, project objectives now span not only the conservation and sustainable management of forests but also the enhancement of carbon stocks and co-benefits such as biodiversity conservation, watershed protection, other ecosystem services and poverty mitigation. REDD+ may even become REDD++ or 'fair trade carbon' where projects must be environmentally and socially responsible while demonstrating improved governance and clarifying property rights (Griffiths 2008; UNFCCC 2009a). While REDD+ projects are likely to attract much more money than ICDPs, this does not guarantee that they will be designed and implemented more carefully; rather, the ICDP experience suggests the opposite.

While avoiding the seven main ICDP problems outlined previously is imperative, the authors' experiences suggest that the following implementation lessons from the more promising ICDP approaches should be considered by those promoting REDD+ projects. All of these are elaborated in the participatory rural development, PA and ICDP literature.

1. Replace standard blueprint project designs with adaptive management and actions geared toward problem identification and solving (which is not the same as 'learning by doing'). This applied research approach integrates design, management and monitoring so that projects systematically test assumptions, adapt and learn (Salafsky *et al*. 2001). Interventions that start small and simple and build on early successes appear to have good long-term prospects.
2. Staff local management organisations with people with the capacity and authority to exercise judgement and deploy resources flexibly, both to enforce regulations (e.g., restrictions on logging) and to generate co-benefits (e.g., promote livelihood opportunities).
3. Provide long-term funding commitments (i.e., a decade or more) rather than conventional project support for short time periods. A key part of building trust among local stakeholders is for them to know where the funding is coming from and why, who will receive the funds and how long this will continue.

4. Put mechanisms in place that enable communities and institutions to make decisions and own projects rather than depend on outside agencies. Many developing country government agencies need more flexibility in overstepping jurisdictional boundaries, and agencies need greater flexibility and willingness to work together on finding REDD+ solutions and addressing local communities' needs. Similarly, government agencies often need help or confidence building before working effectively with local or national NGOs.

PAs and ICDPs in REDD+

The REDD+ discussions have paid little attention to forest PAs, and this needs to be corrected. Forest PAs are likely to become a critically important element of tropical forest countries' strategies to implement and benefit from REDD+. The effective management of forest PAs (in some cases linked to ICDPs) has the potential to make significant contributions to national REDD+ performance and the sale of carbon credits if forest carbon markets emerge as expected.

There are similarities and overlaps between the approaches and methods of ICDPs linked to PAs and REDD+ demonstration projects. REDD+ project proponents could usefully take lessons from ICDPs into account. The reasons why most ICDPs have failed to meet their objectives are well understood and thoroughly documented. Despite this, mistakes continue to be repeated, demonstrating the disconnect between research and practice.

REDD+ demonstration projects have generated considerable excitement, relatively large donor support and very high expectations among stakeholders. They are also being implemented in an atmosphere of impatience and haste. This increases the risk of failure and could undermine the REDD+ initiative, the most exciting development in tropical forest conservation in the past 30 years.

How can emissions from woodfuel be reduced?

Ole Hofstad, Gunnar Köhlin and Justine Namaalwa

- Unsustainable harvesting and combustion of woodfuel can aggravate climate change but, if woodfuel replaces fossil fuel, it can become part of the solution.
- Policies to reduce the demand for woodfuel (promote more efficient cooking stoves, substitute other fuels) can be effective if combined with and supported by other policies.
- Supply side measures (efficient woodfuel production and plantations) can also help reduce emissions, but there is no substitute for better control of harvesting.

Introduction

Unsustainable harvesting and combustion of woodfuel[1] aggravate global climate change. But, since climate change is mainly caused by burning nonrenewable fossil fuel, a switch to sustainable woodfuel could mitigate climate change. This chapter reviews how woodfuel can aggravate or

1 The term 'woodfuel' is used here to cover both 'fuel wood' and 'charcoal', but not the use of wood biomass as feedstock for other sources of energy such as gas or liquid fuels, or for direct combustion to produce electricity.

mitigate climate change and discusses possible measures to limit its negative climate impacts.

Given the importance of woodfuel, both as a source of and a sink for greenhouse gases (GHGs), it is striking how little attention is paid to it in the REDD+ literature. There is general agreement that collecting fuel wood contributes to forest degradation, particularly in Africa, and especially in the drier forests of sub-Saharan Africa (Kanninen *et al.* 2007). The Meridian Institute (2009a) estimated that the climate benefits from stopping 'biomass extraction for fuel (fuel wood and charcoal) at rates greater than regrowth' would be just 5–8% less than those from stopping deforestation. Some investigators warn that focusing too much on the collection of woodfuel as a driver of degradation may lead to interventions that harm the poorest people by limiting their access or driving up prices (Griffiths 2008; Lovera 2008; Peskett *et al.* 2008).

This chapter starts by looking at how woodfuel contributes to GHG emissions. Next, we review the current and projected use of woodfuel (i.e., fuel wood and charcoal) in developing regions, and discuss factors affecting demand. Finally, we outline potential interventions on the supply and demand sides that could be considered when designing national REDD+ policies.

Climate change and woodfuel

Woodfuel contributes to GHG emissions through unsustainable harvests and the combustion of biomass. Whether or not the supply of woodfuel from forests and woodlands is sustainable depends on the difference between the harvest rate and the growth rate. When the extraction rate is greater than the rate at which the biological system regenerates biomass, forest or woodland becomes degraded. For the African *miombo* type woodland, woodfuel yields of about 2–3 t/ha per year are common (Campbell 1996; Hofstad 1997). Namaalwa *et al.* (2009) estimate that yields in Ugandan *Combretum* woodlands are about 2–4 t/ha per year. Aggressive fuel wood and charcoal producers often extract woodfuel at much higher rates where demand is high. Consequently, the density of woodland biomass becomes reduced (Luoga *et al.* 2002) resulting in net CO_2 emission. In Uganda, the density of air-dry biomass in large areas of woodland falls on average by 3 t/ha per year (MWLE 2002).

Since fuel wood is heavy and bulky, it is often made into charcoal if it is to be used some distance from the forest. Where wood is used to make charcoal, harvesting can take place over a much larger area than where wood is gathered for local use. Where woodfuel goes to make charcoal, harvesting could be maintained at a level below that required to regenerate the wood. However, if there is no control of harvesting, or if control is weak, operators are likely to harvest as close to markets as they can to maximise their profit. In many places, degradation is the inevitable result, such as around Kampala (Knöpfle 2004), Dar es Salaam (Monela *et al.* 1993), Blantyre (Matope 2000) and in the Zambian Copper Belt (Chidumayo 1989).

GHGs are emitted when woodfuel combusts. Dry wood contains about 50% carbon, but the carbon content of growing trees is much lower, as they contain a much higher proportion of water than dry wood. When one tonne (metric ton) of dry wood burns or decays, 1833 kg of CO_2 is emitted. In the pyrolysis of wood into charcoal, carbon is emitted to the atmosphere in the form of CO_2, carbon monoxide (CO) and methane (CH_4). Of these, CH_4 is particularly important as its global warming potential is about 21 times that of CO_2. Making charcoal in earth kilns normally results in about 50% of the woodfuel carbon being stored as charcoal, 25% emitted as CO_2, and the rest emitted as methane or other gases, or left as ash or particles in the air (Lamlom and Savidge 2003).

Emission of black carbon from biomass combustion may exacerbate the effects of climate change in Asia (Venkataraman *et al.* 2005). Carbonaceous aerosols cause strong atmospheric heating and large surface cooling that affect the South Asian climate as much as GHGs. Gustafsson *et al.* (2009) found that biomass combustion produced two-thirds of the bulk carbonaceous aerosols, and more than half of the black carbon.

Box 19.1. Effects of forest degradation on biomass and carbon stocks

Luoga *et al.* (2002) found that the standing volume in *miombo* woodland in a Tanzanian forest reserve was 47 m^3/ha. In comparable public land less than 2 km from a public highway which was exploited for charcoal, the standing volume was 14 m^3/ha, while biomass density was 8.8 t/ha. In woodland more than 10 km from the highway, the standing volume was 22 m^3/ha, while biomass density was 13.8 t/ha. The authors concluded that the level of harvesting in public lands is not sustainable as the annual removal of 6.38 m^3/ha far exceeds the mean annual increment of 4.35 m^3/ha.

The stakes are even greater in more humid forests. Palm *et al.* (2004) reported aboveground, time-averaged C stocks of different land use systems in Indonesian and Peruvian rainforest zones. Undisturbed forest in the two locations contained 306 and 294 t C/ha, respectively. Managed and logged forest held 93 and 228 t C/ha, respectively, while shifting cultivation and crop fallows contained an average of 7 to 93 t C/ha in Peru. Rotational rubber agroforestry in Indonesia contained from 46 to 89 t C/ha, and simple agroforestry with intensive tree crops in Indonesia had a carbon stock of 37 t C/ha, while a similar system in Peru had 47 t C/ha.

Use of woodfuel in developing countries

The total global production of wood in 2007 reached approximately 3600 million m^3, of which 1900 million m^3 was used for woodfuel (FAO 2009b). This means that more than half of the total global wood removed from forests, and from areas outside forests, is used for energy production.

Asia accounts for nearly half of global fuel wood consumption, but consumption is declining (Figure 19.1), particularly in China, and in much of east and southeast Asia, where it has been falling since the 1980s. Africa has higher *per capita* fuel wood use than Asia, and consumption is still growing, although the rate of growth is slowing. In South America, where fuel wood is less important, overall consumption has been rising only slowly. In aggregate, the projections suggest that use of fuel wood in the developing world has just peaked, but that the use of fuel wood in the coming decades will decline slowly unless policies are put in place that limit its use. In contrast to fuel wood, aggregate charcoal consumption is still growing, and will continue to do so over the next few decades. The production of charcoal, though still low relative to fuel wood in most of Asia, accounts for a much higher share of woodfuel in Africa and South America. In Africa, the growth rate for aggregate consumption of fuel wood and charcoal is similar to the population growth rate.

The total amount of woodfuel, and the number of people who rely on woodfuel, are still very large. Biomass energy is expected to account for about three-quarters of total household energy consumed in Africa by 2030. In addition, estimates indicate that the number of people using fuel wood and other biomass fuels will rise by more than 40% to about 700 million. In Asia, even though consumption is declining, there may still be 1.7 billion users in 2030, and in Latin America 70 million (IEA 2006).

Although there are large variations between countries, *per capita* consumption of both fuel wood and charcoal tends to decrease as incomes increase. Urbanisation typically decreases fuel wood consumption and increases the use of charcoal, and *per capita* fuel wood consumption decreases as forest cover declines (Arnold *et al.* 2006).

The role that income plays in the choice of fuel has led to the 'energy ladder' hypothesis, which assumes a transition to modern fuels as income rises. Some analyses show that the income elasticity of fuel wood demand is negative, i.e., higher income means less use of fuel wood (considered an inferior good). Further, some studies find that fuel wood is a normal good for lower-income households, but an inferior good for higher-income households. Household studies also indicate that consumption of woodfuel will remain high for a long time to come, particularly in rural households (Arnold *et al.* 2006).

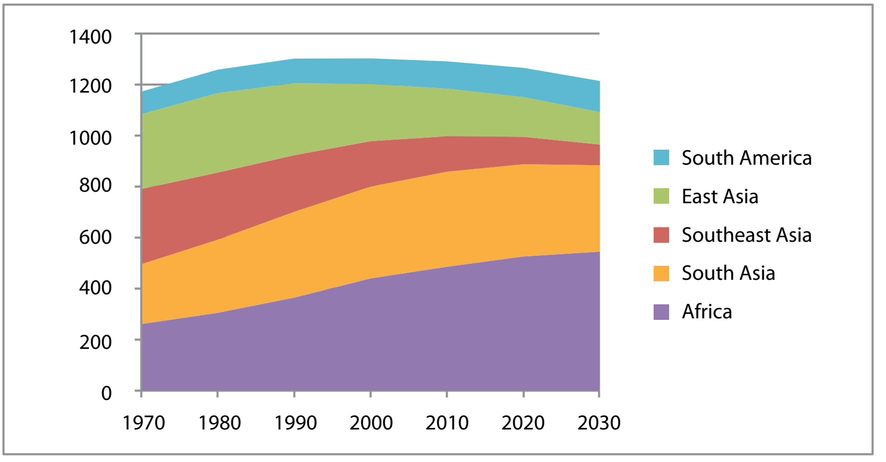

Figure 19.1a. Projections of fuel wood consumption in developing regions (million m^3)
Source: Broadhead *et al*. (2001)

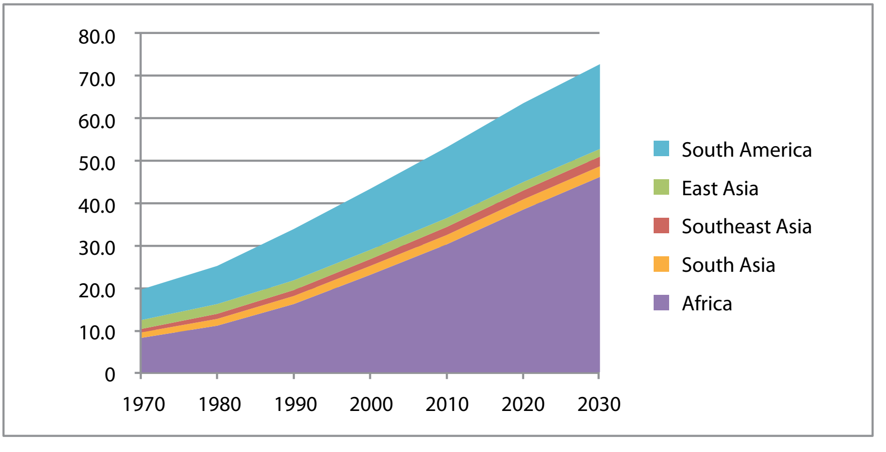

Figure 19.1b. Projections of charcoal consumption in developing regions (million tonnes)
Source: Broadhead *et al*. (2001)

In urban areas, fuel wood users are most likely to switch to charcoal. Charcoal is likely to overtake wood, in terms of the number of users and share of urban energy, as prices of wood increase relative to the prices of other fuels, as incomes rise and as cities become larger. Other 'transition' fuels are kerosene (paraffin) and coal. Gupta and Köhlin (2006) show that it is not only price that influences the transition from wood to modern fuels, but also convenience and the reliability of supplies. The set of policy options is thus broadened.

Five policy options

This section discusses how demand- and supply-side interventions could be part of a national REDD+ strategy. We build on lessons from the 'fuel wood trap' discussion of the 1970s and 1980s (Munslow *et al.* 1988), and the experiences with many policy interventions over the past four decades.

The use of woodfuel stems from the demand for energy. Two policy interventions are of particular interest on the demand side: developing more efficient ways of cooking, and switching from woodfuel to other fuels. On the supply side, three policy options are relevant: developing more efficient charcoal kilns, measures to limit harvest rates to sustainable levels and developing plantations to lessen pressure on 'natural' forests.

Table 19.1 shows a simple assessment of effectiveness, efficiency and equity plus co-benefits (3Es+) of the five policy interventions. We have learned something about the effectiveness of these policies and some of their pitfalls during the last few decades, but less is known about the efficiency of individual measures and combinations of measures under various conditions.

Table 19.1. Effectiveness, efficiency, equity and co-benefits of policy interventions

Policy intervention	Effectiveness	Efficiency	Equity	Co-benefits
Cooking efficiency	Moderate	High	Hurts the poorest consumers if not subsidised	Better health, less local air pollution
Fuel substitution	High for clean energy, low for fossil fuels	Costly for clean energy, cheaper for fossil fuels	Hurts the poorest consumers if prices not differentiated	Better health, less local air pollution
Production efficiency	Moderate, must be combined with harvest control	High, if combined with harvest control	Hurts producers without capital	Less local air pollution
Controlling harvest	Low if centralised, higher if devolved	Low if centralised, higher if devolved	May benefit the rural poor, but elite capture possible	May benefit biodiversity in some areas
Plantations	High	Low, if harvest in indigenous forests is not controlled	Benefits land owners and producers with capital	Sequester carbon if planted on land with low biomass density

Cooking more efficiently

Cooking in a pot placed on top of three stones around an open wood fire is not efficient. Most of the energy is lost and only 5% is transferred to the contents of the pot. Cooking efficiency can be improved by using dry fuel, enclosed burners or stoves, and pots with lids that fit well. With these and other measures, thermal efficiency can be increased to about 20% (Twidell and Weir 2006). If charcoal is used instead of wood, some energy is lost in pyrolysis, but thermal efficiency in cooking is better. Insulated stoves also improve efficiency. Traditional bucket stoves without insulation have efficiency rates of about 10%. Improved charcoal stoves with clay or ceramic insulation may have efficiency rates of up to 30%.

More efficient fuel wood and charcoal stoves may also have co-benefits. There are severe health problems related to the use of open fires, particularly indoors (Torres-Duque *et al.* 2008). These problems will be less with cookers that burn the wood more completely and release fumes outdoors.

Experience in many tropical countries during the last couple of decades shows that in most cases not more than 20% of consumers adopt improved charcoal stoves. The main reasons are that the stoves are too expensive, particularly for poorer urban households, that the insulation is easily broken and that charcoal is still fairly cheap. An important lesson learned from one of the successful stove projects, the Kenya Ceramic Jiko, is to make use of market forces and local artisans to increase adoption rates (Kammen 2000).

Switching fuel

Woodfuel is a good substitute for fossil fuel if the wood is harvested from sustainable production systems. Similarly, renewable energy like hydro-, solar or wind power is a good substitute for woodfuel that is harvested unsustainably. In the analysis of demand we have seen that kerosene, coal and liquid propane gas are often the first substitutes for fuel wood and charcoal in many tropical cities. In most cases, this means substituting fossil fuels for unsustainably produced wood. Box 19.2 shows the net emission effect of such substitutions. Normally, such substitutions will contribute to increased emissions of GHGs when harvesting and transport of wood, as well as processing and distribution of fossil fuels, are accounted for. Thus, from a climate perspective, a move from even unsustainable woodfuel to fossil fuel cannot in general be recommended.

Switching to hydropower or other sources of renewable energy is more promising. However, many developing countries only produce a small proportion of their total electricity output from hydropower plants, windmills or solar panel parks. Most electricity is generated in power plants fuelled by

Box 19.2. Efficiency and greenhouse gas emissions of cooking stoves

The efficiency of stoves that use fossil fuel varies considerably depending on the technology and how they are maintained. Average efficiencies of between 20% and 30% for coal, 35% and 45% for kerosene (paraffin), and 45% and 55% for liquid propane gas are assumed for typical applications (Bauen and Kaltschmitt 2001).

Even if renewably harvested, many biomass fuel cycles are not GHG neutral because they emit substantial products of incomplete combustion. To be GHG neutral, not only must biomass fuel cycles be based on renewable harvesting, but fuels must have close to 100% combustion efficiency, which most currently do not.

CO_2 equivalent emissions from different cooking options are given below (Bhattacharya and Abdul Salam 2002).

Cooking option	Efficiency value selected (%)	Emission factor value selected			Estimated CO_2 equivalent	
		CO_2 (kg/TJ)	CH_4 (kg/TJ)	N_2O (kg/TJ)	g CO_2-e [1] MJ^{-1}	g CO_2-e $MJ^{-1}{}_{useful}$
Kerosene	45	155 500	28.05	4.18	157.40	349.7
Liquid propane gas	55	106 900	21.11	1.88	107.90	196.2
Natural gas	55	90 402	20.65	1.84	91.40	166.2
Traditional stoves (wood)	11	–	519.60	3.74	12.10	109.7
Improved stoves (wood)	24	–	408.00	4.83	10.10	41.9
Traditional stoves (residues)	10.2	–	300.00	4.00	7.50	73.9
Traditional stoves (dung)	10.6	–	300.00	4.00	7.50	71.1
Improved stoves (dung)	19	–	300.00	4.00	7.50	39.7
Traditional stoves (charcoal)	19	–	253.60	1.00	5.60	29.7
Improved stoves (charcoal)	27	–	200.00	1.00	4.50	16.7
Improved stoves (residues)	21	–	131.80	4.00	4.00	19.1
Biogas stoves	55	–	57.80	5.20	2.80	5.1
Gasifier stoves	27	–	–	1.48	0.46	1.7

1 CO_2-e is the carbon dioxide equivalent for a 100-year time horizon. TJ is a terajoule, equal to 1 trillion joules. MJ is a megajoule, equal to 1 million joules. And g CO_2-e MJ^{-1} means grams of CO_2 equivalents.

coal or oil. In many developing countries, the supply of electricity is also erratic and insufficient. If governments seek to substitute clean electricity for fossil fuel and unsustainably produced woodfuel, grids must be expanded to reach poor townships in cities and remote villages in rural districts. In cities, the cost per consumer of expanding grids should be cheap, whereas it will be more expensive in remote villages. How consumers are charged is also important. A progressive tariff, whereby households pay a very low, subsidised price for the first few kWh and a higher price thereafter,[2] applies in some countries and is a good compromise between equity and efficiency.

Substituting fossil fuel or clean electricity for fuel wood would particularly benefit women and girls who are in charge of cooking and fuelwood collection in many places, but it would also improve air quality for all members of the household. A subsidised supply of improved stoves or electricity would be important to poorer urban households.

Production efficiency

Charcoal production in inexpensive earth mound kilns is most economical when the raw material, standing trees, is free or very cheap. But the energy loss is substantial. One tonne of charcoal contains 30 GJ (giga joules) of energy, and is usually derived from 6–12 tonnes of air-dry wood, i.e., between 90 and 180 GJ original energy content (Antal and Grønli 2003). Several other types of kilns, such as mud, brick and steel kilns, are more efficient. The technologies for these kilns are simple and would be easily transferrable if the economics were favourable. If producers have to pay stumpage,[3] they may be motivated to use more efficient technology because their raw material will no longer be free. The government could support training in more efficient technology. However, introducing more efficient kilns and training people to use them must be preceded by measures to control harvesting, otherwise the cost of training will be wasted.

Improved charcoal kilns may yield more, as well as producing commercially valuable byproducts. However, there has been little adoption in pilot schemes, mainly due to: high capital investment and maintenance costs; lack of specific returns from the market for byproducts; high cost of transport of metal kilns from one place to another when trees get scarce; time taken to ferry wood from different parts of the forest to the kiln; and lack of spare parts, maintenance skills and affordable and reliable credit facilities for capital investment.

2 Owners of air-conditioned buildings should pay a high price for electricity such that proper insulation becomes economical.
3 A fee charged by owners for the right to harvest trees.

Substantial volumes of woodfuel are generated as forests and woodlands are cleared for agriculture. This mainly contributes to the energy supply in rural areas, particularly in the forest fringe where deforestation is most intensive. In many cases, clearing takes place so far from the market that much of the wood, particularly large trunks, is burned on the spot rather than taken away as fuel wood for cooking or other household needs. Producing charcoal from some of the logs takes care of some wood left after clearing. Constructing roads would make transporting woodfuel to market easier, but it would also make transporting agricultural produce easier and thus stimulate deforestation, so it might have an overall negative impact in terms of GHG emissions.

Controlling harvesting

Several attempts have been made to control harvesting in indigenous forests and woodlands, such as issuing felling licences and controlling transport. For example, in Uganda a sustainable charcoal production and licensing system was piloted in major charcoal producing areas (Kalumiana and Kisakye 2001). Roadblocks to control charcoal transport to major African cities are common. Some states in Asia have been able to implement these kinds of measures effectively, but most attempts have failed. Loggers may buy one licence, but use it repeatedly. Others operate without a licence as they are unlikely to get caught. Transporters find routes to town that are not controlled, or they drive at night. Others bribe guards or forest officers. The authorities find it is not always worth putting in place costly control measures to regulate the harvest of low-value products like fuel wood and charcoal (Hofstad 2008).

A promising option seems to be to devolve responsibility for trees and forests (Cooke *et al.* 2008), for example, through some form of community forest management (see Chapter 16). If local communities or individual farmers owned trees, they might find it profitable to control harvests and charge stumpage fees. Fees could be in the form of a share of the final product, or a fee per unit output.

For many rural households, fuel wood or charcoal is a cash ‘crop’ that supplements the meagre income they otherwise earn. Transferring property rights of trees to local communities, individuals or farmers would increase their income, although elites could capture some benefits if rights were communal rather than individual. In the case of individual ownership, land grabbing by better-off people may threaten equity. However, if the raw material for woodfuel becomes more expensive, some of the costs would certainly be rolled over to urban consumers. Since poor households depend more on woodfuel than better-off households, more expensive fuel wood and charcoal would hit the poorer harder.

Licensing and quota systems for harvesting fuel wood and transporting woodfuel open up possibilities for corruption. Policy makers, therefore, should consider the risk of corruption and that elites could capture benefits when designing systems to regulate harvests in indigenous forests and woodlands (Larsen *et al*. 2000). Further, forestry personnel may often be excluded from processes for issuing licences and collecting revenue, as these may be handled by finance departments. In these cases, there would be no monitoring of harvests and available stocks, as the finance departments do not carry out such assessments.

Plantations

The final policy option – plantations of fast-growing species – has been attempted in various locations. A number of large-scale plantations were established during the 1980s and 1990s to increase the supply of woodfuel. Many peri-urban plantations were established in the South (Sargent and Bass 1992; Evans and Turnbull 2004). Some have produced poles and wood for construction reasonably profitably, but hardly any have successfully supplied fuel wood or charcoal to urban consumers. As long as *de facto* open access forests and woodlands supply cheaper and better woodfuel, consumers will not shift to wood grown in plantations. For this policy to work, it has to be combined with measures that make woodfuel from indigenous forests less accessible and more expensive. This will happen either when the resource base becomes exhausted, or when harvests are controlled effectively. If REDD+ is the objective, then the latter option is preferable (Yao and Bae 2008).

However, in some places plantations are becoming more important as a source of woodfuels for commercial use. A study in Ethiopia demonstrated that fuelwood, for personal or commercial use, was the primary reason why 15% and 21% of respondents, respectively, planted trees (Arnold *et al.* 2006). In spite of the limited success of fuelwood from plantation forests, there is an unexploited potential for fuelwood as a byproduct from the management of on-farm trees and shrubs mainly used for other purposes. This is a relatively low-input tree crop that could be promoted through interventions favouring multipurpose woody species and management practices. A study from Orissa, India, also shows that community plantations can decrease the pressure on open-access natural forests (Köhlin and Parks 2001).

Many wood industries – logging companies, sawmills, veneer and panel factories – in many parts of the tropics waste huge volumes of wood that could provide raw material for bioenergy. If the prices of logs and fuel wood were higher, then better use of raw material and waste products might follow.

Lessons learned and conclusions

There are clear lessons to be learned from decades of policy interventions in the forest–energy system. First, introducing maximum prices on woodfuels consumed in urban areas leads to high demand, low supply, queues and black markets. Second, establishing large, forest plantations to supply fuel wood is rarely effective. Third, control measures along transport routes from forest to city are rarely effective and often lead to corruption. Fourth, new technologies for producing charcoal or the combustion of woodfuel are not readily adopted unless they are extremely cheap, and unless measures to make wood from indigenous forests relatively more expensive are also introduced.

Several policies could reduce forest and woodland degradation from unsustainable harvesting of woodfuel, but policies that combine various measures are likely to be the most successful. On the demand side, policies could aim to accelerate substitution of 'clean' electricity for fuel wood and charcoal. These could be combined with aggressive marketing and subsidies for improved domestic charcoal stoves. However, the latter may lower the price of charcoal and increase demand, thereby dampening the impact.

Supply-side policies could take the form of community development projects in woodfuel supply zones, including the introduction of subsidised, efficient charcoal kilns. These policies would, however, have little effect if they were not combined with compulsory stumpage fees for indigenous trees. The latter requires a transfer of ownership to local communities or farmers, and it may still be necessary to control harvesting centrally to avoid overexploitation in high-demand areas. There is no substitute for better control of harvesting. Open-access forests and woodlands will be overexploited if harvesting is profitable. If payment of stumpage fees becomes common practice and those who harvest wood have to make better use of it to make a profit, then the private sector may find that plantations for fuel wood become a lucrative investment. Measures to encourage better use of harvested timber or trees felled to provide woodfuel would also contribute to REDD+.

Carbon benefits from avoiding and repairing forest degradation

Francis E. Putz and Robert Nasi

- Stopping illegal timber harvesting and adopting reduced-impact logging in the tropics, together with wildfire suppression, could cost-effectively reduce carbon emissions and enhance carbon uptake.
- Carbon uptake in degraded forests could be enhanced by better post-logging forest management practices and active restoration.
- REDD+ goals related to forest degradation are more achievable than ever due in part to recent improvements in remote sensing techniques for monitoring logging and wildfires coupled with increasing availability of hand-held global positioning systems, especially if the synergy with ongoing forest certification is fully utilised.

Introduction

International discussions about REDD+ have focused on deforestation, with little regard for the more damaging, but equally extensive, forest degradation. While less well studied, emissions from unsustainable wood extraction (poor logging practices and overharvesting of timber and fuel wood) and wildfires are estimated to contribute comparable amounts of emissions as deforestation (Asner *et al.* 2005; FAO 2006; Gibbs *et al.* 2007; Putz *et al.* 2008b). Furthermore, forest degradation often enhances the likelihood of subsequent deforestation. Finally, and not least, in the interests of adaptation to climate change, loss of resilience in degraded forests is of great concern (Guariguata *et al.* 2008).

This chapter focuses on the carbon benefits arising from better forest management (i.e., training workers, planned harvesting and reduced-impact logging plus postharvest silvicultural treatments (RIL+)) and coordinating fire detection and suppression (fuel wood harvesting is discussed in Chapter 19). We also discuss options for restoring degraded forests to enhance the rate of carbon uptake and storage. By treating forest degradation solely in carbon terms, we do not mean to discount the dangers of a focus on carbon at the expense of biodiversity, ecosystems services, and social welfare (Putz and Redford 2009).

Why is there so much tropical forest degradation?

High opportunity costs of maintaining (some) forests

The reason why forests continue to be misused, despite huge efforts at reform, is that often misuse, such as harvesting timber without regard for sustainability, is more financially rewarding than careful management (Rice *et al.* 1997; Pearce *et al.* 2003). In terms of the Von Thünen framework (Karsenty *et al.* 2008), the opportunity costs of maintaining forests increase as the industrial forestry rent frontier is approached. In other words, where improved access means forested land becomes suitable for plantations, agricultural crops or pasture, standing trees become obstacles to intensification of land use (although harvesting and selling timber can defray the costs of clearing). In patchworks of remnant forest and agricultural land, wildfires interfere with forest management and damage commercial plantations of fire-sensitive species such as citrus (Nepstad *et al.* 2001). Beyond agricultural frontiers, where access is poor, terrain is difficult, soils are unsuitable for intensive cropping, and weak governance often precludes investment in long-term management of any sort, rapid, repeated logging is the most likely and the most financially prudent land use (Chomitz 2007). Under such conditions, loggers might gain by adopting some cost-cutting and better harvesting techniques (e.g., planned skid trails to reduce fuel consumption), but they would not gain from adopting better management techniques wholesale (Putz *et al.* 2008b). Many sustainable management practices are only likely to be adopted where effective enforcement of regulations is backed by financial incentives. This need means that REDD+ interventions will often have clear additionality.

Insecure tenure

The lack of long-term, legally binding, forest management concession agreements and other forms of resource tenure is one of the greatest impediments to better forest management (de Graaf 2000). For both communities and concessionaires, insecure tenure precludes solid contracts and raises discount rates in the private sector (Richards and Moura Costa 1999). More generally, weak forest governance and insecure tenure serve to increase the opportunity costs of maintaining forest, foster widespread illegal logging, and keep timber prices low (Tacconi 2007c). That said, secure tenure can provide access to capital and consequently foster forest destruction if intensification of land use is financially and culturally attractive and not precluded by enforced governmental regulations (Gould *et al.* 2006).

Inappropriate policy and regulatory frameworks

Loggers and landowners justifiably complain that forest regulations are unduly complicated and created by authorities who do not understand the socio-ecological context in which they are to be implemented. Scarcity of extension services in most tropical countries exacerbates the problems associated with drawing up and following forest management plans or protecting forests from wildfires.

Where government regulations are forest oriented, ineffective enforcement constrains the adoption of good forest management practices. Consequently, forest managers are accustomed to operating in environments where they can easily manipulate or simply disregard performance requirements. There is clearly a need to change this condition and to foster effective enforcement lest REDD+ initiatives suffer the same fate as many other well-intentioned efforts to promote better forest management (Levin *et al.* 2008).

In many tropical countries, governance failures reinforce norms that are contrary to good forest management. In addition to ineffective law enforcement and corruption, a perceived lack of government interest in long-term management, perceived discrimination against the timber sector and inconsistent, and sometimes conflicting, regulations all contribute to mismanagement. As a result of decades of weak governance, loggers opt for short-term gains from extraction and feel entitled to violate laws. The Peruvian (Smith *et al.* 2006) and Cameroonian (Cerutti *et al.* 2008) experiences show that it is easier to change laws than to implement them effectively.

Lack of trained staff, limited technical guidance and inappropriate wage systems

Worldwide, about 350 million hectares of tropical forests are designated as production forest. About a third of these are controlled by rural communities and indigenous groups (Sunderlin *et al.* 2008a). These forests are exploited mainly for timber and, given growing demand and better access, logging is likely to expand. Because of the diversity of natural forests and limited markets for the timber of most species, loggers usually only harvest between one and 20 trees per hectare. Unfortunately, for every tree harvested by untrained and unsupervised fellers and machine operators working without detailed plans, some 10 to 20 others are severely damaged (Putz *et al.* 2008b; Sasaki and Putz 2009). Numerous studies have shown that with appropriate harvesting plans and training (reduced-impact logging, RIL), 50% or more of this collateral damage can be avoided. Silvicultural treatments applied after logging, such as clearing competitive species from around future crop trees, can double rates of recovery (Peña-Claros *et al.* 2008a). Nevertheless, despite decades of discussions, dozens of workshops, and numerous research and demonstration projects, a misunderstanding of what constitutes improved forest management persists at all levels, from forest workers to company executives (Ezzine de Blas and Ruiz-Perez 2008).

Inefficiency and waste in the forest and along the market chain

In selectively logged tropical forests, an estimated 20% of the volume of harvestable timber is either lost on the forest floor or abandoned and left to rot because of inefficient and wasteful bucking practices (Sist and Bertault 1998). Typically, less than 50% of the total volume of wood from a tree reaches the mill. In most tropical sawmills, the yield of sawn timber from log is often only 35%. Drying the sawn wood translates into an additional 10% volume loss. Finally, when the dried lumber is processed into furniture or other products, the yield is generally less than 70%. Yields in the plywood sector are marginally better because mills are more efficient and because they only process choice logs.

Failure to detect and suppress wildfires

The large-scale, but low intensity, wildfires that intermittently burn the understorey of millions of hectares of tropical forests in some years are a major source of greenhouse gas (GHG) emissions (Barber and Schweithelm 2000; Nepstad *et al.* 2001; Alencar *et al.* 2004). The amounts of carbon emitted vary substantially from year to year, but emissions continue for several years afterwards as damaged trees die off and contribute to the burgeoning fuel loads. Once a forest has burned, it is much more likely to burn in the future because burned out understoreys are more combustible, drier, hotter and windier. Grasses that invade burned areas further increase the likelihood of fires (Parsons 1972; Nepstad *et al.* 2001).

Remote sensing technologies are available to detect and monitor fires (Giglio *et al.* 2008), but forest managers need to know how and when to intervene. Understorey fires typically progress slowly and burn with low flame heights and modest flame widths. Because of their low apparent intensities, even experienced forest managers can underestimate their long-term effects. Unfortunately, even low-temperature fires can damage large trees if they burn long enough. For example, in 1995, an otherwise dedicated forest manager in lowland Bolivia took no action when notified of a fire because he believed the impacts would be inconsequential. Two years later the burned area had lost most of its small trees, many of the large trees had heart rots and hollows, and the entire area was badly infested with vines (Pinard *et al.* 1999). Now, 14 years later, the canopy in the burned area is still open, there is little sound timber, and African pasture grasses have spread into the forest from abandoned roads. On a larger scale, failure to contain fires in 1999 – even though government officials, forestry concession owners and the media had up-to-date information from satellite images – meant that more than 12 million hectares of lowland Bolivia were burned and half the city of Ascension de Guarayos was destroyed.

Policies for improving forest management, reducing emissions and enhancing carbon stocks

If we accept that sustainable forest management practices are only likely to be adopted where effective enforcement of regulations is coupled with financial incentives, then the case for REDD+ funding is clear. The challenge is to find effective, efficient, and equitable ways to retain and enhance carbon stocks that also deliver other co-benefits.

Foster third party certification

The advent of voluntary, third party certification, especially the Forest Stewardship Council (FSC) programme, is a new direction in the long history of attempts to improve tropical forest management. Certification has its detractors, and the mechanism is not flawless, but FSC does take into account social, ecological and economic considerations, and so avoids some of the shortfalls of previous policies (e.g., the Tropical Forestry Action Plan and the International Tropical Timber Organization's Year 2000 Objective). The main difference between certification and other interventions is that certification promotes socially and environmentally beneficial market influences on forest management. While the anticipated 'green premiums' from certification were initially overstressed, forest managers are becoming aware that certification substantially increases their market access (Auld *et al.* 2008). Policies that link verified carbon emissions reductions with certification of timber and other forest products would take advantage of natural synergies.

To the extent that certification has already improved tropical forest management, the question concerning potential policy interventions is, what limits the effectiveness of certification? Ultimately, budget constraints explain why many forests, particularly many community managed forests, are not yet certified (Ebeling and Yasué 2009). It is likely, but not yet proven, that certified forests retain and sequester more carbon, provide more non-timber forest products, and support more biodiversity than uncertified tropical forests. They are probably also more resilient in the face of climate change (Guariguata *et al.* 2008). Thus, supporting certification would seem like an effective and efficient use of REDD+ funding.

Certification programmes that promote better forest management and carbon sequestration have limitations. One problem is that illegal operators, who cause much of the degradation from poor logging, are unlikely to seek certification. Some firms also harvest timber without regard for the negative effects on residual stands because they do not expect to harvest the same area again. For these companies, the costs of improving efficiency through RIL techniques (e.g., annual coupe selection and planned harvesting) are likely to outweigh the benefits. Furthermore, it is important to recognise that certification involves more than simply improving efficiency through the use of RIL techniques, which means that even some companies and communities that manage forests well may find the costs of certification too high. FSC is working to reduce certification costs for small and low intensity managed forests, particularly those managed by communities, but further subsidies are needed. A REDD+ fund for certification and certification audits could provide the needed incentives.

Require use of reduced impact logging techniques

Regulations requiring forest managers to use RIL techniques would be a major step forward in sustainable forest management and would substantially reduce carbon emissions from logged forests. Putz *et al.* (2008a) estimated that a switch to RIL in forests legally managed for timber harvesting would reduce global carbon dioxide emissions by 0.58 Gt per year. Post-logging silvicultural treatments would double this benefit, and control of illegal logging would likely double it again.

One reason why loggers have not adopted RIL techniques is that, contrary to findings from Brazil (Holmes *et al.* 2002), RIL is not always more profitable than conventional logging. In the RIL-Sabah Project (Pinard and Putz 1996), for example, loggers complained that yields from RIL sites were substantially lower, because RIL disallowed harvesting on steep slopes and in riparian buffer zones (Healey *et al.* 2000). The cost savings that accrue to loggers and the carbon savings to society, come mainly from better harvesting plans and from training workers in directional felling and low-impact yarding techniques. In other cases, such as described by Holmes *et al.* (2002), avoiding the loss of logs was the biggest short-term financial benefit to loggers. Changes in forest management practices that lead to increases in timber recovery translate into less risk of leakage, especially where RIL restricts logging in riparian buffer zones and on steep slopes (Schwarze *et al.* 2002).

Longer-term benefits of RIL practices accrue to forest owners, long-term concession holders, and climate-conscious citizens around the world because RIL-logged stands regenerate more quickly than those logged conventionally. Recent studies of post-RIL forest recovery suggest that the long-term carbon benefits of RIL are being substantially underestimated (Box 20.1).

RIL at the stand level has the potential to reduce emissions substantially. But forest management also has to be considered at the landscape level. Significant carbon savings from reducing wood wastage and using less fuel can be made by planning harvesting well and training crews appropriately. Scaling up such stand-level practices to the landscape level has even greater benefits. At the national level, and as a prerequisite for setting national carbon emission baselines, planning means designating a 'permanent forest estate' that delineates and maintains both production and protected areas. In production forests, logging should be prohibited or strictly controlled in High Conservation Value Forests (HCVFs), riparian buffer zones, steep slopes, and other areas that are ecologically fragile or otherwise valuable. Within logged areas, maximum allowable harvesting volumes and minimum cutting cycles should be based on actual forest yield data. Once the annual coupes have been demarcated, accurate topographic maps need to be drawn up showing roads and harvesting patterns. While these recommendations are not new, they are seldom followed, which leaves a great deal of room for REDD+ additionality. Remote sensing coupled with hand-held global positioning system (GPS) tools means that it is possible to monitor compliance with government land use rules quite cheaply. In community managed forests, more labour-intensive monitoring can also be very effective (see Chapter 8).

Train forest workers and reward them appropriately

Given how little it costs to train an experienced forest worker in RIL techniques, the continuing degradation of forests because of lack of training is unfortunate. Irrespective of the ancillary benefits of training, such as safer working conditions, more retention of biodiversity and better protection of riparian areas, REDD+ investors will still need estimates of the carbon benefits derived from training forest workers in RIL.

Box 20.1. Carbon-neutral logging in a Malaysian rainforest: Reduced collateral damage fosters rapid recovery
Michelle Pinard

Industrial-scale experimental implementation of RIL in old-growth dipterocarp forest in Sabah demonstrated substantial carbon benefits from controlling damage (Pinard and Putz 1996). In this tall, heavily stocked forest, selective logging according to RIL guidelines retained, on average, 86 tonnes/ha more carbon in living biomass than nearby forests logged using conventional logging practices (CL). Just 13 years after logging, and in startling contrast to our predictions (Pinard and Cropper 2000), carbon in aboveground biomass had returned to pre-harvest levels in RIL areas. In contrast, no recovery in carbon stocks was observed over the same period in CL areas (Lincoln 2008). While this case study demonstrates that selective logging can be carbon neutral over a very short period, the carbon savings associated with RIL depend on a variety of factors.

The CL v. RIL carbon differential depends both on how bad conventional practices are, and on how well RIL is implemented. At our site, CL typically killed between 40% and 60% of the trees in the residual stand, a proportion that RIL reduced by more than half. Another practice that was an unusual and possibly critical component of our RIL treatment was the cutting of all woody vines one year prior to harvest. Although blanket cutting was costly and probably had at least short-term negative impacts on wildlife, it reduced logging damage and post-harvest vine infestations. Fifteen years post logging, the felling gaps in the RIL areas had generally closed, whereas about 45% of felling gaps in CL areas were dominated by tall herbs and vines (Tomlinson 2009).

Carbon savings with RIL also depend on whether harvesting restrictions influence overall timber yields. In our study, although average harvest intensities were similar in areas logged by the two methods, about 45% of the RIL areas were not logged because of legal restrictions on skidding on slopes exceeding 35°. This foregone timber raised concerns about leakage because of the risk than any shortfall in timber from the RIL area might be harvested from elsewhere, a concern that would presumably be addressed by national-level carbon accounting. Ironically, our carbon estimates were conservative because we used conventional, single entry logging as the baseline instead of the repeated relogging and conversion to plantations that dominated the landscape outside the project area.

Harvest intensity is important because, at very high intensities, some forests will be degraded even if harvested with care (Sist *et al.* 1998). At our site, harvest intensity was relatively high (54 to 175 m^3/ha; Pinard and Putz 1996), but, because many future crop trees in RIL areas survived logging and grew rapidly after being released from competition, rates of post-logging recovery of timber and biomass were very high. In contrast, and to our surprise, even undamaged trees in the CL areas experienced high mortality rates throughout the 13-year recovery period, and recruitment was balanced by mortality, accounting for the lack of carbon accumulation (Lincoln 2008).

Box 20.2. Training needs for RIL and improved forest management

Mark Schulze, Marco Lentini and Johan C. Zweede

When applied in good faith by competent crews, RIL substantially reduces the harmful effects of selective timber harvesting on forest structure, carbon stocks and other ecosystem attributes (Johns *et al.* 1996; Bertault and Sist 1997; Pinard and Cropper 2000; Putz *et al.* 2008b). Ignoring the qualifications in the above assertion – good faith and competence – imperils the entire effort to promote better forest management as a mechanism to reduce emissions from degradation. RIL is not a switch that is flipped on by policy makers or the presidents of timber companies; it is an approach to planning, harvesting and post-harvest operations that demands detailed knowledge and skills at all levels of an organisation and often requires a cultural change in the forest sector. Moreover, effective monitoring and incentive schemes, essential to ensuring RIL is applied in good faith (Macpherson 2007), require well-trained staff at all levels in the government agencies responsible for enforcing environmental regulations (Johns *et al.* 2008).

Recent policy developments in many tropical countries favour sound forest management (e.g., Tieguhong and Betti 2008; Tomaselli and Hirakuri 2008; Banerjee *et al.* 2009). These policies also create needs for qualified professionals on a huge scale. For example, if Brazil's vast network of public production forests (Verissimo *et al.* 2002; Zarin *et al.* 2007) is to contribute substantially to national REDD+ targets, then 27 000 to 33 000 trained forestry professionals will be needed (Schulze *et al.* 2008; Lentini *et al.* in press). In contrast, since 1994 fewer than 5000 Brazilians received hands-on training in forest management (Zweede unpublished). Such disparities between supply and demand for qualified forestry professionals are the norm across the tropics (Durst *et al.* 2006), and have been identified as a key factor in the slow adoption of RIL (Putz *et al.* 2000; Pokorny *et al.* 2005; Sabogal *et al.* 2006).

The history of forest management training initiatives in countries like Brazil, Guyana and Indonesia provides grounds for both optimism and concern. In Brazil, a training initiative started in 1995 has played a key role in generating interest and capacity in RIL (Dykstra and Elias 2003). Virtually every FSC-certified operation in the Brazilian Amazon can be linked to this initiative. In spite of the steadily increasing demand for training, widespread recognition of the value of practice-based training and the low cost per worker (US $500–1000), funding has been sporadic and piecemeal, and at levels well below that required to meet demand. For example, the current training capacity in Brazil is no more than 500 people per year, while the need for training is one order of magnitude larger (Schulze *et al.* 2008). Similarly, only 700 Guyanese have been trained in RIL techniques – one person for every 20 000 ha of state production forest (TFF 2008). In Indonesia, various initiatives have provided training to staff in just 30 of 200 operating forest concessions. Fortunately, a recent surge in funding, if sustained, will allow a dramatic increase in staff training (Klassen personal communication). It is clear that there are ways for countries to meet daunting training challenges. Less clear is whether policy makers and funding agencies fully appreciate the connection between investment in training and successful implementation of forest policies.

Anyone who can lift a chainsaw can fell even a large tree, but in addition to strength and dexterity, experience and training are needed to do it safely and in such a way as to minimise damage to other trees. To estimate the carbon benefits of RIL training, we first assume that from the average tree (2 m^3 of merchantable wood) the RIL-trained feller leaves 0.1 m^3 less wood in the stump. Use of good felling techniques results in less damage to valuable future crop trees (FCTs) and minimises butt log splits and the risk of the log breaking upon impact (a saving of another 0.2 m^3 of harvestable wood). The feller also tops the log (severs it below the crown) and bucks it into manageable and merchantable sections. Trained fellers top and buck logs in ways that maximise utilisation (assume a 0.1 m^3 advantage per tree). We further assume that the density of the avoidable waste of 0.4 m^3 is 0.5 tonnes per m^3 and that 50% of this biomass is carbon. This means that the average carbon benefit per tree felled by a trained worker is 0.1 tonnes. If we assume that this carbon, delivered to the mill and not left on the forest floor, is worth US $5/tonne on a carbon market and that a trained worker fells 10 trees a day, the investment of US $500 of REDD+ money in training will be paid off in carbon retention in just 100 days. The estimated payback period does not take into account reductions in collateral damage from directional felling. Neither does it consider improvements to the physical welfare of workers, lower fuel consumption by the skidders, quicker regrowth (Box 20.1) or increased forest resilience and resistance to fire. But the estimate does give an idea of the cost effectiveness of training just one worker in the production chain. And from the feller's perspective, given that the International Labour Organization (ILO 1990) ranks felling among the most dangerous professions in the world, receiving training that reduces the likelihood of injury or death is the ultimate social co-benefit.

Remuneration systems for forest workers need to reward those who apply these best harvesting practices. Payment systems that include a fixed monthly salary, a piece rate bonus and a reward dependent on work quality would motivate workers at little additional cost. Such incentives are needed even where RIL practices benefit logging contractors and forest owners so as to assure that the benefits are shared by forest workers (Applegate *et al.* 2004).

Control wildfires

Protocols for monitoring fires in real time, methods for notifying relevant authorities, and the capacity to deploy motivated, trained and equipped fire fighters need to be implemented. As most of the forest fires that do so much damage in the tropics are slow-moving ground fires, the equipment needs are modest. However, even when information on the location of fires is available, remoteness and difficult access are still major problems to be overcome (Box 20.3).

Box 20.3. Forest fires in the Amazon: short-term individual benefits versus long-term societal costs

Ane Alencar and Ricardo Mello

Fire is the least expensive and most broadly used method of clearing land and converting forest biomass into soil nutrients for pastures and crops in the tropics. Fire is also used to control weeds and to reinvigorate palatable pasture grasses. Even if beneficial for farmers over the short run, intensification of deforestation and burning impose long-term costs on individuals and society. Deforestation is associated with both forest fragmentation and an increase in ignition sources – two important elements of forest susceptibility to fire (Alencar *et al.* 2004). Coupled with global and regional climate change, these effects reduce the fire resistance of intact tropical forests. Even after a single, low-intensity understorey fire, forests become more fire prone. The risk of large fires increases during droughts when canopy cover decreases, fuel loads increase as leaves are shed, and even the forest interiors dry out. In extreme droughts, such as during the El Niño of 1997 and 1998, the standing forest area burned by forest fires in the Amazon was at least double the area deforested, generating an additional committed 0.7 Pg of CO_2 emissions – assuming a density of 100 t C/ha and 50% tree mortality (Alencar *et al.* 2006).

Wildfires cause direct losses in Amazonian Brazil estimated to vary between US \$22 and US \$42 million per year. The health costs alone represent more than US \$10 million during El Niño–Southern Oscillation (ENSO) years (Mendonça *et al.* 2004). But these fires have a cost that is more insidious and longer lasting than the cost of carbon emissions, smoke-induced respiratory problems, airport closures, infrastructure destruction, biodiversity losses and reductions in profits from crop and cattle production. This additional cost is that the high risk of fire constrains adoption of sustainable land use practices, such as RIL and cultivation of perennial crops, since both require long-term investments.

Fortunately, wildfires can to a large extent be controlled by motivated communities using well-established methods. A study of 28 rural communities in Para State indicated good cause for substantial motivation: small farmers lost 18% of their income to fires in 2004 (Mello and Pires 2004). By implementing fire control measures such as opening fire breaks and coordinating fire crews, these losses were reduced by 75% at a cost to the farmers of only 7% of their income. The benefits from the fire control measures varied, but included increases in carbon stocks of up to several tonnes per hectare. The study indicates that it is possible to reduce fire-induced forest degradation in cost-effective ways that do not preclude a farmer's use of fire.

The social equity and ancillary benefits of controlling forest fires are significant and diverse. Human health benefits from avoiding high concentrations of particulates and other pollutants released by forest fires; emissions from slow moving or smouldering fires are much worse for human health than those from more intense fires. Preventing large quantities of fire-generated aerosols from reducing regional rainfall also benefits society. From a biodiversity perspective, controlling forest fires has exceptional benefits, except where fires are part of the natural regime (e.g., savannas and woodlands).

Given the carbon consequences of fires in tropical forests, REDD+ funds could be used to improve real-time satellite detection of fires. Training in fire fighting would also translate into carbon savings if trained, motivated crews had the wherewithal to get to fire lines quickly. Not least, there is a need for networks of plots to monitor both immediate carbon losses from fires and to estimate further losses as injured trees die. For these, standardised protocols should be adopted. Unfortunately, adopting fire control as part of REDD+ is currently unlikely because in 2009 – in contrast to 1997–1998 when extensive fires closed airports, shut down businesses and caused huge losses across the tropics – fires have been few. If COP15 were to take place during a fire year, the case for fire control as part of REDD+ would be more compelling.

Develop incentives to enhance carbon stocks in logged, burned and otherwise degraded forests

A wide range of methods is available for restoring degraded forests. A start could be made by stopping the causes of degradation and letting forests regenerate on their own. This approach could progress to actively managing degraded areas to accelerate regeneration and growth. Both methods are appropriate for most of the 60% of tropical forests that were degraded in the latter half of the 20th century – about 1084 million ha (FAO 2006). For example, a REDD+ restoration intervention to encourage natural recovery might control illegal logging, promote RIL, lower logging intensities, reduce damage from grazing animals and prevent wildfires. This approach has been successful in Costa Rica and Puerto Rico where deforested areas recovered their old growth biomass and species richness after only 30–40 years (Letcher and Chazdon 2009). A more active approach accelerates regeneration and growth by controlling species that compete with natural regeneration or by augmenting regeneration with planted seeds, seedlings or cuttings. Across the tropics there are many successful examples of these more active treatments (Peña-Claros *et al.* 2008b; Villegas *et al.* 2009).

A major constraint to restoration is the lack of funding but, fortunately, some interventions are cost effective in terms of carbon benefits. For example, for a few dollars per hectare, the growth rates of trees that sequester large amounts of carbon and hold carbon for a long time can often be doubled by clearing vines and overtopping less enduring trees that compete with them (Wadsworth and Zweede 2006; Villegas *et al.* 2009). Restoring more degraded stands, by assisting natural regeneration is low in cost and often results in substantial gains in terms of carbon and biodiversity (Dugan *et al.* 2003). Where natural regeneration is not an option, enrichment planting and other reforestation options, while expensive, can also yield carbon gains.

Increase security of tenure and resource access for forest owners and concessionaires

Secure tenure for communities or private firms, as well as secure long-term access for concessionaires, serve to promote good management. For example, in a study of 80 forest commons in 10 tropical countries, Chhatre and Agrawal (2009) found that carbon stocks increased with the size of the forest, the authority to make decisions locally, and community ownership. Similarly, in areas with extensive forest and limited public infrastructure, forest concessions can help maintain forests while providing social benefits (Karsenty *et al.* 2008, but see Merry *et al.* 2003). Community ownership or secure private tenure seem to be prerequisites for good management but are not sufficient to prevent owners from acting in ways that impose social costs on others. For one thing, illegal logging does not stop when forests are held in common (Kaimowitz 2003; Honey-Rosés 2009). Therefore, in addition to secure tenure, other regulations and incentives will be required to promote better forest management.

Increase sector efficiency through appropriate taxation

Wood wastage along the market chain from the forest to the final product results in part from the design of tax and royalty systems. When levies on harvested timber are collected far from felling sites, timber that does not make it to the point where royalties are assessed is not accounted for and can be wasted. To maximise recovery of felled timber, royalties should be assessed as close to the stump as possible. Ideally, taxes should be calculated on the basis of gross standing volumes (clear bole volumes of standing trees). This approach would encourage concession holders to minimise wastage due to poor felling, poor bucking, and otherwise inefficient log use. A somewhat less favourable alternative would be to calculate royalties on site according to the volume felled.

Develop incentive policies or market-based instruments to improve management

In addition to or instead of taxes, various market-based instruments (MBI) could be used to internalise social costs, convert benefits into private returns, and stimulate changes in the economic behaviour of entrepreneurs (Richards and Moura Costa 1999). Forest certification is a familiar MBI, but performance bonds can also promote better management. These refundable bonds are deposited in a government account at the beginning of the concession period. If harvesting is executed in accordance with RIL and other standards, the bonds are gradually returned to the concessionaires. Fines for noncompliance are deducted. The bonds provide an incentive to shift from short-term exploitation to sustainable forest management. Performance bonds can also compensate, at least in part, for the discounting challenge to long-term management. By ensuring that concessionaires receive income gradually and toward the end of the rotation period, bonds also influence potential returns from logging new areas, roughly in line with the net value of a second harvest (Richards 2000).

Conclusion

The carbon benefits and co-benefits of better forest management, including wildfire control and forest restoration, will be promoted by secure long-term access to the resource. Secure access can be in the form of durable concessions, usufruct rights, or private or community ownership. Forest regulations should be based on realistic estimates of forest productivity (i.e., harvestable timber and carbon stocks) so that harvesting regulations (volume limits, cutting cycles) sustain profits as well as carbon and timber stocks. Professionalising the forest work force by providing training will boost workers' capacity to implement good forestry practices, for which they should be appropriately rewarded. Finally, market-based incentives for better forest management, particularly third party forest product certification, should be a critical component of REDD+ programmes. Such incentives would help to reduce carbon emissions, improve worker safety, protect biodiversity and maintain other ecosystem services.

Improvements in the ways forested areas are managed are only likely if there is the right mix of incentives and enforcement. Given the costs of transforming exploitation into management, a REDD+ mechanism could provide financial and technical support for 'pioneering' managers. These could be logging companies or communities that stop poor forest management and wildfires and enhance carbon uptake through restoration of degraded areas.

Part

5

Testing REDD+ at the local level

The evolving landscape of REDD+ projects

Erin Sills, Erin Myers Madeira, William D. Sunderlin,
Sheila Wertz-Kanounnikoff

- The landscape of REDD+ projects varies significantly across countries, reflecting differences in land tenure systems, drivers of deforestation, recent experience with conservation programmes and governance capacity.
- Indonesia appears to have the most REDD+ projects in the pipeline, with a substantial portion seeking to establish additionality, permanence and a legal claim to carbon by obtaining concessions.
- In Brazil, two common strategies are to initially seek carbon credits from afforestation or reforestation and to develop local-level payments for environmental services (PES) schemes.
- Third-party certification standards and international environmental organisations are major influences on project development.

Introduction

The Bali Road Map has triggered massive expansion in activity related to reducing emissions from deforestation and forest degradation (REDD+) in developing countries. This includes hundreds of planned 'first generation

REDD+ projects' that are seeking to reduce net emissions from defined forest areas. These projects provide a testbed for answering some of the questions raised in previous chapters about how to structure and implement national REDD+ policies.

This chapter first defines these projects, which come in many different shades, and describes the lessons they offer. There are several ongoing efforts to inventory these projects. Based on current knowledge, we discuss key dimensions of projects in Brazil, the Democratic Republic of Congo (DRC) and Indonesia, noting national differences in project development. We close with some observations on emerging patterns in the global landscape of REDD+ projects and implications for how to realise REDD+.

Definition

The UNFCCC, the World Bank, the United Nations, bilateral donors, host nations and voluntary carbon market actors (registries, certifiers and aggregators) use a variety of terms and categories for these activities. In this chapter, we consider all projects that seek to implement, evaluate and generate lessons about strategies to reduce carbon emissions and increase removals in specific forest sites in developing countries, referred to as non-Annex I countries. To avoid confusion with existing terms (e.g., pilots and demonstration activities), we label these 'first generation REDD+ projects' and define the parts of that label.

'REDD+' implies actions to 1) reduce emissions by avoiding deforestation and forest degradation, and 2) increase removals, which means enhance carbon stocks through forest restoration, rehabilitation and conservation. In this chapter, we focus on projects that generate their net reductions in carbon emissions by avoiding deforestation/degradation or by enhancing carbon stocks in existing forest (cf. Sasaki and Putz 2009). We de-emphasise afforestation and reforestation (A/R) projects that are currently eligible for the Clean Development Mechanism (CDM), because it is uncertain whether they will be included in the REDD+ mechanism (Chapter 2), and because much is already known about the CDM and parallel activities in the voluntary market (Jindal *et al.* 2008; Minang *et al.* 2007; Coomes *et al.* 2008; Henman *et al.* 2008; Parker 2008; Wittman and Caron 2009; Wunder and Alban 2008).

The term 'project' refers to activities that:

1. intend to quantify and report changes in forest carbon stocks, following IPCC and/or other broadly accepted guidelines (Chapter 7), and possibly transact forest carbon credits; and

2. operate in a geographically defined site or sites, with predetermined boundaries as suggested by UNFCCC guidelines (Decision 2/CP.13 of SBSTA 30), including activities that aim to incorporate carbon into land use decisions and planning across heterogeneous landscapes at a subnational scale.

We define 'first generation' as projects that have been launched since the UNFCCC COP-13 in Bali and that can share lessons learned and experiences gained up until 2012. We distinguish between these projects and 'pre-REDD+ projects'. The latter include avoided deforestation projects registered as 'activities implemented jointly' (AIJ) under the UNFCCC or developed under the BioCarbon Fund.[1]

Shades of REDD+

While our definition seems straightforward, different groups define REDD+ projects in widely different ways. In the UNFCCC realm, REDD+ projects are linked to national climate mitigation programmes, whereas in the world of carbon markets, REDD+ projects are characterised by the way they generate carbon credits for the voluntary market (Chapter 3). Others with experience in landscape and forest management define REDD+ as a new source of funding for conservation (Chapter 18). Box 21.1 examines the variety of funding sources for REDD+. In this section, we examine how REDD+ projects look (or is expected to look) through these different lenses, assuming that all shades of REDD+ can offer valuable lessons.

For participants in the official UNFCCC process (i.e., governments from implementing and donor countries), REDD+ projects mean subnational demonstration activities that are 'undertaken with approval of host' and constitute 'a step toward the development of national approaches' (FCCC/SBSTA/2/CP.13). Currently, most official activities focus on building capacity (e.g., monitoring, reporting and verification (MRV) systems, financial institutions) to participate in REDD+ and fostering dialogue about how to achieve cost-effective and equitable reductions in forest emissions. For example, this is central to all three programmes listed on the UNFCCC REDD Platform: the Forest Carbon Partnership Facility administered by the World Bank; the UN-REDD Programme of the FAO, UNDP and UNEP; and the Kalimantan Forests and Climate Partnership between Indonesia and

1 Launched by the UNFCCC COP-1, AIJ were undertaken on a voluntary basis with the objectives of building experience and 'learning by doing' about climate change mitigation benefits that would otherwise not occur. See: http://unfccc.int/kyoto_mechanisms/aij/activities_implemented_jointly/items/2094.php. Pre-REDD+ projects were also supported by the second window of the BioCarbon Fund, which the World Bank started in 2004 with the objectives of strengthening the role of forests in climate change mitigation and creating opportunities for the participation of sub-Saharan Africa. See http://wbcarbonfinance.org/Router.cfm?Page=BioCF&ft=Projects

Box 21.1. REDD+ financing trends
Michael Coren

To achieve REDD+, the undervaluation of forests must be addressed; this requires significant financial flows to forest owners and managers at different scales. 'REDD+ readiness finance' comes primarily from bilateral and multilateral donors, with complementary funding from philanthropic sources. This includes support for the development of MRV systems and the formulation of REDD+ strategies, policies and implementation frameworks. The Informal Working Group on Interim Finance for REDD (IWG-IFR 2009) divides readiness finance into 1) initial readiness including the design of REDD+ strategies and initial MRV capacities; 2) participation enablers including the building of MRV systems and the adoption of REDD+ policies; and 3) policy enablers including the governance and policy reforms to support REDD+. IWG-IFR estimates the costs for initial readiness and participation enablers to be €400–500 million, and for policy reforms to be €1–2 billion from 2010–2015.

Bilateral and multilateral donors and the private sector are financing 'REDD+ demonstration activities', such as the first generation REDD+ projects. These include a range of interventions to reduce deforestation at the national and subnational levels by supporting governance reforms, agriculture policies and forest management. The activities, primarily in Asia and Latin America, rely on a diverse set of financial arrangements, ranging from public and philanthropic funds to high-risk private capital. Many are true 'demonstration' or pre-commercial efforts with emissions reduction potential and high co-benefits, but there are also speculative commercial enterprises designed for voluntary and compliance markets.

Pre-compliance REDD+ projects attract private capital thanks both to emerging US climate legislation and to the prospect of an international framework allowing subnational crediting. Resulting emission reductions are currently being verified under voluntary carbon market standards, but could potentially be converted into compliance credits as legal frameworks are established. Public donors include bilateral aid agencies (e.g., AusAid, DANIDA, DFID, GTZ, JICA, KfW, Norad, AFD, USAID) and foundations (e.g., Blue Moon Foundation, Clinton Climate Initiative, MacArthur Foundation, Moore Foundation, Prince's Rainforest Project). They support REDD+ demonstration activities in part to test national-level implementation frameworks, in particular stakeholder involvement and benefit-sharing provisions.

Financing for scaling up REDD+ projects to the landscape scale has not been consolidated. REDD+ demands relatively large investments early in the project cycle (assessment, design, measuring and monitoring, validation and verification). So far, only a handful of private financial institutions and project developers have taken such risks on a significant scale, usually with expectations of generating future compliance credits, with voluntary market credits and alternative revenue as financial security. Ultimately returns on these projects must be high enough to attract the billions of dollars of private investment needed to expand the REDD+ sector globally (cf. Brunswick Research 2009).

Despite the great potential for private financing – especially to generate the large sums of high-risk–high-return capital required to scale up REDD+ – most funding still originates from philanthropic and public sector sources. Until legal frameworks are established through either the UNFCCC or national legislative processes, REDD+ activities will continue to rely on national-level aid from World Bank funds, multilateral institutions, charitable foundations and small-scale, high-risk private sector financing.

Australia (http://unfccc.int/methods_science/redd/items/4531.php). Perhaps because the bilateral and multilateral donors involved in these activities have experience and interest in development aid, they are the primary actors in many African countries where there are significant governance challenges (Wertz-Kanounnikoff and Kongphan-apirak 2009). Although some of these official demonstration activities intend to reduce deforestation and degradation directly, this is generally planned as a later stage. Thus, they could be categorised as 'readiness for REDD+' as opposed to 'demonstrations of REDD+' (cf. Wertz-Kanounnikoff and Kongphan-apirak 2009).

For actors engaged in carbon markets, activities to reduce emissions and increase removals fit the definition of REDD+ if they deliver real, additional, verifiable carbon credits. For example, Ecosystem Marketplace's Forest Carbon Portal tracks only projects that are transacting credits or verifying to a third-party standard. Many commercial actors are seeking to develop and market these carbon credits (Hamilton *et al.* 2009). In general, these actors seek to maximise efficiency, although co-benefits are often important marketing tools for them (Ecosecurities 2009; Brunswick Research 2009). Thus, these projects are important real-world tests of various REDD+ strategies and institutional arrangements. However, there are also limitations on learning from these projects, because their results may not scale up (precisely because they have picked the 'low-hanging fruit,' i.e., the lowest cost and least controversial projects) and because they may restrict access to information about the site selection process and the early phases of project development (due to concerns over moral hazard, competitors and creating unrealistic expectations).

For many involved in forest conservation, REDD+ is not a new concept, but rather a new funding source to finance their pre-existing goals. By integrating carbon objectives into their activities in a manner that meets certain definitions and criteria for additionality, they expect to access vastly greater financing opportunities (Ingram *et al.* 2008). Whether a retooling of an existing conservation project or a newly developed project seeking carbon money for conservation finance, these REDD+ projects are likely to focus more on co-benefits. Many of these projects face significant challenges in demonstrating both financial and environmental additionality: They would have been implemented without carbon funding or they are paying for forests that are not under threat. Yet, they offer important lessons about tradeoffs (or complementarities) across the 3E+ outcomes (Chapter 1), especially in comparison to projects focused more narrowly on climate change mitigation.

A fourth perspective is that REDD+ is often assumed to be equivalent to PES (payments for environmental services, see Chapter 2). The most prominent proposals for how to structure REDD+ internationally are essentially PES systems for countries, similar to 'cash on delivery' aid (CGD 2009). The key feature of these systems is that payments, usually monetary, are contingent and guaranteed upon performance, usually judged by a single outcome measure (Chapter 17). It is sometimes assumed that countries will design their national REDD+ systems to look like PES, passing down conditional payments from the international level to the local level. However, REDD+ projects vary in their emphasis on small-scale local actors and many non-PES policy options are being considered for implementing REDD+ at the national and local levels.

Cataloguing first generation REDD+ projects

From some perspectives, REDD+ projects are emerging very slowly (Niles *et al.* 2009), accounting for only 1% of carbon offset credits transacted in the voluntary market in 2008 (Hamilton *et al.* 2009). On the other hand, many NGOs have criticised the headlong rush into REDD+ and called for more thorough consultation with local people. These divergent perspectives may reflect the fact that many actors are exploring possibilities and establishing options for REDD+ projects, without seeking to bring them to market or register them until policy uncertainties are resolved.

Efforts to catalogue all forest carbon and REDD+ activities worldwide have identified significantly more projects in the pipeline than appear in registries and standards' databases (Parker 2008; Cerbu *et al.* 2009; Johns and Johnson 2009; Wertz-Kanounnikoff and Kongphan-apirak 2009). Both Cerbu *et al.*

(2009) and Wertz-Kanounnikoff and Kongphan-apirak (2009) found that REDD+ activities are unevenly distributed across the world's forests (see Box 21.2).

As part of CIFOR's global comparative study of REDD+, we are in the process of cataloguing forest carbon projects and creating a typology of first generation REDD+ projects. By drawing on the above sources, as well as key informants and materials available on the Internet, we have identified about 60 potential first generation REDD+ projects in Brazil, the DRC and Indonesia. These are the top three countries in terms of existing forest carbon stock and in the top five in terms of annual carbon emissions from deforestation and degradation (FAO 2006). In each of these countries, the landscape of first generation REDD+ projects looks very different.

Evolution of REDD+ in Brazil, the DRC and Indonesia

A brief history

Brazil has the longest history of REDD+ projects, with one of the first major avoided deforestation projects launched by The Nature Conservancy (TNC) and its national partner SPVS in the Atlantic Coastal Forest of Paraná in 2000. This was followed by numerous A/R projects. Brazil also has substantial experience with carbon markets, with 200 registered CDM projects (including one A/R) and 30 projects certified by the Voluntary Carbon Standard (VCS), several involving wood energy.

Indonesia led the current wave of first generation REDD+ projects with the Ulu Masen project, which was the first to receive certification by CCBA in 2008. Indonesia has moderate experience with carbon markets with 47 CDM projects and one VCS-certified project.

By contrast, the DRC has no CDM projects, no prior REDD+ projects and just one A/R project and one fuelwood project. That said, there is now significant interest in – and funding for – developing REDD+ projects in the DRC, including support from GEF, the Forest Carbon Partnership Facility, bilateral aid organisations, and international environmental NGOs with support from corporate social responsibility programmes.

Current status

In our inventory of first generation REDD+ projects, we have identified 35 in Indonesia (one already operating), 20 in Brazil (two already operating), and four in the DRC (none operating yet). This is consistent with other cataloguing efforts, which have also found a concentration of projects in Indonesia.[2] In Brazil, nearly 40 proposals have been submitted to the Amazon

2 The Forest Carbon Portal lists only one forest carbon project in each country, but that reflects its requirement that a project already be certified or selling credits (including from A/R).

Box 21.2. Criteria for location of first generation REDD+ projects

Gillian Cerbu

First generation REDD+ projects are not uniformly spread across the tropical forest landscape. To understand the reasons for this uneven distribution, the ASB Partnership for Tropical Forest Margins (hosted by the World Agroforestry Centre ICRAF) conducted a global survey of REDD+ activities and examined motivations for site selection (Cerbu *et al.* 2009).

Motives for implementing REDD+ projects in particular locations can be characterised as official and unofficial criteria (Cerbu *et al.* 2009). Official selection criteria are publicly stated in project design documents (PDDs), investor websites and other official publications. We analysed these documents for all 179 REDD+ activities in our global survey. Unofficial location criteria were gleaned from 19 interviews and from media sources discussing the locations of REDD+ activities.

We counted 86 official selection criteria, which we categorised into 10 groups. The most frequently cited categories are shown in Figure 21.1. Other categories cited five or fewer times are business value, climate benefits, cultural value, medical benefits and water conservation value. These official selection criteria do not fully explain the current spread of REDD+ projects, with activities primarily concentrated in certain countries. We turned to unofficial reasons to understand this distribution. From the 65 unofficial reasons for site selection stated by respondents or in the media, we formed 13 categories. The most frequently cited categories are shown in Figure 21.2. Other categories are creating a net benefit, cultural value, financial viability, high conservation/biodiversity value, high level of deforestation, currently low level of deforestation but threat of future deforestation, technical capacity, technical interest and water resources protection.

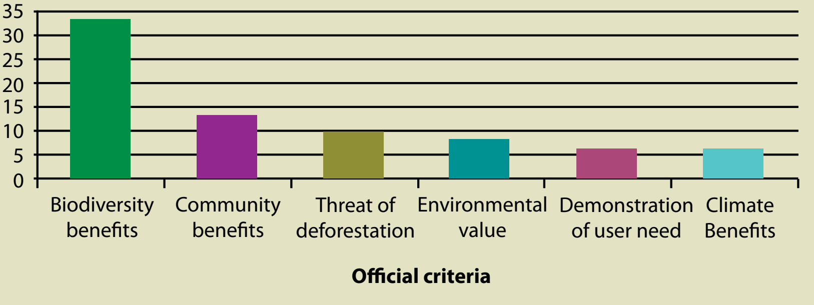

Figure 21.1. Official criteria for REDD+ activity location selection

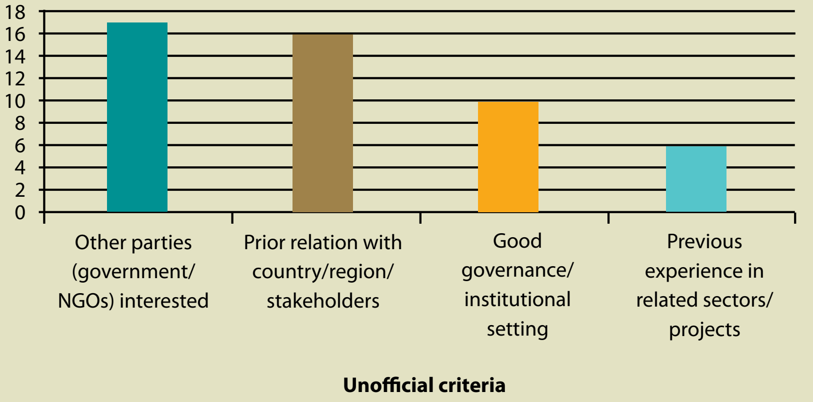

Figure 21.2. Unofficial criteria for REDD+ activity location selection

In practice, existing sustainable forest management and integrated conservation and development projects (ICDPs) underlie many of the criteria, because they are why other parties are interested, prior relationships have been established and prior experience gained. In fact, many REDD+ activities are really extensions of existing ICDPs, whose locations were determined largely by biodiversity, conservation and development goals, with carbon benefits at best a secondary consideration.

Another common theme in the unofficial reasons for site selection is the potential for future success, in terms of good governance as well as financial feasibility, technical capacity and the likelihood of creating a net benefit. This may be driven partly by project funders. For example, the World Bank Carbon Finance Unit argues that local environments must support project identification, preparation and consideration for REDD+ projects to be successful (World Bank 2008a).

To mitigate climate change, REDD+ activities should be located in areas with significant threats to large forest carbon stocks. However, proponents are more likely to look for low-risk investments, facilitated by existing relationships with national, regional or local stakeholders, and by good governance and favourable institutional settings. This is consistent with the uneven distribution of projects across the three countries discussed in detail in this chapter: Brazil and Indonesia are ranked much higher than the DRC in terms of both ease of doing business and governance (World Bank 2009a; Kaufman *et al*. 2008). More generally, the lack of first generation REDD+ projects in the humid forests of Africa indicates that high mitigation potential has not overcome weak governance as a site selection criterion.

Fund (see Box 5.2), and some of those are likely to become new first generation REDD+ projects.

REDD+ projects are distributed unevenly at the subnational level also. In Brazil, the majority are located in the Amazon, with a third of those in Mato Grosso, which is the state with the second highest deforestation rate in Brazil. The remaining REDD+ projects (and most of the A/R projects) are in the Atlantic Coastal Forest. The size of projects varies enormously, with projects as small as 20 hectares in the Atlantic Coastal Forest and as large as 8.4 million hectares (operating at the landscape scale) in the Amazon.

In Indonesia, most REDD+ projects are on the islands of Borneo (15 projects) and Sumatra (10), with only a few each on Java (2), Sulawesi (3) and Papua (5). This is consistent with expectations that islands with both large forest stock and rapid deforestation (Sumatra and Borneo) would have more REDD+ activities than islands with less forest carbon under threat. Project sizes vary in the range of 10 000 hectares to 4.2 million hectares with larger projects operating at a landscape scale.

One advanced project in the DRC focuses on two community managed reserves in the eastern part of the country; several other REDD+ projects and multiple readiness activities are being developed.

One common pattern across all three countries is that many proponents are developing REDD+ projects where they previously had conservation projects.

Most projects in these three countries plan to pursue certification or at least claim that they will meet the standards of CCBA and a carbon registry

Box 21.3. How standards are shaping the REDD+ landscape: The case of the Climate, Community and Biodiversity Standards
Joanna Durbin

Carbon credit buyers have been wary of forest carbon, in part because of the complexity of accurately measuring emissions reductions, concerns about the permanence of those reductions and perceived greater social and environmental risks relative to other project types. These risks are particularly acute in tropical regions where there is also the greatest potential for forest carbon projects. Depending on how the project is implemented, land use change in these regions can either impoverish and disenfranchise the poor or can bring new sustainable livelihoods and biodiversity protection.

Standards have been created to address these issues and have been influential in building support for forest carbon by providing a set of broadly accepted criteria and a mechanism for independent third-party verification. According to a recent survey of carbon offset buyers (Ecosecurities 2009), the most recognised standards for forest carbon projects in the voluntary carbon market are the Climate, Community and Biodiversity Standards (CCBS), the UNFCCC Clean Development Mechanism (CDM), and the Voluntary Carbon Standard (VCS).

The VCS has helped build confidence in estimates of climate benefits and remove liability for potential reversals in those benefits, thereby creating 'permanent' forest carbon credits. This box focuses on the CCBS, which, together with the VCS, is defining the 'quality' dimensions of forest carbon offsets, thereby influencing the way projects are developed and what buyers seek in projects.

The CCBS requires project developers to demonstrate that they are generating co-benefits for local communities and biodiversity and that they have adopted an inclusive approach respecting people's rights, interests and traditions. The majority of forest carbon projects in development are planning to use the CCBS. In November 2009, 14 projects completed a full validation audit, 25 were undergoing validation and at least 50 more were planning to use the standards.

While originally designed to identify the highest quality projects, the CCBS has almost become a requirement for market access. More than 75% of carbon offset buyers who responded to the Ecosecurities (2009) survey said they would pay a premium for carbon credits certified under the CCBS in addition to a carbon accounting standard such as the VCS or CDM. Buyers and investors have two motivations for demanding CCBS certification. First, they understand that forestry projects are unlikely to generate sustained flows of permanent emissions reductions without local support. Second, they may want to support additional social and biodiversity benefits with their carbon investment, especially if they entered the market to fulfil corporate social responsibility.

By creating a mechanism to demonstrate strong social and environmental credentials of forest carbon projects, the CCBS has raised awareness of the importance of social and biodiversity impacts, has defined how they should be addressed and has stimulated demand for multiple benefit projects. The extent to which this influence will continue when forest carbon is integrated into compliance markets is uncertain. One effort to ensure that effective social and environmental safeguards are adopted in future compliance markets is the 'REDD+ Social and Environmental Standards' under development by CCBA and CARE. These standards will provide a mechanism for government-led REDD+ programmes to demonstrate social and environmental co-benefits. The goal is to develop support for multiple benefit government REDD+ programmes in the same way that CCBS has generated demand for REDD+ projects with co-benefits.

(e.g., through certification under the VCS or the Brazilian Social Carbon standard). This reflects the growing importance of third-party certification in the voluntary carbon market (see Box 21.3). This is likely to influence the REDD+ landscape in these countries by determining what is required to demonstrate permanent legal ownership and additionality of carbon, as well as by showing how to incorporate environmental services and livelihoods (Madeira 2009).

Proponents

Many actors are involved in developing REDD+ projects, including bilateral aid organisations, host-country government agencies, international NGOs, local NGOs, investment banks, private sector project developers and timber and plantation companies.[3] In many cases, organisations collaborate to develop projects. For example, the FFI-Macquarie taskforce is a partnership between an international environmental NGO and a financial institution. While all REDD+ projects must quantify their reductions in net emissions, the different types of actors bring different priorities and emphasise different co-benefits. For example, bilateral aid organisations often place a strong emphasis on supporting local livelihoods; private investors prioritise efficient emissions reductions compatible with corporate social responsibility objectives.

Several international environmental NGOs are global players in REDD+. Conservation International (Harvey *et al.* [in press]), The Nature Conservancy, the World Wide Fund for Nature and the Wildlife Conservation Society are all developing REDD+ projects in at least two of the three countries discussed in this section. Their influence means that projects are being developed with a strong concern for environmental co-benefits, specifically biodiversity. For example, in the DRC, all the projects we have identified are being developed by international environmental organisations.

Brazilian organisations (NGOs, private sector and government) are the key force behind at least two-thirds of the REDD+ projects catalogued in the country. Most of these projects involve an international partner, at least to facilitate access to international funding. About one-fifth of projects have strong private sector leadership.

In Indonesia, international environmental NGOs and their national affiliates are developing more than half of the REDD+ projects, working with local NGOs, government, timber and plantation companies and private project developers. A quarter of REDD+ projects are being developed by an actor from the private sector, sometimes in partnership with NGOs or government.

3 There are several online directories of carbon offset providers and developers. See http://www.carboncatalog.org/providers/; http://www.endscarbonoffsets.com/directory/; www.carbonoffsetguide.com.au

Host country governments play at least a small role in most – if not all – REDD+ projects in that third-party certification requires a letter of endorsement or a memorandum of understanding from a relevant government authority. The government of Indonesia is developing a regulatory framework for projects, including rules for revenue sharing. Subnational governments in both Brazil and Indonesia are also involved in funding, marketing, developing or implementing projects. There is significant government leadership of about a quarter of projects in both countries, including efforts to support protected areas and to incorporate forest carbon into planning at the landscape scale.

Strategies

All REDD+ projects share the common objective of reducing emissions or enhancing forest carbon stocks. However, the operationalisation of REDD+ differs depending on both the specific deforestation or degradation threat (or restoration opportunity) and the existing institutional, socio-economic and biophysical context. Projects might require local actors to reduce fuelwood collection; encourage regeneration by planting or tending trees; restore hydrological systems in peat domes; prevent wildfire by installing fire breaks and burning only under optimal conditions; extend the length of cultivation and fallows in swidden systems; adopt reduced impact logging and active silvicultural management; and stop or slow conversion of forest to other land uses.

One important distinction is whether a project seeks to change the behaviour of agents who are already operating in the project area, or seeks to prevent new agents of deforestation and degradation from entering the project area. The latter strategy, called 'avoided planned deforestation and degradation' under the VCS, is common in Indonesia. Many project proponents in Indonesia are negotiating to purchase a concession and manage the forest for carbon, thus pre-empting timber extraction or conversion to plantations (Madeira 2009). The concession model is not as prevalent in Brazil, thus the concept of buying out concessions is not part of the REDD+project landscape.

Although major problems with land tenure remain in the Brazilian Amazon, it is possible to obtain relatively secure private title to some forest lands. Thus, in both the Amazon and the Atlantic Coastal Forest, project proponents (or affiliated organisations) are purchasing land for some REDD+ projects – including both degraded forest to be restored and forest facing future threats. Nearly half of the projects in Brazil are considering local-level PES schemes, with conditional payments to individual agents who forgo deforestation or contribute to forest restoration. By contrast, local-level PES schemes are not prominent in Indonesian REDD+ projects. This is consistent with the finding of Bond *et al.* (2009) that PES is most advanced in Latin America.

Summary and relationship with national architecture

Despite the great variety in the first generation REDD+ projects under development, some trends are emerging. Brazil has more projects that are being developed by domestic organisations, that involve the purchase of land and that are considering local-level PES schemes as a component of their implementation strategy. In Indonesia, international NGOs play a more prominent role in project development, and projects frequently involve establishing concessions. The DRC has readiness activities but relatively few REDD+ projects in advanced stages of development. This variation across countries reflects differences in land tenure systems, recent experience with conservation, deforestation drivers and governance capacity. The project landscape across these three countries confirms the thesis of this book that we can learn much from previous conservation initiatives: the first generation of REDD+ projects are building on and borrowing from the accumulated experience of a wide range of previous conservation interventions.

Standards, funding and development of projects are being driven largely by actors in developed countries, where there is demand for both offsets and environmental co-benefits. Brazil could be considered the exception that makes the rule, in that many Brazilian project developers, investors and environmental NGOs involved in REDD+ are located south of the Amazon, where there is also some demand for voluntary carbon credits. Interest in environmental co-benefits is also reflected in the engagement of major environmental organisations, who are key players in the development of projects as on-the-ground tests of REDD+, while the multilateral initiatives of the UN and the World Bank focus on building capacity at the national and regional levels.

There are different perspectives on whether REDD+ projects are (or should be) transient phenomena that will be phased out when or if the international REDD system moves toward a national approach (see Chapter 2). Clearly, the volumes of emissions reductions possible under national programmes have the potential to greatly surpass what a single project could achieve. But others contend that any 'effective REDD+ system must ensure that landholders and forest dwellers receive real incentives to reduce deforestation and conserve standing forest, and projects are fundamental to achieving this' (Schwartzman 2009). As national programmes evolve, governments will have to consider how to incorporate projects, what degree of fungibility to allow between voluntary and compliance markets, and how to ensure consistency in MRV (Chapter 7).

In some senses, each first generation REDD+ project is like a mini test case of a national REDD+ system: the proponent must decide on the most effective intervention, develop an efficient implementation strategy, establish monitoring and verification systems that meet market or donor requirements and build a financial structure to receive, allocate and distribute carbon financing. They face governance and corruption issues (both within the project and in relation to government authorities); they are often concerned with co-benefits (because of organisational mandate, belief that co-benefits are key to reducing carbon emissions, requirement for certification or for marketing purposes); and they must decide how to share benefits from carbon revenues.

One crucial difference is, however, that projects cannot tackle corruption at the national level (Chapter 13), reform land tenure laws (Chapters 11 and 12) or reverse perverse subsidies for agriculture (Chapters 10 and 15). Rather, they must operate within the existing institutional context. They can thus provide important lessons about elements of the institutional and legal context that are most critical to reform in order to facilitate REDD+ at the local level, and about how to implement REDD+ under less than optimal conditions. The next chapter addresses the issue of how to learn these lessons from projects.

Chapter 22

Learning while doing

Evaluating impacts of REDD+ projects

Pamela Jagger, Stibniati Atmadja, Subhrendu K. Pattanayak, Erin Sills and William D. Sunderlin

- REDD+ projects require an impact assessment approach to estimate emissions and removals; for REDD+ to succeed we need information on this and the associated 3E+ outcomes.
- There are few examples of rigorous impact assessment in the conservation, avoided deforestation and payments for environmental services (PES) literature. REDD+ impact assessment could contribute tremendously to our understanding of successful environment and development policy initiatives.
- We will learn more rapidly and effectively by sharing evaluation designs and findings across REDD+ projects.

How will learning from projects improve REDD+?

We have a narrow, but critical, window of opportunity to evaluate and learn from the experience of first generation REDD+ projects. By gathering evidence on processes and outcomes, we will learn what causes REDD+ projects to succeed or fail. REDD+ is a unique opportunity to share the lessons we learn, because of the global distribution and relatively coordinated timing of projects, significant allocation of financial resources, and clear objectives and explicit mandate set by international negotiators. This chapter directs donors, regulators, and project proponents and developers to ways in which we can learn from evaluating projects. We advocate for serious attention and financial resources to be committed to independent process and impact assessment of first generation REDD+ projects.[1] By definition, REDD+ projects are performance based and therefore evaluate their effect on changes in carbon stock in comparison to a reference level. In this early phase of developing REDD+ policy, it is also crucial to examine, evaluate and share findings on the effects and distribution of co-benefits and costs, i.e., according to the effectiveness, efficiency and equity plus co-benefits (3E+) principle (Chapter 1). This broad assessment of project outcomes and processes is critical for learning how changes in forest carbon happen and what causes them.

Identifying and designing methods to facilitate learning from the hundreds of REDD+ projects expected to be implemented over the next few years is not easy. Projects take different approaches, operate at different scales, and are implemented across diverse settings, as clearly spelled out in Chapter 21. Nevertheless, if we invest time and resources in evaluating a representative sample of REDD+ projects using state-of-the-art methods, and if we share our findings among projects and regions, we will learn lessons that will help ensure the success of REDD+.

This chapter makes the case for rigorous empirical evaluations of REDD+ projects, so that we can learn if and how they reduce emissions or increase removals and deliver 3E+ outcomes. We discuss how REDD+ evaluations can contribute to our empirical knowledge and give examples of rigorous impact assessments of natural resource and conservation policies (e.g., payments for environmental services (PES) schemes, avoided deforestation polices, decentralisation reforms and protected area (PA) management). We conclude that the success of REDD+ rests crucially on sharing evaluation designs and findings across REDD+ projects so that we learn more rapidly and effectively.

Why do we need to evaluate REDD+ projects?

Intergovernmental Panel on Climate Change (IPCC) guidelines and voluntary certification standards require that REDD+ projects rigorously evaluate their effect on net carbon emissions (see Chapter 7 on monitoring, reporting and verification (MRV)). This provides a starting point for assessing the impacts of REDD+ projects, not only on carbon, but also on socio-

1 In this chapter, we use the term 'evaluation' to refer broadly to the analysis of public policies. The term 'impact assessment' refers to a specific set of research designs and methods for assessing and understanding outcomes of public policies.

economic and environmental outcomes. While collecting baseline data and regularly monitoring projects, as required for MRV, we have the opportunity to collect data to help us understand the underlying causes of these outcomes. The requirement to verify outcomes makes REDD+ projects inherently different from traditional forest sector development projects. The design of REDD+ projects, combined with the allocation of large sums of money for monitoring and evaluation, is a unique opportunity to significantly improve our knowledge, not only on REDD+, but on development and environment interventions more generally.

There are four reasons to evaluate REDD+ projects using impact assessment methods:

1. REDD+ projects have to assess impact. The Bali Action Plan requires REDD+ projects to measure changes in net carbon emissions that result from project activities;
2. Project proponents and donors need to know what the 3E+ outcomes are, and what tradeoffs between conservation and livelihoods are associated with the outcomes;
3. For REDD+ to gain broad acceptance, it has to work on the ground. Impact assessment can deliver hard evidence on whether or not projects are meeting their goals, and allow project to make adjustments as they go along;
4. While we can learn a lot from individual projects, a common, systematic approach to evaluating REDD+ projects will facilitate learning, and allow comparison of the various factors that influence 3E+ outcomes across projects. A common, systematic approach to evaluation will allow:
   - Site conditions and project design elements associated with 3E+ outcomes to be identified;
   - Rigorous evaluation to inform the design of national policies and processes that enable and guide REDD+; and
   - Practitioners and academics to learn about the effectiveness of alternative conservation instruments, including PES.

Learning tools

Process assessment and impact assessment are tools for understanding causal mechanisms underlying observed outcomes. These tools help us extract timely, persuasive and relevant lessons from projects to inform the policy process. They can and should be part of the mix of monitoring and evaluation methods (Margoulis *et al.* 2009). Table 22.1 shows research designs and data collection requirements for assessing process and impact.

Table 22.1. Options for assessing REDD+ projects

Level of effort and resources	When to design assessment strategy	When to collect data			Process learning
		Baseline	Post-intervention	Controls	
High	Before project implementation	Yes	Yes	Yes	Throughout
Medium	Before project implementation	Yes	Yes	Yes	Some
	Before or in early stages of implementation	Yes	Yes	No	
	In early stages of implementation	No	Yes	No	
Low	After project implementation	No	Yes	No	Limited or none

Process assessment

Process assessment involves documenting and analysing project implementation. Since implementation often deviates from project plans, process assessment is essential to track actual activities, their sequence, course corrections and the actors involved. Process assessment for REDD+ projects is likely to document: how proponents engage with local communities and other forest stakeholders; land, forest and carbon tenure arrangements; stakeholder power relations; logistical aspects, including budgeting; baseline data collection; verification and audit processes; and the direct costs of project implementation. Collecting data at the start and throughout the project is fundamental for evaluating processes, and for understanding why the project did or did not attain its objectives. In cases where rigorous evaluation designs are not possible due to logistics, political considerations or cost, process assessment can provide important data for evaluation based on conceptual models of how interventions generate outcomes.

Impact assessment

The main components of impact assessments are: 1) measuring outcomes after an intervention (e.g., a REDD+ project), and 2) comparing the observed outcomes with the counterfactual, i.e., what would the situation have been without the intervention. To learn from impact assessments, we must understand why we observe particular outcomes. In other words, impact assessments should measure and interpret what causes the effects of interventions. Impact assessments are increasingly used to evaluate social policies and development projects (Leeuw and Vaessen 2009; World

Bank 2009f) and researchers have called for the same approach to evaluate environmental and natural resource policies (Bennear and Coglianese 2005; Frondel and Schmidt 2005; Ferraro and Pattanayak 2006). An ideal impact assessment has four steps: 1) identifying key parameters; 2) collecting data; 3) rigorous evaluation of the data (beyond the scope of this chapter, but see Box 22.1 for references); and 4) disseminating and acting upon the findings.

Box 22.1. Web resources for learning state of the art evaluation techniques

Process assessment

Wageningen University has a website devoted to tools and methods for participatory planning, monitoring and evaluation, http://portals.wi.wur.nl/ppme/content.php?Tools_%26_Methods.

The National Science Foundation has produced a user friendly handbook for mixed method evaluations, http://www.nsf.gov/pubs/1997/nsf97153/start.htm.

The Conservation Measures Partnership and Benetech have developed adaptive management software for conservation projects, www.miradi.org.

Outcomes assessment

The Network of Networks Impact Evaluation Initiative (NONIE) of the World Bank has a series of publications that provide guidance on impact evaluation, http://www.worldbank.org/ieg/nonie/guidance.html.

The International Initiative for Impact Evaluation provides discussion and suggested methods for impact evaluation, http://3ieimpact.org/page.php?pg=resources.

The website of the Independent Evaluation Group at the World Bank provides overviews of evaluation methodology and examples of state of the art evaluations, http://www.worldbank.org/oed/.

Evaluation of conservation and natural resource interventions

Pattanayak (2009) has produced the 'Rough Guide to Evaluation of Environmental and Development Programs', http://www.sandeeonline.com/uploads/documents/publication/847_PUB_Working_Paper_40.pdf.

A special issue of *New Directions for Evaluation* focuses on Environmental Program and Policy Evaluation: Addressing Methodological Challenges, http://www3.interscience.wiley.com/journal/122445950/issue.

Here, we focus on the before-after-control-impact (BACI) design for impact assessment, which estimates impacts using data collected before and after, and from both control and intervention sites.

Regardless of the design, an impact assessment can only provide clear answers if the key questions, variables and outcomes of interest are clearly formulated. Evaluators need to identify:

- The intervention to be evaluated (e.g., REDD+ project activities, excluding any national policy changes in support of REDD+);
- Specific outcomes of interest (e.g., changes in carbon emissions and income derived from the forest);
- Observable indicators of those outcomes (e.g., changes in forest cover and household wealth);
- Observable process indicators that characterise how the intervention is implemented (e.g., maps of tenure and forest use, number of field visits to monitor compliance); and
- Confounding factors that vary within the site and control areas and influence the outcomes of interest (e.g., market access, population density, average annual rainfall).

Collection of baseline[2] data 'before' project implementation facilitates a rigorous impact assessment, because it allows the changes in outcomes before and after the intervention to be estimated. Over a short time, and when there are relatively few other policy, economic or environmental changes, the baseline could be considered to be the counterfactual. This means that nothing would have changed without the intervention. Much of the existing literature on avoided deforestation relies on extrapolating historical trends (e.g., past 5–10 years) or projections that modify historical trends by including other variables. However, the ideal evaluation design is to collect baseline data on key outcome variables and their determinants from both project (treatment) and control sites (see also Figure 22.1).

Advance planning, in addition to allowing collection of baseline data before the project begins, can add to the rigour of the impact assessment by identifying or even creating 'control' groups that are similar to the treatment group but not directly affected by the intervention. Evaluators can scope for areas that are similar to the project site in terms of biophysical, demographic and socio-economic characteristics to serve as control areas. Scoping can also identify areas outside project boundaries that may be affected by leakage.

2 The term 'baseline' has several meanings in the REDD+ debate. In line with common use in the evaluation literature, in this chapter, we use the term 'baseline' for the 'pre-intervention site conditions', not in the sense of a prediction about the future.

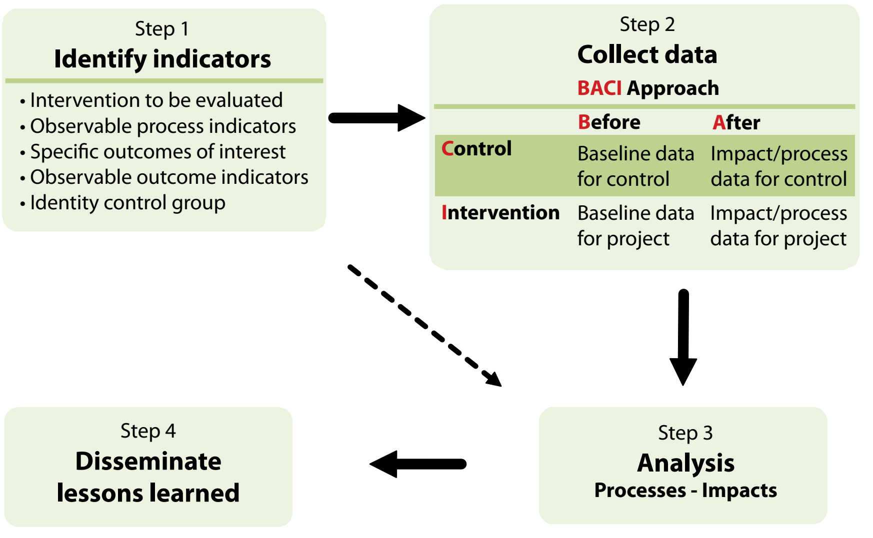

Figure 22.1. The BACI design for assessing REDD+ projects

The final and critical stage of impact assessment is disseminating and acting on the findings. Independent evaluators should ensure that they share the results with project proponents and other stakeholders in supportive ways, and with other projects through networks for joint learning. Project proponents who share lessons from both the successes and the failures transparently with donors, national governments and the global community will encourage widespread acceptance and implementation of REDD+ as a climate-change mitigation strategy. Effective dissemination means producing a range of products for different audiences. These would include reports, in appropriate format and language, for communities, policy makers and peers via the internet and peer-reviewed journal articles.

The BACI design has pitfalls. A key assumption is that it is possible to find control sites that are close enough to the project site to be similar, yet far enough away to ensure that the project has no influence on forest users' behaviour. Failure to find such control sites undermines the basic premise of the BACI design. Further, even the most rigorous impact assessment, using an ideal BACI design for a single site, will not necessarily provide insights into the reasons for the observed outcomes. To learn about the factors that influence outcomes, it is important to 1) compare findings across REDD+ projects evaluated using similar BACI designs, and 2) triangulate findings using contextual information to understand the processes that lead from project implementation to project outcomes. Quantitative-data collection cannot fully capture information on the context; qualitative process learning, using techniques such as participatory rural appraisal and key informant interviews, throughout project implementation is crucial. Methods for process and impact evaluation have been documented in numerous guides to evaluation (see Box 22.1).

Learning from previous impact assessments

The literature on evaluating natural resource management and conservation policy reforms provides important lessons for assessing REDD+ projects. There are few rigorous evaluations of designs and methods to assess the causal effects of conservation investments (Ferraro and Pattanayak 2006). For example, most evaluations of PES schemes are qualitative case studies drawing on records of government and non-governmental organisations, reviews of grey literature, key informant interviews and rapid field appraisals (Pattanayak *et al.* 2009). The most common quantitative empirical assessments use *ex post* data on both treated and control units (e.g., households or watersheds inside and outside the REDD+ project boundary). If the sample is large enough and there is sufficient variation in the data, this kind of assessment allows for multivariate regression of outcomes on treatment status (e.g., whether there was participation in the REDD+ project) to control for potential confounding factors. This research design does not require the analyst to explicitly identify an appropriate control group and thus the results may rely on extrapolation across very different treated and non-treated units.

'Matching' methods, developed to address these issues, are increasingly being used to evaluate the outcomes of natural resource and conservation related policies. They have been used to study the causal impact of individual, transferable quotas on the collapse of fisheries worldwide (Costello *et al.* 2008); moratoria on development in the USA (Bento *et al.* 2007); the effect of protected areas on forest cover in Costa Rica (Andam *et al.* 2008), Sumatra (Gaveau *et al.* 2009) and globally (Nelson and Chomitz 2009); payments for ecosystem services on forest cover in Costa Rica (Arriagada 2008; Pfaff *et al.* 2008); decentralised management on forest cover in India (Somanathan *et al.* 2009); and devolution of forest management on household income from forests in Malawi (Jumbe and Angelsen 2006). The most rigorous of these evaluations apply matching methods to changes in outcomes (before and after the intervention), sometimes reconstructed through secondary or recall data (which can be difficult). This emphasises the importance of collecting baseline data. Even when considering changes in outcomes, matching methods assume that all factors influencing both programme participation and outcomes (e.g., determinants of participation in a REDD+ project and deforestation rates) are observed, measured and used in the matching process. In fact, it can be very difficult to reconstruct the process of selecting sites and recruiting participants *ex post*. Thus, even if the evaluation plan is to apply matching methods *ex post* to measures of final outcomes, process assessment early in the project is critical.

Box 22.2. Examples of state of the art evaluations relevant to REDD+ projects

Measuring the effectiveness of protected area networks in reducing deforestation (Andam *et al*. 2008)

Andam *et al*. (2008) evaluate the effect of Costa Rica's protected-area (PA) system on deforestation using matching methods that compare outcomes on very similar protected and unprotected forest plots. They match forest plots using a technique called covariate balancing of baseline variables (i.e., covariates include high, medium or low land productivity; distance to forest edge, road and city). They find 10% of protected forests would have been deforested had they not been protected. Without controlling for covariates through covariate matching, the result would have been 44%. The difference in findings is because protected areas are generally less accessible, and have lower agricultural productivity.

Evaluating whether protected areas reduce tropical deforestation in Sumatra (Gaveau *et al*. 2009)

Gaveau *et al*. (2009) examine the effect of PAs on deforestation. They combine an analysis of remote sensing images with field-based methods to assess changes in forest cover in Sumatran PAs arising from agricultural encroachment, large-scale mechanised logging, and forest regrowth. They match PAs (i.e., treatment groups) and areas around PAs (i.e., control groups), before and after PAs were established, based on the 'propensity score' of protection (which essentially is based on a statistical model of pre-establishment forest cover, slope, elevation, roads and size of forest edge). The matched comparison suggests that PAs reduced deforestation by 24% from 1990 to 2000, whereas a naïve (i.e., simple mean differences) comparison of PAs and adjacent areas would suggest that PAs reduced deforestation by 59%. As in the case of Andam *et al*. (2008), the overestimation stems from not accounting for the non-random location of PAs in Sumatra ('passive protection').

Income after Uganda's forest sector reform: are the rural poor gaining? (Jagger 2008)

Jagger (2008) uses data from households living adjacent to three major forest sites in western Uganda to assess the effect of Uganda's forest sector decentralisation reform on rural livelihoods. Detailed income portfolio data collected immediately prior to the reform are compared with data collected four years after reform implementation. The decentralisation reform did not affect forest management in one of the forest sites; this site serves as a control in the design. The difference-in-difference method is used to estimate the effect of the reform. Changes in control sites are subtracted from changes in treatment sites. Covariates used in regression models allow for the control of exogenous factors that influence outcomes. The findings demonstrate that the reform has had a limited effect on livelihoods overall, but that the relative importance of forest income has declined for poor households and increased for relatively wealthy households.

Figure 22.2. Reporting research findings to the community, western Uganda
(Photo by: Paul Sserumaga)

The small but growing literature on evaluating various policy reforms related to natural resource management and conservation provides important lessons for those assessing the impact of REDD+ projects:

- Rigorous methods and traditional case study methods often deliver different results;
- Different (potentially complementary) ways to identify control groups include 1) random selection of intervention and control groups; 2) matching and other quasi-experimental methods; and 3) selecting non-treated groups with purposive criteria (i.e., market access, population density and forest type);
- Although baselines can be constructed retrospectively, collecting baseline data before the project begins is much more reliable than informant recall or secondary data;
- Ground-truthing and collecting household data give important insights into project outcomes that remote sensing methods cannot measure.

In addition to being useful for evaluation, data collected at intervals on the same units – or panel data – are critical for understanding dynamic processes such as poverty, migration and the evolution of land use on tropical forest frontiers. Recognising this, an increasing number of research initiatives and studies are collecting panel data for both biophysical and socio-economic indicators in tropical forest zones (see examples in Box 22.3). Some REDD+ projects

Box 22.3. Examples of global and local or regional scale datasets with environmental and socio-economic baselines

Global scale

International Forestry Resources and Institutions: Data from over 300 forest sites throughout the developed and developing world. Data on biophysical indicators of forest conditions and community forest institutions. http://www.sitemaker.umich.edu/ifri/home.

Poverty Environment Network: Detailed, quarterly household data on forest use and income portfolios from about 9000 households in 40 sites in 26 countries throughout the low- to medium-income tropics. http://www.cifor.cgiar.org/pen/_ref/home/index.htm.

Local or regional scale panel data studies of livelihoods and environmental change

Nang Rong Projects, University of North Carolina at Chapel Hill: Demographic, social and land use and land cover data for the past 20 years from Nang Rong, Thailand. http://www.cpc.unc.edu/projects/nangrong.

Ouro Preto do Oeste, University of Salisbury in collaboration with North Carolina State University and UC Santa Barbara: Socioeconomics and land use and land cover data in four waves from 1996 to 2009 from an old frontier in the Brazilian state of Rondônia. http://facultyfp.salisbury.edu/jlcaviglia-harris/NSF/NSF-SES-0452852.htm.

TAPS, Brandeis University: Socioeconomic, cultural, environmental and multidimensional indicators of well-being among the Tsimane in the Department of Beni, Bolivia. http://www.tsimane.org/.

may be able to use baseline and control-group data from these studies. More importantly, these research initiatives offer research tools (e.g., socio-economic household survey instruments, methods for ground-truthing land use cover change findings from remote sensing analysis) and lessons for evaluating REDD+ projects. For example, some initiatives have tracked households for many years and have tested ways to reduce attrition and to systematically update research instruments to reflect new activities and concerns. Studies that collect data across multiple sites, such as those conducted by International Forestry Resources and Institutions and the Poverty Environment Network, have had to balance collecting data consistently (to enable global comparisons) with adapting survey instruments and procedures to local circumstances.

These studies have also had to demonstrate their external validity, that is, to show that the sites they monitor are representative and that their results are generally applicable.

Learning as we move forward with REDD+ projects

Learning from REDD+ projects has payoffs in improving the projects themselves, improving the national policies and processes that guide REDD+, and in laying the foundation for effective, efficient and equitable implementation of REDD+ post-2012. Policy makers and donors should bear this in mind to get REDD+ off to a good start.

Our recommendations to project donors, regulators, proponents, developers and researchers are:

- Collect basic forest and socio-economic data before starting projects and after project implementation;
- Identify how outcomes will be measured and what variables are important to explain outcomes;
- Collect data at regular intervals during project implementation to help understand process and progress;
- Include control sites where possible;
- Invite and collaborate with independent or third-party evaluators and researchers; and
- Strive to make the design and findings of REDD+ project evaluations transparent for all stakeholders.

We recognise that the cost of our proposed mode of learning is potentially high, but we argue that the payoffs (and the costs of not learning) are large, both for project proponents and the global community. Those funded to generate international public goods that identify lessons from the first generation of REDD+ projects should also be funded to do rigorous evaluation research. Suppose that the global REDD+ effort in its first few years costs US $10 billion and that a concerted research and learning effort on REDD+ projects improves the efficiency by a very modest 5%, then the saving of US $500 million far exceeds the cost of learning. Such investment opportunities are rare!

Chapter 23

Summary and conclusions

REDD wine in old wineskins?

Frances Seymour and Arild Angelsen

Introduction

The purpose of this book is to synthesise what we know about 'what works' to reduce deforestation and forest degradation. Bringing together what we know is important for REDD+ policy makers, practitioners and other stakeholders as they begin to realise REDD+ in national policies and on the ground.

As this book amply illustrates, drawing on existing experience to inform the first generation of REDD+ policies, programmes, and projects presents a paradox. We have learned many lessons about forest conservation and management, but most are lessons about what has *not* worked. The challenge now is to build on experience but to avoid repeating the mistakes of the past.

Trying to realise a new REDD+ paradigm of forest management using existing policies and institutions would be like putting new wine in old wineskins. In the same way that fermenting new wine will burst old wineskins, REDD+ initiatives that are truly transformational will not fit in 'business as usual' structures and practices. In this summary we bring together key messages for REDD+, particularly regarding the dilemmas posed by the imperative to manage tradeoffs among the various sources of risk to the success of REDD+.

Key lessons and dilemmas

REDD+ must be new … but build on what has gone before

Efforts to address deforestation and degradation over the last few decades have been disappointing (Chapter 4). Because of this background, REDD+ must inspire confidence that the effort will be successful this time. Perhaps the biggest difference between REDD+ and earlier initiatives is that it will be performance based. International donors, funds or markets will, eventually, pay national and local endeavours based on results. This ‘payment for performance’ approach gives national governments an incentive to implement REDD+ effectively and efficiently.

Another way in which REDD+ departs from previous initiatives is in the scale envisaged. The potential volume, geographic scope and time scale of financing to reduce deforestation and degradation would be unprecedented if ambitious global emission reduction targets are agreed. While no one asserts that ‘trees grow on money’, several of the approaches described in this book have not had as much impact as they could have, in part because of limited funding. For example, short-term funding for integrated conservation and development projects (ICDPs, Chapter 18), inadequate financing for more efficient cooking stoves (Chapter 19) and too little funding for training in reduced impact logging (RIL, Chapter 20) meant that these initiatives fell short of expected impact.

The combination of performance-based payments and significant anticipated funding could reverse the political economy of deforestation and create the political will for a transformation in national policies that affect forests. But proponents of change face institutional arrangements and governance practices that are poorly equipped to deal with REDD+ challenges, such as influencing and coordinating all sectors that affect forests, targeting funding flows, controlling corruption in administering finances and facilitating meaningful stakeholder participation in programme design and implementation.

A key dilemma for those planning to implement REDD+ is whether to create wholly new institutions to manage it or to use existing ones. Many countries have, or are considering setting up, REDD+ national funds to manage the large sums of international REDD+ finance they anticipate. These national funds may be modelled on conservation trust funds (CTF, Chapter 6). The various options for REDD+ national architecture will make tradeoffs among political legitimacy, efficiency, accountability, transparency and co-benefits (Chapter 5).

Creating new institutions takes time and can be politically difficult, while using existing institutions risks business as usual mindsets and practices. As with other dilemmas presented below, the right answer will depend on national circumstances, and consideration of risks and tradeoffs. As countries choose different paths, analysis of their experiences will illuminate the circumstances under which existing institutions can be deployed for new roles, and when new ones should be created.

REDD+ requires targeted interventions … and broad sectoral coordination

To successfully implement REDD+, institutions will have to take on new or expanded roles. New ways of collaborating across sectors, stakeholder groups and levels of government will be needed to design programmes and projects, to make sure policies are coherent and to link reporting mechanisms across scales (Chapter 9). National REDD+ institutions must make upward and downward linkages: transferring funds from the national to the local level, managing incentives (both policy measures and payments) and channelling information from the local to the national and international levels (Chapter 2).

REDD+ approaches must also stimulate and coordinate action across various agencies and stakeholder groups. Perhaps the most innovative aspect of REDD+ compared to past approaches is that countries will need to look ’beyond the canopy‘ and consider all policies and institutions that affect forest carbon stocks. Many chapters in this book show that REDD+ approaches confined to the forestry sector alone would be insufficient. Everything we know about the drivers of deforestation and degradation suggests that REDD+ policies and measures will need to go beyond the forestry sector (Chapter 10). This means integrating national development planning, budgeting and regulation across sectors in an unprecedented way.

Such broad policy reforms require effective coordination across sectors. And yet forest-specific agencies and regulations have been mostly ineffective in influencing decisions in agriculture, energy, infrastructure and industrial expansion that affect forests. Measures that only apply to the forestry sector are unlikely to be successful and will need to be applied more broadly, for example, by reforming the wider judicial system efforts to combat corruption (Chapter 13).

As a result, REDD+ must be cast in the overall framework of improving governance in a country. There is an opportunity for the REDD+ community to effectively tap into experiences from other sectors. Systematically harvesting lessons learned from successful and unsuccessful institutional reform initiatives outside the forestry sector is thus an important component of a future research agenda. Another area for further study is how REDD+ initiatives can best be integrated into broader national climate change mitigation and adaptation strategies, including nationally appropriate mitigation actions (NAMAs) and national adaptation programmes of action (NAPAs).

REDD+ must be transformational … in a world where change is incremental

Several chapters suggest that REDD+ must not only take a new approach and work at a different scale from previous efforts but must also be transformational. The need for dramatic change is particularly evident in the case of forest tenure and rights (Chapters 11 and 12). Moving ahead without first reforming tenure runs the risk of reducing the effectiveness, efficiency and especially equity of REDD+ implementation. The tenure characteristics of most forest frontiers – where there are no legitimate forest stewards able to defend *de facto* exclusion rights – mean that payment for environmental services (PES) schemes have limited applicability for REDD+ implementation (Chapter 17).

On the other hand, taking a strict 'no rights, no REDD+' stance risks missing out on 'no regrets' REDD+ interventions. 'No regrets' interventions could include policies to reduce demand for land and forest products that indirectly drive deforestation and degradation (Chapters 10 and 12). REDD+ initiatives could also be used to accelerate reform. For example, REDD+ funds could be used to reinforce existing rights, by combining PES schemes and enforcement measures to help indigenous communities consolidate *de jure* recognition of rights into *de facto* control over their land.

The national institutions that will be dealing with REDD+ are often characterised by varying degrees of corruption (Chapter 13). Large REDD+ revenues flowing into national coffers will create new opportunities for rent-seeking behaviour. Many countries will need to put in place policies and practices to ensure transparency, accountability and efficient spending of REDD+ revenues. This means they should set up monitoring, reporting and verification systems for flows of money as well as carbon.

However, these changes will not happen overnight, and REDD+ proponents will have to balance the risk of losses because of corruption against the risk of lost opportunities because of excessive caution. And, REDD+ could be instrumental in catalysing reform, as in the case of forest tenure. Greater international scrutiny, involvement of national ministries of economy and finance and provision of publicly available information on carbon stocks and flows of funds could speed up the introduction of mechanisms to promote transparency and accountability.

National REDD+ thus requires moving forward on three fronts simultaneously: first, getting started on fundamental change agendas, while accepting that these are likely to be long-term efforts; second, exploiting the political will and finance associated with REDD+ to speed up reforms already underway; and third, moving ahead with 'no regrets' initiatives where possible, for example, where reform of forest tenure is ongoing, but with appropriate safeguards, including the free, prior and informed consent of affected communities.

REDD+ needs policies … but the bias is toward projects

The first generation of REDD+ initiatives includes a large and expanding population of diverse site-specific projects, while most national-level strategies are still at the early stages of planning, consultation, and institution building. Efforts to design and implement REDD+ policies – especially those that address drivers of deforestation and degradation outside the forestry sector – remain in their infancy.

This differential pace results in a mismatch between the emphasis on experimentation at the subnational or project level and the stress on national approaches in international negotiations (Chapter 21). Policy reforms (e.g., in agriculture and energy sectors), and transformational change in such areas as tenure reform, will be critical to REDD+. Yet site-specific demonstration projects cannot by nature 'demonstrate' these broader changes.

The forces that drive the project approach are strong: both public and private financing agencies prefer the project approach because they have more control and they can showcase the direct impacts of their funding photogenically. Other REDD+ proponents, such as national and international NGOs, have also gravitated to the project approach, in which they have long experience. Initial surveys of the first generation of pilot projects suggest that many are simply old wine in new REDD+ wineskins: existing projects or approaches that have been rebranded as 'REDD+' to attract new finance. Further, policy changes will likely continue to lag behind project development in part due to political challenges that usually confront such changes.

Nevertheless, the experiences of pilot projects can provide lessons for national policies by pointing to the most critical institutional and legal reforms that will be needed to implement REDD+ at the local level (Chapter 21). However, we cannot assume that the aggregate effect of projects will somehow be enough to catalyse transformation at the national level. Many of the national reforms that are needed are qualitatively different from what can be achieved in a pilot project. Without more attention to fundamental policy and institutional reforms, countries could begin to equate REDD+ implementation with pilot projects, a concept that would be hard to shake loose.

Two approaches can address this dilemma. First, 'landscape level' initiatives implemented at a scale larger than pilot projects could provide early experience in how to integrate low carbon development strategies into land use planning at municipal, district or provincial levels. Second, programmatic initiatives – such as community-based management of degraded forests – could move ahead while more politically contentious policies are debated. In any case, the interdependence of national policy change and local action provides an important topic for further analysis.

Promising REDD+ approaches … but no silver bullets

In the Introduction, we noted that many (if not most) previous policies and interventions to conserve and better manage forests have had disappointing outcomes. They were badly designed, paid little attention to the broad forces of deforestation or implementation was hampered by weak capacity, inadequate local involvement or corruption. But evidence also suggests that improving the design and implementation of approaches that have already been widely tested will reap benefits.

Protected areas may be more effective in conserving forests than previously thought (Chapters 10 and 18), and should become part of the REDD+ toolkit. The effectiveness of protected areas could be enhanced by taking on board lessons learned from complementary ICDPs (Chapter 18). Policies that decentralise forest management need to be redesigned to become more legitimate, effective and equitable. Community forest management (CFM) is no panacea for forest conservation, but some evidence suggests that forests managed by communities store more carbon, and that CFM can be a cost effective way to manage forests (Chapter 16).

The expansion of agriculture into forest areas could be eased by spatial targeting of agricultural policies to areas that are not forested (Chapter 15). Within the forestry sector (as conventionally defined) there are policies and practices available that could reduce forest emissions: RIL techniques, control of wildfires, incentives for restoring degraded land, and taxes and market instruments to improve forest management (Chapter 20). Old-fashioned command-and-control approaches may still have a role, for example to control harvesting from natural forests (Chapter 19). In some contexts, sustainable extraction could be managed by local users, if their right to exclude outsiders is backed up by relevant authorities.

Much attention has been given to payments for environmental services (PES) schemes for implementing REDD+. And, conceptually, cascading international payments for reducing forest emissions into a national PES scheme is the most straightforward solution, as payments directly incentivise and compensate for the changes in land use necessary to achieve REDD+

objectives. In the medium to long term, PES schemes are likely to be the implementation instrument of choice. However, the conditions for effective PES are rather stringent, for example carbon rights holders (forest owners) must be able to exclude other users and this is seldom the case on forest frontiers (Chapter 17). Thus, countries will probably need to go through a readiness phase for PES before wide-scale implementation.

All told, there are a number of promising approaches for achieving REDD+ objectives. Some have a better-than-average track record and there are clear lessons as to how they can be improved. However, not one – not even PES – is a silver bullet. In each country, policy makers will need to put together a mix of policies and approaches that tackle the drivers of deforestation and degradation in their particular national circumstances. As experience accumulates, further research can illuminate which combination of approaches is most effective, efficient, and equitable under particular conditions.

REDD+ must be national … but success is local

National REDD+ strategies face the challenge of combining national coordination and policy coherence with meaningful local involvement in implementation. However elegant the policy solutions or programmes devised at the national level, whether REDD+ succeeds or fails will depend on how institutions actually lead and coordinate across sectors and stakeholder groups, how they transfer funds, and how they mediate and satisfy the interests of various stakeholders, especially those who control what happens locally on the ground. Chapter 17 identifies appropriate institutions as the critical condition for successful PES schemes, but this could also apply more generally to REDD+ efforts.

Because REDD+ initiatives must be coordinated at the national level, there is likely to be tension between retaining control centrally and devolving authority and responsibility to local governments and communities. Community monitoring of forest emissions is one of many ways to vertically integrate REDD+ implementation (Chapter 8).

Lessons learned from a decade of forest decentralisation indicate that genuine devolution of authority for making decisions is rare (Chapter 14). Experience also cautions that decentralisation will not automatically lead to less deforestation and degradation, or to more equity. National minimum standards for managing forests and protecting rights are necessary, regardless of the scale of implementation. And yet involving local officials in making rules and sharing benefits, and making those officials downwardly accountable will be critical to REDD+ success.

The literature on successful community forest management (CFM) is highly relevant to REDD+ initiatives at the local level (Chapter 16). Secure tenure and the ability to exclude others are important, as is community involvement in designing the rules. In turn, the rules must be simple, locally enforceable, and include accountability. However, Chapter 16 also cautions that, aside from institutional design, many factors in CFM success are exogenous, suggesting that externally supported interventions should be targeted to areas where they are likely to work.

REDD+ is urgent … but can not be rushed

The imperative to implement REDD+ as quickly as possible derives from the urgent need to reduce emissions from all sources to avoid catastrophic climate change, and to capture the forest-based mitigation potential before it disappears with disappearing forests. To the extent that REDD+ also supports other objectives by delivering co-benefits – including adaptation to climate change, poverty reduction and conservation of biodiversity – REDD+ takes on the urgency of those agendas as well.

But, as many chapters make clear, constraints are holding back the pace of REDD+ implementation, despite the urgency. Global negotiations have not resolved many issues related to the scope, scale, funding, performance indicators and MRV systems of REDD+ (Chapter 2). Many of the details of the global architecture for REDD+ are likely to take several years to work out, which means that the full implications for individual countries will be uncertain for some time to come. REDD+ proponents who move too quickly face the risk that their assumptions about the shape of the regime and volume of funding may prove wrong; those who move too slowly risk missing opportunities for earlier and larger emissions reductions and associated financial flows.

A second constraint to moving REDD+ forward quickly at the national and subnational levels – and perhaps the most significant – is that transforming how forests are managed will, in many cases, require protracted political negotiation (Chapter 3). A transparent and inclusive process to resolve conflicts among various stakeholders will be necessary to arrive at a shared vision for REDD+, a vision that is in fact and perception legitimate in the eyes of domestic winners and losers and the international community. Moving too quickly without confronting the need for change could risk attempting to build REDD+ on the existing forest management paradigm (akin to putting 'new REDD+ wine in old wineskins'). Announcing bold targets and empowering new institutions without consultation and constituency building risks rearguard action by vested interests to undermine the new initiative.

A third constraint on the pace of REDD+ is that the conditions for successful REDD+ implementation do not currently exist in most countries. This means that policy makers and practitioners must pay careful attention to the timing and sequencing of interventions. An emerging consensus around a phased approach – moving from a readiness phase, to one in which policies and measures are implemented, to full, performance-based implementation – offers a framework of eligibility and support, and allows countries to move through the phases as quickly as possible.

Specifically, there is a risk that performance-based payments will begin too early. Until reference levels have been negotiated and MRV systems are in place for monitoring emission reductions and removals, it will be impossible to link payments to outcomes, risking low or no additionality ('hot air'). For example, credible claims for reduced degradation or stock enhancement will require repeated ground-level inventories (Chapter 8). Equally, it is essential that MRV systems for finance are in place before significant volumes of revenue begin to flow. Without mechanisms for transparent allocation, independent audit and other mechanisms of accountability in place, the risk of misallocation of resources and corruption will be high.

We know a lot … but need to be learning while doing

A constraint to REDD+ implementation results from the paradox mentioned at the beginning of this chapter: we know much more about what does not work in reducing deforestation and degradation than about what does work. Few forestry sector interventions have been subject to rigorous impact assessments. As a result, much more research lies ahead before REDD+ policy makers and practitioners will have access to comprehensive knowledge about 'what works' under a variety of circumstances. For each of the dilemmas described in the sections above, there is a corresponding research agenda to further understand the risks and tradeoffs.

A related dilemma is how much REDD+ effort and investment should be focused on moving ahead with 'best bets' (what we think is most likely to work based on what we currently know), and how much should be invested in long-term, rigorous analysis to confirm or challenge conventional wisdom. Clearly, it will be important to document and disseminate the early results from the first generation of REDD+ projects so that midcourse corrections can be made as quickly as possible.

The landscape of first generation REDD+ projects is highly diverse (Chapter 21). And, as described in Chapter 22, these projects will need to collect baseline data and monitor progress over the life of the project and beyond to measure to what extent the interventions have had the expected effects on rates of deforestation and degradation, as well as on local livelihoods, biodiversity or governance. BACI (before and after, control and intervention) methods to measure impact offer a systematic approach to assessing project outcomes and allow for comparative analysis across sites.

In addition, the global community of REDD+ policy makers and practitioners could learn much from attempts to formulate and implement national strategies and policies that are truly transformational in nature. In the same way that project-level initiatives should be subjected to rigorous impact assessment, at least as much effort should be devoted to evaluating the effectiveness, efficiency and equity of REDD+ policies under various conditions. As it is the transformational nature of the REDD+ implementation agenda that is truly new compared to past approaches to addressing deforestation and degradation, the opportunities for generating insights from rigorous comparative analysis should be large indeed.[1]

Realising REDD+: What are the prospects?

Past attempts to conserve and better manage forests offer plenty of reasons to be pessimistic about the success of REDD+. Why should we believe that success is more likely this time?

First, although a large share of the REDD+ action will be more of the same, it also includes genuinely new elements. International and national payments will increasingly be linked to performance and measureable results, thus altering incentives for all stakeholders in a way that has never before been attempted on a national scale.

Second, sections of the international community have demonstrated a strong willingness to pay for REDD+. More funding is likely to come from public sources and, perhaps, from selling REDD+ credits in international carbon markets, depending on the conclusion of the UNFCCC agreement and decisions by the European Union and individual countries on the inclusion of REDD+ credits as offsets. The volume of finance could be sufficient to tip the balance of the political economy of forest management from one that drives deforestation and degradation to one that supports conservation and restoration.

Third, many developing countries are demonstrating a strong will to tackle the problems of deforestation and forest degradation, and to make REDD+ part of low carbon economic development. This match between international 'willingness to pay' and national 'willingness to play' is essential for the success of REDD+, in both the negotiation and implementation arenas.

1 CIFOR is coordinating the Global Comparative Study on REDD that looks at the first generation of REDD+ activities at national and subnational levels. For more information, see http://www.cifor.cgiar.org/.

Fourth, many organisations and individuals are watching REDD+, and are alert to potential negative consequences for effectiveness, efficiency and equity. Private sector actors are also sensitive to the risks to their reputations associated with involvement in REDD+. More than in the past, this scrutiny should help to limit mismanagement of REDD+ funds and corruption, and provide early warning of adverse impacts on vulnerable communities and ecosystems.

Finally, the seriousness of climate change and the magnitude of the adaptation challenge are becoming increasingly evident. National and global policies are likely to increase their focus on effective action to reduce emissions, and countries and domestic players seen to hinder progress will lose legitimacy. The multiple benefits at all levels to be gained from better management of the world's forests are bound to increase political pressure for effective, efficient and equitable implementation of REDD+.

Taken together, the analyses presented in this book provide evidence for cautious optimism that REDD+ can indeed be realised in national institutions, policies and actions on the ground.

Terms and abbreviations

3E	Effectiveness, efficiency and equity
3E+	Effectiveness, efficiency, equity and co-benefits
3I	Incentives, information and institutions
A/R	Afforestation and reforestation
AAU	Assigned amount unit
AD	Avoided deforestation
AFD	Agence française de développement
AFOLU	Agriculture, forestry and other land uses
AIJ	Activities implemented jointly
ASB	Alternatives to Slash and Burn, Partnership for the Tropical Forest Margins
ASEAN	Association of Southeast Asian Nations
AusAid	Australian Agency for International Development
BACI	Before-after, control-impact
BAU	Business as usual
BNDES	Brazilian Development Bank
CBFM	Community-based forest management

CBNRM	Community-based natural resource management
CCBA	Climate, Community and Biodiversity Alliance
CCBS	Climate, Community and Biodiversity Standards
CDM	Clean Development Mechanism
CED	Center for Environment and Development
CER	Certified emission reductions
CFM	Community forest management
CfRN	Coalition for Rainforest Nations
CIDOB	Confederation of Indigenous People of Bolivia
CIFOR	Center for International Forestry Research
CL	Conventional logging practices
CO_2e	Carbon dioxide equivalent
COMIFAC	Central African Forest Commission
COP	Conference of the Parties
CSP	Cross-sector partnership
CTF	Conservation Trust Fund
DANIDA	Danish International Development Agency
DFID	UK Department for International Development
DRC	Democratic Republic of the Congo
ETS	Emissions trading scheme
EU	European Union
ex ante	Before the fact
ex post	After the fact
FAN	Fundación Amigos de la Naturaleza (Friends of Nature Foundation in Bolivia)
FAO	Food and Agriculture Organization of the United Nations
FCPF	Forest Carbon Partnership Facility
FCT	Future crop tree
FPIC	Free and prior informed consent
FSC	Forest Stewardship Council
FT	Forest transition
GEF	Global Environment Facility
GHG	Greenhouse gas
GJ	Gigajoule
GOFC - GOLD	Global Observation of Forest and Land Cover Dynamics
GPG	Good Practice Guidelines
GPS	Global positioning system
GtC	Gigatonnes of carbon
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Technical Cooperation Agency)

ha	Hectare
HCVF	High conservation value forest
HFLD	High forest, low deforestation
HFHD	High forest, high deforestation
ICDP	Integrated conservation and development project
ICRAF	World Agroforestry Centre
IFA	Illegal forest activity
IFCA	Indonesian Forest-Climate Alliance
IPCC	Intergovernmental Panel on Climate Change
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
IWG-IFR	Informal Working Group on Interim Finance for REDD
JFM	Joint forest management
JI	Joint implementation
JICA	Japan International Cooperation Agency
K:TGAL	Kyoto: Think Global Act Local
KfW	Kreditanstalt für Wiederaufbau (German Development Bank)
KwH	Kilowatt hour
LISA	Low input sustainable agriculture
LDC	Least developed countries
LFHD	Low forest, high deforestation
LFLD	Low forest, low deforestation
LFND	Low forest, negative deforestation
LULUCF	Land use, land use change and forestry
MARV	Measurement, assessment, reporting and verification
MBI	Market-based instrument
MRV	Monitoring, reporting and verification or measuring, reporting and verification
NAFTA	North American Free Trade Agreement
NAMA	Nationally appropriate mitigation action
NAPA	National adaptation programme of action
NCAS	National Carbon Accounting System
NCCC	Indonesia's National Council for Climate Change
NCCP	National Climate Change Program
NGO	Nongovernmental organisation
NONIE	Network of Networks Impact Evaluation Initiative
Norad	Norwegian Agency for Development Cooperation
ODA	Official development assistance
PA	Protected area

PAM	Policies and measures
PDD	Project design document
PEN	Poverty Environment Network (of CIFOR)
PES	Payments for environmental services, payments for ecosystem services
PFM	Participatory forest management
REAP	Reduced emissions agricultural policy
RECOFTC	The Center for People and Forests
RED	Reducing emissions from deforestation
REDD	Reducing emissions from deforestation and forest degradation
REDD+	Reducing emissions from deforestation and forest degradation and enhancing forest carbon stocks
RIL	Reduced impact logging
RIL+	Reduced impact logging plus pre- and post-logging silvicultural treatments
R-PIN	Readiness Plan Idea Notes
R-PLAN	Readiness Plan
RPP	Readiness Preparation Proposal
SAP	Structural adjustment programme
SFM	Sustainable forest management
SNV	Netherlands Development Organisation
SPVS	Sociedade de Pesquisa em Vida Selvagem e Educação Ambiental (Society for Wildlife Research and Environmental Education, in Brazil)
tC	Metric tonnes of carbon
TCO	Tierra comunitaria de orígen (Original community land, in Bolivia)
TNC	The Nature Conservancy
UCD	Underlying causes of deforestation
UNDP	United Nations Development Programme
UNDRIP	United Nations Declaration on the Rights of Indigenous People
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UN-REDD	United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
VCS	Voluntary carbon standard
VER	Verified emission reductions

Glossary

Note: The terms in **green** have their own entries in the glossary.

3E, 3E+ criteria

The 3E criteria (effectiveness, efficiency and equity) are generic criteria to evaluate options and outcomes, and are increasingly used to evaluate climate mitigation policy options. In this book, the 3E+ criteria is also used, where the '+' refers to the inclusion of co-benefits such as poverty alleviation and biodiversity. See Box 1.1.

Additionality

Additionality is the requirement that an activity or project should generate benefits, such as emissions reductions or **carbon stock** enhancements, that are additional to what would happen without the activity (i.e., the **business as usual** scenario). Sometimes a distinction is made between such *environmental* additionality and *financial* additionality, which means a project would not have been implemented without **REDD+** support. Under the **Kyoto Protocol**, 'additionality' means that projects must demonstrate real, measurable, long-term benefits in reducing or preventing carbon emissions and that these would not have occurred without the project.

Afforestation

Afforestation is defined under the **Kyoto Protocol** as the direct, human-induced conversion of non-forest land to permanent forested land for a period of at least 50 years.

AFOLU

AFOLU is an acronym for 'agriculture, forestry and other land uses'. A term put forward by the Intergovernmental Panel on Climate Change Guidelines (2006) to cover 'land use, land use change and forestry (**LULUCF**), and agriculture'.

Activities implemented jointly (AIJ)

COP-1 in Berlin in 1995 launched a pilot phase of activities implemented jointly (AIJ). In this phase, Annex I Parties voluntarily implement projects that reduce emissions of greenhouse gases, or enhance their removal through **sinks**, on a voluntary basis. The objectives are to build experience and 'learn by doing'. There are no credits for AIJ activities during the pilot phase, which has been extended indefinitely.

Annex I and non-Annex I countries

Under the UN Framework Convention on Climate Change (UNFCCC), nations fall into two categories: developed countries (Annex I countries) and developing countries (non-Annex I countries). In accordance with the principle of 'common but differentiated responsibilities', Annex I countries have greater commitments to enacting policy and reporting than non-Annex 1 countries have, and most have committed to reduce emissions under the **Kyoto Protocol**.

Baseline

The term 'baseline' in the **REDD+** debate refers to three concepts.

1) A historical baseline is the rate of deforestation and forest degradation (DD) and the resulting greenhouse gas emissions over a specific number of years, e.g., the last 10 years.
2) A **business as usual** (BAU) baseline is the projected DD and associated emissions without any REDD+ interventions. It is used to assess the impact of REDD+ measures and ensure **additionality**.
3) A crediting baseline or reference level is a benchmark below which emissions must fall before a country or project is rewarded for reductions, e.g., before it can sell REDD+ credits.

In the project evaluation literature (Chapter 22), baseline can also refer to pre-project conditions, for example, the term 'baseline study' refers to collecting socio-economic and ecological data before a project starts. See also Box 7.2.

Biomass

The total dry mass of living organic matter.

Business as usual (BAU)

A policy neutral reference to future emissions or removals, estimated using projections of future emission or removal levels without any **REDD+** activity.

Canopy Cover

The share of the surface of an ecosystem that is under the tree canopy. Canopy cover is also referred to as 'crown cover' or 'tree cover'.

Carbon market

A market in which carbon emission reductions are traded, usually in the form of carbon credits. Carbon markets can be voluntary (where emissions reductions targets are not regulated) or compliance (where carbon credits are traded to meet regulated emissions reductions targets). The largest carbon market is currently the EU Emissions Trading System (ETS).

Carbon pool

A reservoir that accumulates or releases carbon. The **Marrakesh Accords** recognise five main carbon pools in forests: aboveground biomass, belowground biomass, dead wood, litter and soil organic matter.

Carbon rights

Carbon rights refer to the claims on the benefit streams from carbon pools, for example, the benefit from a specific parcel of forest. Where a carbon market exists, carbon rights may have a monetary value.

Carbon sequestration

The removal of carbon from the atmosphere to long-term storage in sinks through physical or biological processes, such as photosynthesis.

Carbon sink

A pool (reservoir) that absorbs or takes up carbon released from other components in the carbon cycle.

Carbon stock

The quantity of carbon contained in a **carbon pool**.

Certification

In the current **REDD+** context, certification is the process of verifying that projects meet a voluntary offset standard (such as the Voluntary Carbon Standard or Climate, Community and Biodiversity Standard) through a third-party audit. Certification can also refer to the verification of **Clean Development Mechanism** (CDM) credits, i.e., **Certified Emissions Reductions** (CER).

Certified Emission Reduction (CER)

The technical term for the outcome of a **Clean Development Mechanism** (CDM) project. A CER is a unit of greenhouse gas reduction that has been generated and certified under the provisions of Article 12 of the Kyoto Protocol which describes the CDM. One CER equals one tonne of carbon dioxide equivalent (CO_2e). Two types of CERs can be issued for net emission removals from **afforestation** and **reforestation** (A/R) CDM projects:

1) temporary certified emission reduction (tCERs); and
2) long-term certified emission reductions (lCERs).

Clean Development Mechanism (CDM)

An offset mechanism under Article 12 of the **Kyoto Protocol** designed to assist **Annex I countries** in meeting their emissions reduction targets, and to assist **Non-Annex I countries** in achieving sustainable development. CDM allows Annex I countries to finance and implement projects that reduce emissions in Non-Annex I countries so that they can get credits to meet their own emissions reduction targets.

Co-benefits

Benefits arising from **REDD+** in addition to climate **mitigation** benefits, such as enhancing biodiversity, enhancing adaptation to climate change, alleviating poverty, improving local livelihoods, improving forest governance and protecting rights.

Compliance market

Compliance markets are created and regulated by mandatory national or international climate regimes. They allocate or auction greenhouse gas emission limits (quotas or caps) to countries or subnational units (e.g., companies), and allow them to buy carbon credits to meet their cap, or sell them if they emit less than their cap (i.e., trade, thus also referred to as cap-and-trade).

Conference of the Parties (COP)

The governing body of the UN Framework Convention on Climate Change, which meets once a year.

Control group

The group with which a group of project participants (treatment group) is compared. For example, a control group could be households, communities, districts or forests outside the project area which are not affected by project activities.

Crediting baseline

A crediting baseline is the reference level against which emissions or removal are measured and rewarded. See also **Baseline**.

Deforestation

Most definitions describe deforestation as the long-term or permanent conversion of land from **forest** to non-forest. In the **Marrakesh Accords** deforestation is defined as 'the direct human-induced conversion of forested land to non-forested land'. The Food and Agriculture Organization defines deforestation as 'the conversion of forest to another land use or the long-term reduction of the tree canopy cover below the minimum 10% threshold'.

Degradation

Degradation refers to changes within the **forest** which negatively affect the structure or function of the forest stand or site, and thereby lower the capacity of the forest to supply products or services. In the context of **REDD+**, degradation will most probably be measured in terms of reduced carbon stocks in forests which remain as forests. No formal definition of degradation has yet been adopted because many forest carbon stocks fluctuate due to natural cyclical causes or management practices.

First generation REDD+ projects

Projects launched since 2005 to reduce net carbon emissions from defined areas of **forest**. The intention is to share experiences and lessons learned by 2012. See Chapter 21.

Forest

The FAO defines forest as minimum **canopy cover** of 10%, minimum tree height *in situ* of 5 meters, minimum area of 0.5 hectares, and agriculture is not the dominant land use. The UN Framework Convention on Climate Change allows for a more flexible forest definition: minimum **canopy cover** 10–30%, minimum tree height 2–5 m, minimum area 0.1 ha. Individual countries have their own definitions.

Forest Carbon Partnership Facility (FCPF)

The FCPF is a World Bank programme to help developing countries reduce emissions from **deforestation** and forest **degradation**. Objectives include capacity building for **REDD+** and testing performance-based payment schemes in pilot countries.

Forest transition

Forest transition describes the changes in forest cover over time in several phases: initial high forest cover and low **deforestation**; high and accelerating deforestation; slowing of deforestation and stabilisation of forest cover; and **reforestation**. See Box 1.2.

Fungibility (of REDD+ credits)

Fungibility is the extent to which **REDD+** credits and other types of carbon credits can be exchanged on carbon markets. When REDD+ credits are fully fungible, they can be sold freely and used to meet emission reductions targets in countries that have committed to such targets.

Hot air

Hot air refers to payment for false emission reductions or removal increases, that is, reductions or increases that are not truly **additional**. This might happen if **the reference level** (crediting baseline) for emissions from a country or project area is set above the true **business as usual (BAU) baseline**. The prime example is carbon credits claimed by Russia and Ukraine under the Kyoto Protocol. Economic decline in those countries during the 1990s led to a sharp decrease in greenhouse gas emissions. Under Kyoto Protocol rules, these countries were eligible to sell the credits to other Annex I countries, despite the fact that the credits came from emission reductions that would have occurred anyway. This meant less emissions reductions in other Annex I countries, and more overall greenhouse gas emissions and global warming. Hot air is also referred to as 'paper credits'.

Indigenous people

There is no universally agreed definition of indigenous people, although some international legal instruments do give definitions. According to the United Nations, rather than define indigenous people, the most useful approach is for them to identify themselves according to the fundamental right to self-identification set out in declarations of human rights.

Input-based payments

Payments that are made based on actions which are assumed to produce emissions reductions or removals increases, but where the outcome cannot be measured directly (or is very costly to measure). Input-based payment schemes are often referred to as **policies and measures** (PAMs).

IPCC 2006 GL

The Intergovernmental Panel on Climate Change (IPCC) published this methodological report in 2006. It provides guidelines for national greenhouse gas inventories.

Joint Implementation (JI)

A flexible mechanism under the **Kyoto Protocol** (alongside CDM) designed to help **Annex I countries** meet their emissions reduction targets by investing in emissions reduction projects in other Annex I countries as an alternative to reducing emissions domestically. Unlike the CDM, JI emissions reductions take place in countries that have greenhouse gas emission targets.

Kyoto Protocol

A 1997 agreement under the UN Framework Convention on Climate Change. Annex I countries that ratified the Protocol committed to reducing their emissions of carbon dioxide and five other greenhouse gases by an average of 5.2 % between 2008 and 2012, compared to their 1990 level. The Kyoto Protocol now covers 189 countries globally, but less than 64% in terms of global greenhouse gas emissions. As of November 2009, the United States is the only signatory nation that has not ratified the Protocol. The first commitment period of the Kyoto Protocol ends in 2012.

Leakage

In the context of climate change, carbon leakage happens when interventions to reduce emissions in one area (subnational or national) lead to an increase in emissions in another area. Carbon leakage is also referred to as 'emissions displacement'.

Liability

Liability is the obligation of the **REDD+** implementing project or country to ensure that the emission reductions for which it has received credit are permanent.

Local communities

There is no universally agreed international definition of local communities, although some international legal instruments have given definitions. With respect to a particular **REDD+** activity, the term commonly refers to communities within the area of influence.

LULUCF

Acronym for 'land use, land-use change and forestry'. LULUCF activities are covered under Article 3 (par. 3 and 4) and Articles 6 and 12 of the **Kyoto Protocol**. See also **AFOLU**.

Marrakesh Accords

Agreements reached at COP-7 in 2001 that set rules for implementing the more detailed provisions of the **Kyoto Protocol**. Among other things, the accords include rules for establishing a greenhouse gas emissions trading system; implementing and monitoring the **CDM**; and setting up and operating three funds to support efforts to adapt to climate change.

Mitigation

Action to prevent further accumulation of greenhouse gases in the atmosphere by reducing the amounts emitted or by storing carbon in sinks.

Nested approach

A nested approach allows an international funding mechanism to account for and credit emissions reductions and **carbon stock** enhancements at both subnational and national levels. The approach can either be sequential (first subnational then national) or simultaneous (accounting at both levels).

Net emissions

In **REDD+**, net emissions are estimates of emissions from **deforestation** that consider both the **carbon stocks** of the **forest** being cleared and the carbon stock of the replacement land use.

Payments for environmental services (PES)

PES also stands for 'payments for ecosystem services.' A buyer that values environmental services pays to the provider or the manager of the land use supplying the environmental service if and only if, the seller actually delivers the environmental service. In **REDD+,** PES refers to a results-based system in which payments are made for emissions reductions or **carbon stock** enhancements relative to an agreed **reference level**.

Permanence

The duration and irreversibility of a reduction in greenhouse gas emissions. Nonpermanence is a form of intertemporal **leakage**. See also **Liability**.

Policies and measures (PAMs)

In **REDD+**, PAMs are nationally enacted policies and actions that countries undertake to reduce emissions or increase removals.

Principle of conservativeness

Justification for intentionally underestimating emissions reductions or removals increases to reduce the risk of overestimation of the climate benefit. The principle is applied when MRV cannot completely, accurately and precisely measure, report and verify emissions or removals.

Readiness

REDD+ country actions, including capacity building, policy design, consultation and consensus building, and testing and evaluation of a REDD+ national strategy, prior to a comprehensive REDD+ implementation.

REDD or REDD+ implementation plan

A plan for making a national REDD+ strategy operational, sometimes used to request international funding.

REDD+ units

A REDD+ unit is an emissions reduction or removal increase that can be sold in a **carbon market** (similar to **CER** and **VER**), and that might also include co-benefits.

Reduced impact logging (RIL)

Planned and carefully controlled timber harvesting by trained workers to minimise the harmful effects of logging.

Reducing emissions from deforestation and forest degradation (REDD and REDD+)

REDD refers to mechanisms currently being negotiated under the UN Framework Convention on Climate Change process to reduce emissions from **deforestation** and forest **degradation** in developing countries. **REDD+** includes enhancement of forest carbon stocks, that is, 'negative degradation' or 'removals' on land classified as forests. As used in this book, REDD+ does not include **afforestation** and **reforestation** (A/R). See Box 1.1 for a more detailed discussion.

Reference level

A reference level is in this book used synonymously with a crediting **baseline**. See also **Baseline**.

Reforestation

Reforestation is 'the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested, but that has been converted to non-forested land'. In the first commitment period of the **Kyoto Protocol**, reforestation activities have been defined as reforestation of lands that were not forested on 31 December 1989, but have had forest cover at some point during the past 50 years.

Remote sensing

A method of measuring **deforestation** and/or forest **degradation** by a recording device that is not in physical contact with the forest, such as a satellite.

Removals

Refers to the removal of CO_2, or other greenhouse gases from the atmosphere, and its storage in carbon pools, such as forests. See also **Carbon sequestration**.

Restoration

Activities that enhance the recovery of a degraded ecosystem.

Sequestration

See **Carbon sequestration**.

Silviculture

The practice, science and art of tending **forests** to reap goods and services, including timber and non-timber forest products.

Sink (or carbon sink)

A pool or reservoir (e.g., a forest) that absorbs or takes up carbon released from other components of the carbon cycle, and that absorbs more than it releases.

Source

A pool (reservoir) that absorbs or takes up carbon released from other components of the carbon cycle, and that releases more than it absorbs.

Stern Report/Review

Released in October 2006, the Stern Review on the Economics of Climate Change discusses the effects of climate change and global warming on the world economy. The review concludes that 1% of global gross domestic product (GDP) per annum needs to be invested in order to avoid the worst effects of climate change. Failure to do so could risk lowering global GDP by 20%.

Subnational activity

Activities implemented at the subnational level as part of a national **REDD+** strategy. Subnational activities can be implemented by governments, local authorities, communities, NGOs or private entities. They may be embedded in a national or international crediting mechanism.

Sustainable forest management (SFM)

The term SFM has different meanings to different individuals and organisations. According to the UN General Assembly, SFM is 'a dynamic and evolving concept [that] aims to maintain and enhance the economic, social and environmental value of all types of forests, for the benefit of present and future generations'. In the REDD+ debate, some organisations make a distinction between 'sustainable forest management' (SFM) and 'sustainable management of forests' (SMF): SFM is then referring to industrial logging, while SMF is a broader term. In this book, we use SFM as an umbrella term to cover activities to enhance and maintain the products and services provided by forests (e.g., carbon storage).

Tier

The IPCC Good Practice Guidance tiers are levels of methodological complexity: Tier 1 is the most basic and uses global default values for carbon stocks; Tier 2 is intermediate and uses national values; and Tier 3 is most demanding in terms of complexity and data requirements, and uses site-specific values for carbon stocks. See also Box 8.1.

UN-REDD Programme

The UN-REDD Programme is a collaborative programme for reducing emissions from **deforestation** and forest **degradation** in developing countries. It brings together the FAO, the UNDP and the UNEP in a multidonor trust fund established July 2008 that pools resources and funds programme activities.

Verification

Independent third-party assessment of the expected or actual emissions reductions of a particular **mitigation** activity.

Verified emissions reductions (VER)

A unit of greenhouse gas emission reduction that has been verified by an independent auditor, but that has not undergone the procedures for **verification**, certification and issuance under the **Kyoto Protocol**, and may have yet to meet the legal requirements under the Protocol. The units are traded on voluntary carbon markets.

Voluntary carbon market

The voluntary carbon markets function alongside compliance markets. Buyers are companies, governments, NGOs and individuals who are voluntarily seeking to offset their emissions by purchasing **verified emissions reductions**.

References

Adeney, J. M., Christensen Jr, N. L. and Pimm, S. L. 2009 Reserves protect against deforestation fires in the Amazon. PLoS ONE 4(4): e5014.

Agrawal, A. 2001 Common property institutions and sustainable governance of resources. World Development 29(10): 1649-1672.

Agrawal, A. 2005 Environmentality. Duke University Press, Raleigh, NC, USA. 344p.

Agrawal, A. 2007 Forests, governance, and sustainability: common property theory and its contributions. International Journal of the Commons 1(1): 51-76.

Agrawal, A., Chhatre, A. and Hardin, R. 2008 Changing governance of the world's forests. Science 320(5882): 1460-1462.

Agrawal, A. and Gibson, C. C. 1999 Enchantment and disenchantment: the role of community in natural resource conservation. World Development 27(4): 629-649.

Agrawal, A. and Goyal, S. 2001 Group size and collective action: third-party monitoring in common-pool resources. Comparative Political Studies 34(1): 63-93.

Agrawal, A. and Ostrom, E. 2001 Collective action, property rights, and decentralization in resource use in India and Nepal. Politics and Society 29(4): 485-514.

Agrawal, A. and Redford, K. 2009 Conservation and displacement: an overview. Conservation and Society 7(1): 1-10.

Ählström, J. and Sjöström, E. 2005 CSOs and business partnerships: strategies for interaction. Business Strategy and the Environment 14(4): 230-240.

Alencar, A., Nepstad, D. and Vera-Diaz, M. C. 2006 Forest understory fire in the Brazilian Amazon in ENSO and non-ENSO years: area burned and committed carbon emissions. Earth Interactions 10 (Paper No. 6).

Alencar, A., Solorzano, L. and Nepstad, D. C. 2004 Modeling forest understory fires in an eastern Amazonian landscape. Ecological Application 14(4): 139-149.

Alston, L., Libecap, G. and Mueller, B. 1999 Titles, conflict, and land use: the development of property rights and land reform on the Brazilian Amazon frontier. University of Michigan Press, Ann Arbor, MI, USA.

Alvarado, L. X. R. and Wertz-Kanounnikoff, S. 2007 Why are we seeing 'REDD'? An analysis of the international debate on reducing emissions from deforestation and degradation in developing countries. Analyses. Institut du développement durable et des relations internationales, Paris. 28p.

Amsberg, J. V. 1998 Economic parameters of deforestation. World Bank Economic Review 12(1): 133-153.

Anaya, S. J. and Grossman, C. 2002 The case of Awas Tingni v. Nicaragua: a new step in the international law of indigenous peoples. Arizona Journal of International and Comparative Law 19(1): 1-15.

Andam, K. S., Ferraro, P. J. and Holland, M. B. 2009 What are the social impacts of land use restrictions on local communities? Empirical evidence from Costa Rica. Paper contributed to the Conference of the International Association of Agricultural Economists. Beijing, China, 16-22 August 2009.

Andam, K. S., Ferraro, P. J., Pfaff, A., Sanchez-Azofeifa, G. A. and Robalino, J. A. 2008 Measuring the effectiveness of protected area networks in reducing deforestation. Proceedings of the National Academy of Sciences 105(42): 16089-16094.

Anderson, K. 2009 Distorted agricultural incentives and economic development: Asia's experience. World Economy 32(3): 351-384.

Andersson, K. P. and Gibson, C. C. 2004 Decentralization reforms: help or hindrance to forest conservation? Draft presented to the Conference on the International Association of Common Property (IASCP) in Oaxaca, Mexico, 9-13 August.

Andersson, K. and Gibson, C. C. 2007 Decentralized governance and environmental change: local institutional moderation of deforestation in Bolivia. Journal of Policy Analysis and Management 26(1): 99-123.

Angelsen, A. 1999 Agricultural expansion and deforestation: modelling the impact of population, market forces and property rights. Journal of Development Economics 58: 185-218.

Angelsen, A. 2007 Forest cover change in space and time: combining von Thünen and the forest transition. World Bank Policy Research Working Paper 4117. The World Bank, Washington, DC.

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

Angelsen, A. (ed.) 2008b Moving ahead with REDD: issues, options and implications. CIFOR, Bogor, Indonesia. 156p.

Angelsen, A. and Kaimowitz, D. 1999 Rethinking the causes of deforestation: lessons from economic models. World Bank Research Observer 14(1): 73-98.

Angelsen, A. and Kaimowitz, D. (eds) 2001 Agricultural technologies and tropical deforestation. CAB International, Wallingford, UK.

Angelsen, A. and Wertz-Kanounnikoff, S. 2008 What are the key design issues for REDD and the criteria for assessing options? *In*: Angelsen, A. (ed.) Moving ahead with REDD: issues, options and implications. CIFOR, Bogor, Indonesia.

Angelsen, A., Streck, C., Peskett, L., Brown, J. and Luttrell, C. 2008 What is the right scale for REDD? *In*: Angelsen, A. (ed.) Moving ahead with REDD: issues, options and implications, 31-40. CIFOR, Bogor, Indonesia.

Antal, M. J. and Gronli, M. 2003 The art, science, and technology of charcoal production. Industrial & Engineering Chemistry Research 42(8): 1619-1640.

Applegate, G., Putz, F. E. and Snook, L. K. 2004 Who pays for and who benefits from improved timber harvesting practices in the tropics: lessons learned and information gaps. CIFOR, Bogor, Indonesia.

Araujo, C., Bonjean, C. A., Combes, J.-L., Combes Motel, P. and Reis, E. J. 2009 Property rights and deforestation in the Brazilian Amazon. Ecological Economics 68(8-9): 2461-2468.

Arifin, B. 2005 Institutional constraints and opportunities in developing environmental service markets: lessons from institutional studies on RUPES in Indonesia. World Agroforestry Centre, Bogor, Indonesia.

Arnold, J. E. M. and Stewart, W. C. 1991 Common property resource management in India. Oxford Forestry Institute, University of Oxford, Oxford.

Arnold, J. E. M., Kohlin, G. and Persson, R. 2006 Woodfuels, livelihoods, and policy interventions: changing perspectives. World Development 34(3): 596-611.

Arriagada, R. A. 2008 Private provision of public goods: applying matching methods to evaluate payments for ecosystem services in Costa Rica. PhD dissertation. North Carolina State University, Raleigh, NC, USA.

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 310(5747): 480-482.

Asquith, N. M., Vargas Ríos, M. T. and Smith, J. 2002 Can forest-protection carbon projects improve rural livelihoods? Analysis of the Noel Kempff Mercado climate action project, Bolivia. Mitigation and Adaptation Strategies for Global Change 7(4): 323-337.

Auld, G., Gulbrandsen, L. H. and McDermott, C. L. 2008. Certification schemes and the impacts on forests and forestry. Annual Review of Environment and Resources 33: 187-211.

Baland, J.-M. and Platteau, J.-P. 1996 Halting degradation of natural resources: is there a role for rural communities? Food and Agriculture Organization of the United Nations, Rome. 423p.

Baland, J.-M. and Platteau, J.-P. 1999 The ambiguous impact of inequality on local resource management. World Development 27(5): 773-788.

Ballesteros, M. A., Nakhooda, S. and Werksman, J. 2009 Power, responsibility, and accountability: re-thinking the legitimacy of institutions for climate finance. WRI Working Paper. World Resources Institute, Washington, DC. 57p. Available from: http://www.wri.org.

Bandiaky, S. 2008 Gender inequality in Malidino Biodiversity Reserve, Senegal: political parties and the 'village approach'. Conservation and Society 6(1): 62-73.

Banerjee, O., Macpherson, A. J. and Alavalapati, J. 2009 Toward a policy of sustainable forest management in Brazil: a historical analysis. The Journal of Environment Development 18(2): 130-153.

Barber, C. V. and Schweithelm, J. 2000 Trial by fire: forest fires and the forestry policy in Indonesia's era of crisis and reform. World Resources Institute, Washington, DC.

Barbier, E. B., Damania, R. and Léonard, D. 2005 Corruption, trade and resource conversion. Journal of Environmental Economics and Management 50(2): 276-299.

Barnett, T. E. 1990 The Barnett report: a summary of the report of the commission of inquiry into aspects of the timber industry in Papua New Guinea. Asia-Pacific Action Group, Hobart, Tasmania.

Barr, C. A., Dermawan, A., Purnomo, H. and Komarudin, H. In press. Financial governance and Indonesia's reforestation fund: a political economic analysis of lessons for REDD. CIFOR, Bogor, Indonesia.

Barrett, C. B. and Arcese, P. 1995 Are integrated conservation–development projects (ICDPs) sustainable? On the conservation of large mammals in Sub-Saharan Africa. World Development 23(7): 1073-1084.

Bauen, A. and Kaltschmitt, M. 2001 Reduction of energy related CO_2 emissions – the potential contribution of biomass. *In*: Proceedings of 1st World Conference on Biomass for Energy and Industry, Sevilla, Spain, 5-9 June 2000, Vol. II, 1354-1357.

Becker, G. S. 1968 Crime and punishment: an economic approach. Journal of Political Economy 76(2): 169.

Becker, L. C. 2001 Seeing green in Mali's woods: colonial legacy, forest use, and local control. Annals of the Association of American Geographers 91(3): 504-526.

Benecke, G., Friberg, L., Lederer, M. and Schröder, M. 2008 From public–private partnership to market: the clean development mechanism (CDM) as a new form of governance in climate protection. Sonderforschungsbereich, Berlin.

Bennear, L. S. and Coglianese, C. 2005 Measuring progress: program evaluation of environmental policies. Environment: Science and Policy for Sustainable Development 47(2): 22-39.

Bennett, M. T. 2009 Markets for ecosystem services in China. An exploration of China's 'eco-compensation' and other market-based environmental policies. Forest Trends, Washington, DC. 86p.

Bento, A., Towe, C. and Geoghegan, J. 2007 The effects of moratoria on residential development: evidence from a matching approach. American Journal of Agricultural Economics 89(5): 1211-1218.

Bertault, J.-G. and Sist, P. 1997 An experimental comparison of different harvesting intensities with reduced-impact and conventional logging in East Kalimantan, Indonesia. Forest Ecology and Management 94(1-3): 209-218.

Bezemer, D. and Headey, D. 2008 Agriculture, development, and urban bias. World Development 36(8): 1342-1364.

Bhattacharya, S. C. and Abdul Salam, P. 2002 Low greenhouse gas biomass options for cooking in the developing countries. Biomass and Bioenergy 22(4): 305-317.

Biermann, F., Chan, S., Mert, A. and Pattberg, P. 2007 Multi-stakeholder partnerships for sustainable development: does the promise hold? *In*: Glasbergen, P., Biermann, F. and Mol, A. (eds) Partnerships, governance and sustainable development: reflections on theory and practice. Edward Elgar, Cheltenham, UK.

Bond, I., Grieg-Gran, M., Wertz-Kanounnikoff, S., Hazlewood, P., Wunder, S. and Angelsen, A. 2009 Incentives to sustain forest ecosystem services: a review and lessons for REDD. Natural Resources Issues No. 16. International Institute for Environment and Development, London with CIFOR, Bogor, Indonesia and World Resources Institute, Washington, DC. 47p.

Boserup, E. 1965 The conditions of agricultural growth. The economics of agrarian change under population pressure. Aldine, Chicago, IL, USA.

Bozmoski, A. and Hepburn, C. 2009 The interminable politics of forest carbon: an EU outlook. Background paper for forest carbon finance summit 2009: making forest carbon markets work. Washington, DC. 6-8 March 2009.

Brandon, K., Redford, K. and Sanderson, S. (eds) 1998 Parks in peril: people, politics, and protected areas. Island Press, Covelo, CA, USA.

Bray, D. B., Ellis, E. A., Armijo-Canto, N. and Beck, C. T. 2004 The institutional drivers of sustainable landscapes: a case study of the 'Mayan Zone' in Quintana Roo, Mexico. Land Use Policy 21(4): 333-346.

Broadhead, J., Bahdon, J. and Whiteman, A. 2001 Woodfuel consumption modeling and results. Annex 2. *In*: Past trends and future prospects for the utilization of wood for energy. GFPOS/WP/05, global forest products outlook study. Food and Agriculture Organization of the United Nations, Rome.

Brock, K. and Coulibaly, N. G. 1999 Sustainable rural livelihoods in Mali. IDS Research Report No. 35. Institute of Development Studies, Brighton, UK.

Brockington, D., Igoe, J. and Schmidt-Soltau, K. 2006 Conservation, human rights, and poverty reduction. Conservation Biology 20(1): 250-252.

Brondizio, E. S. 2008 The Amazonian Caboclo and the Açaí palm: forest farmers in the global market. New York Botanical Garden Press, New York.

Brown, D., Seymour, F. and Peskett, L. 2008 How do we achieve REDD co-benefits and avoid doing harm? *In*: Angelsen, A. (ed.) Moving ahead with REDD: issues, options and implications, 107-118. CIFOR, Bogor, Indonesia.

Brown, G. M. 2000 Renewable natural resource management and use without markets. Journal of Economic Literature 38(4): 875-914.

Brown, K. and Pearce, D. W. E. 1994 The causes and consequences of tropical deforestation: the economic and statistical analysis of factors giving rise to the loss of tropical forests. UBC Press, London. 338p.

Bruce, J. 1998 Learning from comparative experience with agrarian reform. Presented to International Conference on Land Tenure in the Developing World. Cape Town, South Africa, 27–29 January 1998.

Bruner, A. G., Gullison, R. E., Rice, R. E. and Fonseca, G. A. B. da 2001 Effectiveness of parks in protecting tropical biodiversity. Science 291: 125-128.

Brunswick Research 2009 WWF 2009 forest carbon investor survey: research summary. Available from: http://assets.panda.org/downloads/2009_forest_carbon_investor_research_report.pdf (12 Nov. 2009).

Bullock, S., Childs, M. and Picken, T. 2009 A dangerous distraction. Why offsetting is failing the climate and people: the evidence. Friends of the Earth, London.

Bulte, E. H., Damania, R. and López, R. 2007 On the gains of committing to inefficiency: corruption, deforestation and low land productivity in Latin America. Journal of Environmental Economics and Management 54(3): 277-295.

Börner, J., Wunder, S., Wertz-Kanounnikoff, S., Rügnitz-Tito, M., Pereira, L. and Nascimento, N. In press. Direct conservation payments in the Brazilian Amazon: scope and equity implications. Ecological Economics in press.

Campbell, A., Miles, L., Lysenko, I., Hughes, A. and Gibbs, H. 2008 Carbon storage in protected areas: technical report. The United Nations Environment Programme World Conservation Monitoring Centre, Cambridge, UK.

Campbell, B. M. (ed.) 1996 The Miombo in transition: woodlands and welfare in Africa. CIFOR, Bogor, Indonesia.

Casson, A. and Obidzinski, K. 2007 From new order to regional autonomy: shifting dynamics of illegal logging in Kalimantan, Indonesia. *In*: Tacconi, L. (ed.) Illegal logging: law enforcement, livelihoods and the timber trade. Earthscan, London.

Cavendish, W. 2000 Empirical regularities in the poverty–environment relationship of rural households: evidence from Zimbabwe. World Development 28(11): 1979-2000.

CCBA 2008 Climate, community and biodiversity project design standards. 2nd ed. The Climate, Community, and Biodiversity Alliance, Arlington, VA, USA. Available from: http://www.climate-standards.org/standards/pdf/ccb_standards_second_edition_december_2008.pdf.

Cerbu, G., Minang, P., Swallow, B. and Meadu, V. 2009 Global survey of REDD projects: what implications for global climate objectives? ASB Policy Brief No. 12. ASB Partnership for the Tropical Forest Margins, Nairobi, Kenya. Available from: www.asb.cgiar.org.

Cerutti, P. O. and Tacconi, L. 2008 Forests, illegality, and livelihoods: the case of Cameroon. Society & Natural Resources 21(9): 845-853.

Cerutti, P. O., Nasi, R. and Tacconi, L. 2008 Sustainable forest management in Cameroon needs more than approved forest management plans. Ecology and Society 13(2): 36.

CGD 2009 Cash on delivery: progress-based aid for education. Center for Global Development. Available from: http://www.cgdev.org/section/initiatives/_active/codaid (12 Nov. 2009).

Chapin, M., Lamb, Z. and Threlkeld, B. 2005 Mapping indigenous lands. Annual Review of Anthropology 34: 619-638.

Charnley, S. and Poe, M. 2007 Community forestry in theory and practice: where are we now? Annual Review of Anthropology 32: 301-336.

Chazdon, R. L. 2008 Beyond deforestation: restoring forests and ecosystem services on degraded lands. Science 320(5882): 1458-1460.

Chhatre, A. 2007 Accountability in decentralization and the democratic context: theory and evidence from India. Representation, Equity and Environment Working Paper No. 23. World Resources Institute, Washington, DC.

Chhatre, A. and Agrawal, A. 2008 Forest commons and local enforcement. Proceedings of the National Academy of Sciences 105(36): 13186-13191.

Chhatre, A. and Agrawal, A. 2009 Trade-offs and synergies between carbon storage and livelihood benefits from forest commons. Proceedings of the National Academy of Sciences 106(42): 17667-17670.

Chidumayo, E. N. 1989 Land use, deforestation and reforestation in the Zambian Copperbelt. Land Degradation and Development 1(3): 209-216.

Chomitz, K. M., Buys, P., De Luca, G., Thomas, T. and Wertz-Kanounnikoff, S. 2007 At loggerheads? Agricultural expansion, poverty reduction, and environment in the tropical forests. A World Bank Policy Research Report. The World Bank, Washington, DC.

Coad, L., Campbell, A., Clark, S., Bolt, K., Roe, D. and Miles, L. 2008 Protecting the future: carbon, forests, protected areas and local livelihoods. Revised ed. The United Nations Environment Programme World Conservation Monitoring Centre, Cambridge, UK.

Colchester, M. 2006 Forest peoples, customary use and state forests: the case for reform. Paper to 11th Biennial Congress of the International Association for the Study of Common Property. Bali, Indonesia. 19-22 June 2006.

Colchester, M. 2007 Beyond tenure: rights-based approaches to people and forests: some lessons from the Forest Peoples Programme. Paper to the International Conference on Poverty Reduction in Forests: Tenure, Markets and Policy Reforms, Bangkok, Thailand, 3-7 September 2007. Forest Peoples Programme, London.

Colchester, M., Boscolo, M., Contreras-Hermosilla, A., Del Gatto, F., Dempsey, J., Lescuyer, G., Obidzinski, K., Pommier, D., Richards, M., Sembiring, S. N. *et al.* 2006 Justice in the forest: rural livelihoods and forest law enforcement. CIFOR, Bogor, Indonesia.

Colfer, C. J. P. 2005 The complex forest: communities, uncertainty, and adaptive collaborative management. Resources of the Future, Washington, DC and CIFOR, Bogor, Indonesia. 370p.

Collomb, J. G. and Bikie, H. 2001 1999–2000 Allocation of logging permits in Cameroon: fine-tuning central Africa's first auction system. Global Forest Watch Cameroon and World Resources Institute, Washington, DC.

Contreras, A. 2003 Creating space for local forest management: the case of the Philippines. *In*: Edmunds, D. and Wollenburg, E. (eds) Local forest management: the impacts of devolution policies, 127-149. Earthscan, London.

Contreras-Hermosilla, A. 1997 The 'cut-and-run' course of corruption in the forestry sector. Journal of Forestry 95: 33-36.

Contreras-Hermosilla, A. 2000 The underlying causes of forest decline. Occasional Paper No. 30. CIFOR, Bogor, Indonesia.

Contreras-Hermosilla, A. and Vargas Rios, M. T. 2002 Social, environmental and economic dimensions of forest policy reforms in Bolivia. Forest Trends, Washington, DC and CIFOR, Bogor, Indonesia.

Conyers, D. 2001 Whose elephants are they? Decentralization of control over wildlife management through the CAMPFIRE programme in Binga District, Zimbabwe. Working Paper No. 31. World Research Institute, Washington, DC.

Cooke, P., Köhlin, G. and Hyde, W. F. 2008 Fuelwood, forests and community management – evidence from household studies. Environment and Development Economics 13(01): 103-135.

Coomes, O. T., Grimard, F., Potvin, C. and Sima, P. 2008 The fate of the tropical forest: carbon or cattle? Ecological Economics 65(2): 207-212.

Corbera, E., Kosoy, N. and Martínez Tuna, M. 2007 Equity implications of marketing ecosystem services in protected areas and rural communities: case studies from Meso-America. Global Environmental Change 17(3-4): 365-380.

Costello, C., Gaines, S. D. and Lynham, J. 2008 Can catch shares prevent fisheries collapse? Science 321(5896): 1678-1681.

Cotula, L., Vermeulen, S., Leonard, R. and Keeley, J. 2009 Land grab or development opportunity? Agricultural investment and international land deals in Africa. International Institute for Environment and Development, London and Food and Agriculture Organization of the United Nations and International Fund for Agricultural Development, Rome. 120p. Available from: ftp://ftp.fao.org/docrep/fao/011/ak241e/ak241e.pdf.

Coughenour, C. 2003 Innovating conservation agriculture: the case of no-till cropping. Rural Sociology 68(2): 278-304.

Cronkleton, P., Pacheco, P., Ibarguen, R. and Albornoz, M. A. 2009 Reformas en la tenencia de la tierra y los bosques: la gestión comunal en las tierras bajas de Bolivia. CIFOR and Centro de Estudios para el Desarrollo Laboral y Agrario, La Paz, Bolivia.

Crook, R. C. and Sverrisson, A. S. 2001 Decentralization and poverty-alleviation in developing countries: a comparative analysis, or is West Bengal unique? IDS Working Paper No. 130. Institute of Development Studies Brighton, UK.

Culas, R. J. 2007 Deforestation and the environmental Kuznets curve: an institutional perspective. Ecological Economics 61(2-3): 429-437.

Curran, L. M., Trigg, S. N., McDonald, A. K., Astiani, D., Hardiono, Y. M., Siregar, P., Caniago, I. and Kasischke, E. 2004 Lowland forest loss in protected areas of Indonesian Borneo. Science 303(5660): 1000-1003.

Dachang, L. and Edmunds, D. 2003 The promises and limitations of devolution and local forest management in China. *In*: Edmunds, D. and Wollenburg, E. (eds) Local forest management: the impacts of devolution policies, 20-54. Earthscan, London.

Dahal, G. R., Larson, A. M. and Pacheco, P. In press. Outcomes of reform for livelihoods, forest condition and equity. *In*: Larson, A. M., Barry, D., Dahal, G. R. and Colfer, C. J. P. (eds) Forests for people: community rights and forest tenure reform. Earthscan, London.

Damania, R., Fredriksson, P. G. and List, J. A. 2003 Trade liberalization, corruption, and environmental policy formation: theory and evidence. Journal of Environmental Economics and Management 46(3): 490-512.

Danielsen, F., Burgess, N. D., Balmford, A., Donald, P. F., Funder, M., Jones, J. P. G., Alviola, P., Balete, D. S., Blomley, T., Brashares, J.

et al. 2009 Local participation in natural resource monitoring: a characterization of approaches. Conservation Biology 23(1): 31-42.

Davis, C., Daviet, F., Nakhooda, S. and Thuault, A. 2009 A review of 25 readiness plan idea notes from the World Bank Forest Carbon Partnership Facility. WRI Working Paper. World Resources Institute, Washington, DC.

de Graaf, N. R. 2000 Reduced impact logging as part of the domestication of neotropical rainforest. International Forestry Review 2(1): 40-44.

de Jong, W. 2001 The impact of rubber on the forest landscape in Borneo. *In*: Angelsen, A. and Kaimowitz, D. (eds) Agricultural technologies and tropical deforestation. CAB International, Wallingford, UK.

de Mendonça, M. J. C., Vera Diaz, M. d. C., Nepstad, D., Seroa da Motta, R., Alencar, A., Gomes, J. C. and Ortiz, R. A. 2004 The economic cost of the use of fire in the Amazon. Ecological Economics 49(1): 89-105.

de Sherbinin, A. 2002 A guide to land-use and land-use cover change (LUCC). A collaborative effort of SEDAC and the IGBP/IHDP LUCC Project. Columbia University, New York. http://sedac.ciesin.columbia.edu/tg/guide_frame.jsp?rd=LU&ds=1 (1 Nov. 2009).

DeFries, R., Hansen, A., Newton, A. C. and Hansen, M. C. 2005 Increasing isolation of protected areas in tropical forests over the past twenty years. Ecological Applications 15(1): 19-26.

Dietz, T., Ostrom, E. and Stern, P. C. 2003 The struggle to govern the commons. Science 302(5652): 1907-1912.

Djogo, T. and Syaf, R. 2003 Decentralization without accountability: power and authority over local forest governance in Indonesia. *In*: Suryanata, D., Fox, J. and Brennan, S. (eds) Issues of decentralization and federation in forest governance: proceedings from the Tenth Workshop on Community-based Management of Forestlands, 9-25. East-West Center, Honolulu, Hawaii.

Dugan, P. C., Durst, P. B., Ganz, D. J. and Mckenzie, P. J. 2003 Advancing assisted natural regeneration (ANR) in Asia and the Pacific. FAO Regional Office for Asia and the Pacific, Bangkok, Thailand.

Durst, P. B., McKenzie, P. J., Brown, C. L. and Appanah, S. 2006 Challenges facing certification and eco-labelling of forest products in developing countries. International Forestry Review 8(2): 193-200.

Dutschke, M. 2009 The climate stabilization fund: global auctioning of emission allowances to help forests and people. *In*: Filho, W. L. and Mannke, F. (eds) Interdisciplinary aspects of climate change, 103-120. Peter Lang Scientific, Frankfurt and New York.

Dutschke, M. and Wertz-Kanounnikoff, S. 2008 Financing REDD: linking country needs and financing sources. Infobrief No.17. CIFOR, Bogor, Indonesia.

Dutschke, M., Wertz-Kanounnikoff, S., Peskett, L., Luttrell, C., Streck, C. and Brown, J. 2008 Mapping potential sources of REDD financing to different needs and national circumstances. CIFOR, Bogor, Indonesia, Amazon Environmental Research Institute, Brasilia, and Overseas Development Institute, London.

Dykstra, D. and Elias 2003 RIL becomes real in Brazil. International Tropical Timber Organization Tropical Forest Update 13/4.

Ebeling, J. and Yasué, M. 2009 The effectiveness of market-based conservation in the tropics: forest certification in Ecuador and Bolivia. Journal of Environmental Management 90(2): 1145-1153.

EC 2008 Addressing the challenges of deforestation and forest degradation to tackle climate change and biodiversity loss. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Com(2008) 645/3. European Comission, Brussels.

Echavarría, M., Vogel, J., Albán, M. and Meneses, F. 2004 The impacts of payments for watershed services in Ecuador. Markets for Environmental Services 4. International Institute for Environment and Development, London. 61p.

Ecosecurities 2009 The forest carbon offsetting survey 2009. EcoSecurities, Dublin, Ireland. Available from: http://www.ecosecurities.com/Standalone/Forest_Carbon_Offsetting_Trends_Survey_2009/default.aspx.

Elbow, K., Furth, R., Knox, A., Bohrer, K., Hobbs, M., Leisz, S. and Williams, M. 1998 Synthesis of trends and issues raised by land tenure country profiles of West African countries, 1996. *In*: Bruce, J. (ed.) Country profiles of land tenure: Africa, 1996. Research Paper No. 130. Land Tenure Center, University of Wisconsin, Madison, WI, USA. Available from: http://pdf.wri.org/ref/elbow_98_synthesis.pdf (1 Nov. 2009).

Elías, S. and Whittman, H. 2005 State, forest and community: decentralization of forest administration in Guatemala. *In*: Pierce, C. and Capistrano, D. (eds) The politics of decentralization: forests, power and people, 282-296. Earthscan, London.

Eliasch, J. 2008 Climate change: financing global forests. The Eliasch review. Office of Climate Change, London.

Ellsworth, L. and White, A. 2004 Deeper roots: strengthening community tenure security and community livelihoods. Ford Foundation, New

York. Available from: http://www.fordfound.org/pdfs/impact/deeper_roots.pdf.

Elmqvist, T., Pyykönen, M., Tengö, M., Rakotondrasoa, F., Rabakonandrianina, E. and Radimilahy, C. 2007 Patterns of loss and regeneration of tropical dry forest in Madagascar: the social institutional context. PLoS ONE 2(5): e402.

Evans, J. and Turnbull, J. W. 2004 Plantation forestry in the tropics: the role, silviculture, and use of planted forests for industrial, social, environmental, and agroforestry purposes. 3rd ed. Oxford University Press, Oxford. 467p.

Ezzine de Blas, D. and Ruiz Pérez, M. 2008 Prospects for reduced impact logging in Central African logging concessions. Forest Ecology and Management 256(7): 1509-1516.

Fan, C. S., Lin, C. and Treisman, D. 2009 Political decentralization and corruption: evidence from around the world. Journal of Public Economics 93(1-2): 14-34.

FAO 1985 Tropical forestry action plan. Food and Agriculture Organization of the United Nations, Rome. http://www.ciesin.columbia.edu/docs/002-162/002-162.html.

FAO 2001 State of the world's forests 2001. Food and Agriculture Organization of the United Nations, Rome.

FAO 2005 Best practices for improving law compliance in the forestry sector. Forestry Paper No. 145. Food and Agriculture Organization of the United Nations, Rome.

FAO 2006 Global forest resource assessment 2005. Progress towards sustainable forest management. Food and Agriculture Organization of the United Nations, Rome.

FAO 2009a FAOSTAT. Food and Agricultural Organization of the United Nations, Rome. http://faostat.fao.org/default.aspx (22 Sep. 2009).

FAO 2009b FAOSTAT. Food and Agriculture Organization of the United Nations, Rome. http://faostat.fao.org/site/626/default.aspx#ancor (9 Oct. 2009).

FAO 2009c Forest tenure assessment. Food and Agriculture Organization of the United Nations, Rome. http://www.fao.org/forestry/tenure/en/ (1 Nov. 2009).

Ferraro, P. 2009 Regional review of payments for watershed services: Sub-Saharan Africa. Journal of Sustainable Forestry 28(3-4): 525-550.

Ferraro, P. J. and Pattanayak, S. K. 2006 Money for nothing? A call for empirical evaluation of biodiversity conservation investments. PLoS Biology 4(4): 482-488.

Finley-Brook, M. 2007 Indigenous land tenure insecurity fosters illegal logging in Nicaragua. International Forestry Review 9(4): 850-864.

Fitzpatrick, D. 2006 Evolution and chaos in property rights systems: the third world tragedy. Yale Law Journal 115: 996-1048.

Forest Carbon Partnership Facility (FCPF) 2009 REDD implementation framework. Presented to Global Dialogues on R-PP Preparation, 13–14 August. (www.forestcarbonpartnership.org/fcp/sites/forestcarbonpartnership.org/files/Documents/PDF/Oct2009/Day%202_2%20REDD_Implementation_Framework.pdf).

Forest Peoples Programme (FPP) 2008 The Forest Carbon Partnership Facility: facilitating the weakening of indigenous peoples' rights to lands and resources. Forest Peoples Programme, Moreton-in-Marsh, UK.

Forest Peoples Programme (FPP) 2007 Making FPIC – free, prior and informed consent – work: challenges and prospects for indigenous peoples. FPIC Working Papers. Forest Peoples Programme, Moreton-in-Marsh, UK.

Forsyth, T. 2007 Promoting the 'development dividend' of climate technology transfer: can cross-sector partnerships help? World Development 35(10): 1684-1698.

Forsyth, T. and Walker, A. 2008 Forest guardians, forest destroyers: the politics of environmental knowledge in northern Thailand. University of Washington Press, Seattle, WA, USA.

Fox, J. 2002 Siam mapped and mapping in Cambodia: boundaries, sovereignty, and indigenous conceptions of space. Society and Natural Resources 15: 65-78.

Fox, J. 2008 The production of forests: tree cover transitions in Thailand, Laos, and southern China. Paper to the Social Life of Forests conference. University of Chicago, Chicago, IL, USA, May 2008.

Friends of the Earth 2009 Cana Bois: plundering protected areas in Cameroon for the European market. Friends of the Earth, Yaoundé, Cameroon.

Frondel, M. and Schmidt, C. M. 2005 Evaluating environmental programs: the perspective of modern evaluation research. Ecological Economics 55(4): 515-526.

Gaston, K. J., Jackson, S. F., Cantú-Salazar, L. and Cruz-Piñón, G. 2008 The ecological performance of protected areas. Annual Review of Ecology, Evolution, and Systematics 39(1): 93-113.

Gaveau, D. L. A., Epting, J., Lyne, O., Linkie, M., Kumara, I., Kanninen, M. and Leader-Williams, N. 2009 Evaluating whether protected areas reduce tropical deforestation in Sumatra. Journal of Biogeography 36(11): 2165-2175.

Gebremedhin, B., Pender, J. and Tesfay, G. 2003 Community natural resource management: the case of woodlots in northern Ethiopia. Environment and Development Economics 8(1): 129-148.

GEF 1998 GEF evaluation of experience with conservation trust funds. GEF/C.12/Inf.6. Global Environment Facility, Washington, DC.

Geist, H. J. and Lambin, E. F. 2001 What drives tropical deforestation? A meta-analysis of proximate and underlying causes of deforestation based on subnational case study evidence. CC Report Series No. 4. Land-Use and Land-Cover Change International Project Office, Louvain-la-Neuve, Belgium. 115p.

Geist, H. J. and Lambin, E. F. 2002 Proximate causes and underlying driving forces of tropical deforestation. BioScience 52(2): 143-150.

Ghimire, K. B. and Pimbert, M. P. (eds) 1997 Social change and conservation. Earthscan, London. 352p.

Gibbs, H. K., Brown, S., Niles, J. O. and Foley, J. A. 2007 Monitoring and estimating tropical forest carbon stocks: making REDD a reality. Environmental Research Letters 4(2): 045023.

Gibson, C. C., Williams, J. T. and Ostrom, E. 2005 Local enforcement and better forests. World Development 33(2): 273-284.

Giglio, L., Csiszar, I., Restás, Á., Morisette, J. T., Schroeder, W., Morton, D. and Justice, C. O. 2008 Active fire detection and characterization with the advanced spaceborne thermal emission and reflection radiometer (ASTER). Remote Sensing of Environment 112(6): 3055-3063.

Glasbergen, P. 2007 Setting the scene: the partnership paradigm in the making. *In*: Glasbergen, P., Biermann, F. and Mol, A. (eds) Partnerships, governance and sustainable development: reflections on theory and practice, 1-25. Edward Elgar, Cheltenham, UK.

Global Witness 2009 Honest engagement: transparency and civil society participation in REDD. Global Witness, London.

GOFC-GOLD 2009 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 COP14-2. GOFC-GOLD Project Office, Natural Resources Canada, Alberta, Canada. http://www.gofc-gold.uni-jena.de/redd.

Goldstein, M. and Udry, C. 2008 The profits of power: land rights and agricultural investment in Ghana. Journal of Political Economy 116(6): 981-1022.

Gould, K. A., Carter, D. R. and Shrestha, R. K. 2006 Extra-legal land market dynamics on a Guatemalan agricultural frontier: implications for neoliberal land policies. Land Use Policy 23(4): 408-420

Government of Vietnam 2008 Readiness plan ideas note (RPIN). The Forest Carbon Partnership Facility Washington, DC. http://www.forestcarbonpartnership.org/fcp/VN.

Granda, P. 2005 Carbon sink plantations in the Ecuadorian Andes: impacts of the Dutch FACE-PROFAFOR monoculture tree plantations' project on indigenous and peasant communities. WRM Series on Tree Plantations No. 1. World Rainforest Movement, Montevideo, Uruguay.

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(3): 035005.

Gray, J. A. 2002 Forest concession policies and revenue systems: country experience and policy changes for sustainable tropical forestry. World Bank Technical Paper No. 522. The World Bank, Washington, DC.

Greenpeace 2007 Carving up the Congo. Greenpeace, London. http://www.greenpeace.org.uk/media/reports/carving-up-the-congo.

Greenpeace 2009 Summary of the 'REDD from the Conservation Perspective' report. Commissioned by Greenpeace from the University of Freiburg Institute of Forest Policy. http://www.greenpeace.org/raw/content/usa/press-center/reports4/greenpeace-summary-of-the-red.pdf.

Griffiths, T. 2005 Indigenous peoples and the World Bank: experiences with participation. Forest Peoples Programme, Moreton-in-Marsh, UK.

Griffiths, T. 2008 Seeing 'REDD'? Forests, climate change mitigation and the rights of indigenous peoples and local communities. Update for Poznan (UNFCCC COP 14). Forest Peoples Programme, Moreton-in-Marsh, UK.

Griffiths, T. 2007 Seeing 'RED'? 'Avoided deforestation' and the rights of indigenous peoples and local communities. Forest Peoples Programme, Moreton-in-Marsh, UK. http://www.forestpeoples.org/.

Grindeff, I. 2009. Eco firm pays out for PNG carbon trading. The Age, 18 June. http://news.theage.com.au/breaking-news-world/eco-firm-pays-out-for-png-carbon-trading-20090618-cj1r.html.

Grondard, N., Loisel, C., Martinet, A. and Routier, J. B. 2008 Analysis of 7 outstanding issues for the inclusion of tropical forests in the international climate governance. Office National des Forêts, Paris.

Guariguata, M. R., Cornelius, J. P., Locatelli, B., Forner, C. and Sánchez-Azofeifa, G. A. 2008 Mitigation needs adaptation: tropical forestry and climate change. Mitigation and Adaptation Strategies for Climate Change 13(8): 793-808.

Gupta, G. and Köhlin, G. 2006 Preferences for domestic fuel: analysis with socio-economic factors and rankings in Kolkata, India. Ecological Economics 57(1): 107-121.

Gupta, A. and Siebert, U. 2004 Combating forest corruption: the forest integrity network. Journal of Sustainable Forestry 19(1-3): 337-349.

Gustafsson, O., Krusa, M., Zencak, Z., Sheesley, R. J., Granat, L., Engstrom, E., Praveen, P. S., Rao, P. S. P., Leck, C. and Rodhe, H. 2009 Brown clouds over South Asia: biomass or fossil fuel combustion? Science 323(5913): 495-498.

Hajer, M. 1996 Ecological modernization as cultural politics. *In*: Lash, S., Szerszynski, B. and Wynne, B. (eds) Risk, environment and modernity: towards a new ecology, 246-268. Sage, London.

Hajer, M. and Wagenaar, H. (eds) 2003 Deliberative policy analysis: understanding governance in the network society. Cambridge University Press, Cambridge, UK.

Hamilton, K., Sjardin, M., Shapiro, A. and Marcello, T. 2009 Fortifying the foundation: state of the voluntary carbon markets 2009. Ecosystem Marketplace, New York and New Carbon Finance, Washington, DC. http://ecosystemmarketplace.com/documents/cms_documents/StateOfTheVoluntaryCarbonMarkets_2009.pdf (12 Nov. 2009).

Hansen, C. P. and Treue, T. 2008 Assessing illegal logging in Ghana. International Forestry Review 10(4): 573-590.

Harvey C., Zerbock O., Papageorgiou S. and Parra A. [in press]. What is needed to make REDD work on the ground? Lessons learned from pilot forest carbon initiatives. Conservation International, Arlington, Virginia, USA.

Healey, J. R., Price, C. and Tay, J. 2000 The cost of carbon retention by reduced impact logging. Forest Ecology and Management 139(1-3): 237-255.

Henman, J., Hamburg, S. and Vega, A. S. 2008 Feasibility and barriers to entry for small-scale CDM forest carbon projects: a case study from the northeastern Peruvian Amazon. The Carbon & Climate Law Review 2(3): 254-263.

Herold, M. 2009 An assessment of national forest monitoring capabilities in tropical non-Annex I countries: recommendations for capacity building. The Prince's Rainforests Project, London, and the Government of Norway, Oslo, Norway. 62p. http://princes.3cdn.net/8453c17981d0ae3cc8_q0m6vsqxd.pdf (4 Nov. 2009).

Heyman, J. and Ariely, D. 2004 Effort for payment. A tale of two markets. Psychological Science 15(11): 787-793.

Hofstad, O. 1997 Woodland deforestation by charcoal supply to Dar es Salaam. Journal of Environmental Economics and Management 33: 17-32.

Hofstad, O. 2008 A theoretical analysis of illegal wood harvesting as predation – with two Ugandan illustrations. Scandinavian Forest Economics 42: 441-452.

Holck, M. 2008 Participatory forest monitoring: an assessment of the accuracy of simple cost-effective methods. Biodiversity and Conservation 17(8): 2023-2036.

Holden, S. 2001 A century of technological change and deforestation in the miombo woodlands of northern Zambia. *In*: Angelsen, A. and Kaimowitz, D. (eds) Agricultural technologies and tropical deforestation. CAB International, Wallingford, UK.

Holland, J. M. 2004 The environmental consequences of adopting conservation tillage in Europe: reviewing the evidence. Agriculture, Ecosystems & Environment 103(1): 1-25.

Holmes, T. P., Blate, G. M., Zweede, J. C., Pereira, R., Barreto, P., Boltz, F. and Bauch, R. 2002 Financial and ecological indicators of reduced impact logging performance in the eastern Amazon. Forest Ecology and Management 163(1-3): 93-110.

Honey-Rosés, J. 2009 Illegal logging in common property forests. Society & Natural Resources: An International Journal 22(10): 916-930.

Huang, M., Upadhyaya, S. K., Jindal, R. and Kerr, J. 2009 Payments for watershed services in Asia: a review of current initiatives. Journal of Sustainable Forestry 28(3): 551-575.

Huther, J. and Shah, A. 2000 Anti-corruption policies and programs: a framework for evaluation. Policy Research Working Paper 2501. The World Bank, Washington, DC.

Hutton, J. M., Adams, W. M. and Murombedzi, J. C. 2005 Back to the barriers? Changing narratives in biodiversity conservation. Forum for Development Studies 17: 365-380.

Ibrekk, H. O. and Studsrød, J. E. 2009 Review of the embassy's development assistance portfolio: environment and climate change. 'Greening and climate proofing of the portfolio'. Norad Report 1/2009 discussion. Norwegian Agency for Development Cooperation, Oslo. 39p.

IEA 2006 World energy outlook. International Energy Agency, Paris.

IETA 2009 IETA's principles for reducing emissions and enhancing sequestration in the land-use sector. International Emissions Trading Association, Geneva. http://www.ieta.org/ieta/www/pages/getfile.php?docID=3278 (24 Nov. 2009).

ILO 1990 Occupational safety and health in forestry. International Labour Organization, Geneva.

Ingram, J., Stevens, T., Clements, T., Hatchwell, M., Krueger, L., Victurine, R., Holmes, C. and Wilkie, D. 2009 WCS REDD project development guide. TransLinks. http://www.translinks.org/ToolsandTrainingMaterials/tabid/2064/language/en-US/Default.aspx (13 Nov. 2009).

IPCC 2003 Good practice guidance for land use, land-use change and forestry. Penman, J. *et al.* (eds). National Greenhouse Gas Inventories Programme, Institute for Global Environmental Strategies, Kanagawa, Japan.

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

IPCC 2007 IPCC fourth assessment report. Report by Working Group I, The physical science basis. Cambridge University Press, Cambridge, UK.

IWG-IFR 2009 Report of the informal working group on interim finance for REDD+. Informal Working Group on Interim Finance for REDD. http://www.unredd.net/index.php?option=com_docman&task=doc_details&Itemid=&gid=1096 (12 Nov. 2009).

Jack, B. K., Leimona, B. and Ferraro, P. 2009 A revealed preference approach to estimating supply curves for ecosystem services: use of auctions to set payments for soil erosion control in Indonesia. Conservation Biology 23(2): 359-367.

Jagger, P. 2008 Forest incomes after Uganda's forest sector reform: are the poor gaining? CGIAR Systemwide Program on Collective Action and Property Rights (CAPRi). Working Paper Series No. 92. International Food Policy Research Institute, Washington, DC.

Jagger, P. 2009 Forest sector reform, livelihoods and sustainability in western Uganda. *In*: German, L., Karsenty, A. and Tiani, A. M. (eds) Governing Africa's forests in a globalized world. Earthscan, Washington, DC and CIFOR, Bogor, Indonesia.

Jagger, P., Pender, J. and Gebremedhin, B. 2005 Trading off environmental sustainability for empowerment and income: woodlot devolution in northern Ethiopia. World Development 33(9): 1491-1510.

Jayasuriya, S. 2001 Agriculture and deforestation in tropical Asia: an analytical framework. *In*: Angelsen, A. and Kaimowitz, D. (eds) Agricultural technologies and tropical deforestation. CAB International, Wallingford, UK.

Jindal, R., Swallow, B. and Kerr, J. 2008 Forestry-based carbon sequestration projects in Africa: potential benefits and challenges. Natural Resources Forum 32(2): 116-130.

Johns, T. and Johnson, E. 2009 An overview of readiness for REDD: a compilation of readiness activities prepared on behalf of the Forum on Readiness for REDD, Version 1.2. The Woods Hole Research Center Falmouth, MA, USA. http://www.whrc.org/Policy/REDD/ (12 Nov. 2009).

Johns, J. S., Barreto, P. and Uhl, C. 1996 Logging damage during planned and unplanned logging operations in the eastern Amazon. Forest Ecology and Management 89(1-3): 59-77.

Johns, T., Merry, F., Stickler, C., Nepstad, D., Laporte, N. and Goetza, S. 2008 A three-fund approach to incorporating government, public and private forest stewards into a REDD funding mechanism. International Forestry Review 10(3): 458-464.

Jumbe, C. and Angelsen, A. 2006 Do the poor benefit from devolution policies? Evidence from forest co-management in Malawi. Land Economics 82(4): 562-581.

K:TGAL 2008 Progress report. Kyoto: Think Global, Act Local. University of Twente, Enschede, Netherlands. Unpublished project material.

Kaimowitz, D. 2003 Forest law enforcement and rural livelihoods. International Forestry Review 5(3): 199-210.

Kaimowitz, D. and Angelsen, A. 1998 Economic models of tropical deforestation. A review. CIFOR, Bogor, Indonesia. 139p.

Kaimowitz, D. and Angelsen, A. 2008 Will livestock intensification help save Latin America's forests? Journal of Sustainable Forestry 27(1-2): 6-24.

Kaimowitz, D., Byron, N. and Sunderlin, W. D. 1998 Public policies to reduce inappropriate tropical deforestation. *In*: Lutz, E. (ed.) Agriculture and environment: perspectives on sustainable rural development. The World Bank, Washington, DC.

Kalumiana, O. S. and Kisakye, R. 2001 Study on the establishment of a sustainable charcoal production and licensing system in Masindi and Nakasongola Districts. Report prepared for ACDI/VOCA EPED Project. Masindi, Uganda.

Kammen, D. M. 2000 Case study #1: research, development and commercialization of the Kenya Ceramic Jiko (KCJ), methodological and technological issues in technology transfer. Cambridge University Press, Cambridge, UK and New York.

Kanninen, M., Murdiyarso, D., Seymour, F., Angelsen, A., Wunder, S. and German, L. 2007 Do trees grow on money? The implications of deforestation research for policies to promote REDD. Forest Perspectives 4. CIFOR, Bogor, Indonesia.

Karky, B. S. 2008 The economics of reducing emissions from community managed forest in Nepal Himalaya. PhD Thesis, University of Twente, Enschede, Netherlands.

Karousakis, K. 2007 Incentives to reduce GHG emissions from deforestation: lessons from Costa Rica and Mexico. Organisation for Economic Cooperation and Development, Paris.

Karsenty, A. In press. Forest taxation regime for tropical forests: lessons from central Africa. International Forestry Review.

Karsenty, A., Drigo, I. G., Piketty, M.-G. and Singer, B. 2008 Regulating industrial forest concessions in central Africa and South America. Forest Ecology and Management 256(7): 1498-1508.

Kaufmann, D., Kraay, A. and Mastruzzi, M. 2006 Governance matters V: governance indicators for 1996-2005. World Bank Policy Research Working Paper 4012. The World Bank, Washington, DC.

Kaufmann, D., Kraay, A. and Mastruzzi, M. 2008 Governance matters VIII: aggregate and individual governance indicators, 1996-2008. Policy Research Working Paper 4978. The World Bank, Washington, DC. 105p.

Keeley, J. and Scoones, I. 1999 Understanding environmental policy processes: a review. IDS Working Papers 89. Institute of Development Studies, Brighton, UK.

Kern, K. and Bulkeley, H. 2009 Cities, Europeanization and multi-level governance: governing climate change through transnational municipal networks. Journal of Common Market Studies 47(2): 309-332.

Killick, T. 2004 Politics, evidence and the new aid agenda. Development Policy Review 22(1): 5-29.

Kishor, N. and Damania, R. 2007 Crime and justice in the Garden of Eden: improving governance and reducing corruption in the forestry sector. *In*: Campos, E. J. and Pradhan, S. (eds) The many faces of corruption. The World Bank, Washington, DC.

Knöpfle, M. 2004 A study on charcoal supply in Kampala. Ministry of Energy and Mineral Development, Kampala, Uganda. 68p.

Koeberle, S., Walliser, J. and Stavreski, Z. (eds) 2006 Budget support as more effective aid? Recent experiences and emerging lessons. The World Bank, Washington, DC. 524p.

Kohlin, G. and Parks, P. J. 2001 Spatial variability and disincentives to harvest. Land Economics 77(2): 206-218.

Kolstad, I. and Søreide, T. 2009 Corruption in natural resource management: implications for policy makers. Resources Policy 34(4): 214-226.

Kolstad, I. and Wiig, A. 2009 Is transparency the key to reducing corruption in resource-rich countries? World Development 37(3): 521-532.

Koyuncu, C. and Yilmaz, R. 2009 The impact of corruption on deforestation: a cross-country evidence. The Journal of Developing Areas 42(2): 213-222.

Krueger, A. O., Schiff, M. and Valdes, A. 1988 Agricultural incentives in developing countries: measuring the effect of sectoral and economy wide policies. World Bank Economic Review 2(3): 255-271.

Lamlom, S. H. and Savidge, R. A. 2003 A reassessment of carbon content in wood: variation within and between 41 North American species. Biomass and Bioenergy 25(4): 381-388.

Landell-Mills, N. and Porras, I. T. 2002 Silver bullet or fools' gold? A global review of markets for forest environmental services and their impact on the poor. Instruments for Sustainable Private Sector Forestry Series. International Institute for Environment and Development, London.

Larmour, P. 2007 A short introduction to corruption and anti corruption. CIES e-Working Paper No. 37. CIES-ISCTE Centre for Research and Studies in Sociology, Lisbon, Portugal.

Larsen, C. S. 2003 Promoting aboriginal territoriality through interethnic alliances: the case of the Cheslatta T'en in northern British Columbia. Human Organization 62(1): 74-84.

Larsen, H. O., Olsen, C. S. and Boon, T. E. 2000 The non-timber forest policy process in Nepal: actors, objectives and power. Forest Policy and Economics 1(3-4): 267-281.

Larson, A. M. 2002 Natural resources and decentralization in Nicaragua: are local governments up to the job? World Development 30(1): 17-31.

Larson, A. M. 2003 Decentralisation and forest management in Latin America: towards a working model. Public Administration and Development 23(3): 211-226.

Larson, A. M. 2005a Democratic decentralization in the forestry sector: lessons learned from Africa, Asia and Latin America. *In*: Pierce, C. and Capistrano, D. (eds) The politics of decentralization: forests, power and people, 32-62. Earthscan, London.

Larson, A. M. 2005b Formal decentralization and the imperative of decentralization 'from below': a case study of natural resource management in Nicaragua. *In*: Ribot, J. C. and Larson, A. M. (eds) Democratic decentralization through a natural resource lens, 55-70. Routledge, London.

Larson, A. M. 2008 Indigenous peoples, representation and citizenship in Guatemalan forestry. Conservation and Society 6(1): 35-48.

Larson, A. M. and Ribot, J. C. 2005 Democratic decentralisation through a natural resource lens: an introduction. *In*: Ribot, J. C. and Larson, A. M. (eds) Democratic decentralization through a natural resource lens, chap. 1. Routledge, London.

Larson, A. and Ribot, J. 2007 The poverty of forestry policy: double standards on an uneven playing field. Sustainability Science 2(2): 189-204.

Larson, A. M. and Soto, F. 2008 Decentralization of natural resource governance regimes. Annual Review of Environment and Resources 33(1): 213-239.

Larson, A., Barry, D., Cronkleton, P. and Pacheco, P. 2008 Tenure rights and beyond: community access to forest resources in Latin America. Occasional Paper No. 50. CIFOR, Bogor, Indonesia.

Larson, A., Barry, D., Dahal, G. R. and Colfer, C. J. P. (eds) In press-a. Forests for people: community rights and forest tenure reform. Earthscan, London.

Larson, A. M., Marfo, E., Cronkleton, P. and Pulhin, J. M. In press-b Authority relations under new forest tenure arrangements. *In*: Larson, A. M., Barry, D., Dahal, G. R. and Colfer, C. J. P. (eds) Forests for people: community rights and forest tenure reform. Earthscan, London.

Larwanou, M., Abdoulaye, M. and Reij, C. 2006 Etude de la régénération naturelle assistée dans la Région de Zinder (Niger): une première exploration d'un phénomène spectaculaire. http://www.frameweb.org/CommunityBrowser.aspx?id=2801&lang=en-US (10 Oct. 2009).

Laurance, W. 2009 Roads to rainforests ruin. New Scientist 203(2723): 24-25.

Lawlor, K, Olander, L. P., Weinthal, E. 2009 Reducing emissions from deforestation: options for policymakers. Working paper, Nicholas Institute for Environmental Policy Solutions, Durham, NC, USA

Lawson, A., Booth, D., Msuya, M., Wangwe, S. and Williamson, T. 2005 Does general budget support work? Evidence from Tanzania. Overseas Development Institute, London, and Daima Associates, Dar es Salaam, Tanzania. http://www.odi.org.uk/resources/download/2346-8-page-summary.pdf.

Le Billon, P. 2000 The political ecology of transition in Cambodia 1989–1999: war, peace and forest exploitation. Development and Change 31(4): 785-805.

Leeuw, F. and Vaessen, J. 2009 Impact evaluations and development: NONIE guidance on impact evaluation. The World Bank, Washington, DC. http://www.worldbank.org/ieg/nonie/guidance.html (12 Nov. 2009).

Lele, U., Kumar, N., Husain, S. A., Zazueta, A. and Kelly, L. 2000 The World Bank forest strategy: striking the right balance. The World Bank, Washington, DC. 153p.

Lentini, M., Schulze, M. and Zweede, J. In press. Os desafios ao sistema de concessoes de florestas publicas na Amazonia. Ciencia Hoje.

Letcher, S. G. and Chazdon, R. L. 2009 Rapid recovery of biomass, species richness, and species composition in a forest chronosequence in northeastern Costa Rica. Biotropica 41(5): 608-617.

Leverington, F., Hockings, M. and Lemos Costa, K. 2008 Management effectiveness evaluation in protected areas. Report for the project global study into management effectiveness evaluation of protected areas. The World Conservation Union, World Commission on Protected Areas, The Nature Conservancy, World Wide Fund for Nature, University of Queensland, Gatton, Australia. 70p.

Levin, K., McDermott, C. and Cashore, B. 2008 The climate regime as global forest governance: can reduced emissions from deforestation and forest degradation (REDD) initiatives pass a 'dual effectiveness' test? International Forestry Review 10(3): 538-549

Lincoln, P. 2008. Stalled gaps or rapid recovery – the influence of damage on post-logging forest dynamics and carbon balance. PhD Thesis, University of Aberdeen, UK.

Linder, S. 2000 Coming to terms with the public–private partnership: a grammar of multiple meanings. *In*: Rosenau, T. (ed.) Public–private policy partnerships, 19-36. MIT Press, Cambridge, MA, USA.

Lloyd, B. and Subbarao, S. 2009 Development challenges under the Clean Development Mechanism (CDM) – can renewable energy initiatives be put in place before peak oil? Energy Policy 37(1): 237-245.

Lopez, R. A. and Hathie, I. 2000 The structure of government intervention in African agriculture. Journal of Development Studies 37(1): 57-72.

Lovera, S. 2008 The hottest REDD issues: rights, equity, development, deforestation and governance by indigenous peoples and local communities. Commission on Environmental, Economic and Social Policies and Global Forest Coalition, Gland, Switzerland.

Luoga, E. J., Witkowski, E. T. F. and Balkwill, K. 2002 Harvested and standing wood stocks in protected and communal miombo woodlands of eastern Tanzania. Forest Ecology and Management 164(1-3): 15-30.

Luttrell, C., Schrekenberg, K. and Peskett, L. 2007 The implications of carbon financing for pro-poor community forestry. Forestry Briefing

14. Overseas Development Institute, London. http://www.odi.org.uk/resources/download/438.pdf.

Lynch, O. J. and Talbott, K. 1995 Balancing acts: community based forest management and national law in Asia and the Pacific. World Resources Institute, Washington, DC. 188p.

Madeira, E. M. 2009 REDD in design: assessment of planned first generation activities in Indonesia to reduce emissions from deforestation and degradation (REDD). RFF Discussion Paper 09-49. Resources for the Future, Washington, DC.MacDicken, K. G. 1997 A guide to monitoring carbon storage in forestry and agroforestry projects. Winrock Internationl Institute for Agricultural Development, Arlington, VA, USA. http://www.fcarbonsinks.gov.cn/thjl/Winrock%20International%20%E7%A2%B3%E7%9B%91%E6%B5%8B%E6%8C%87%E5%8D%97.pdf.

Macpherson, A. J. 2007. Following the rules: a bioeconomic policy simulation of a Brazilian forest concession. PhD Thesis, University of Florida, Gainesville, FL, USA.

Magrath, W. B., Grandalski, R. L., Stuckey, G. L., Vikanes, G. B. and Wilkinson, G. R. 2007 Timber theft prevention: introduction to security for forest managers. East Asia and Pacific Region Sustainable Development Discussion Paper. The World Bank, Washington, DC.

Mahar, D. and Ducrot, E. 1998 Land-use zoning on tropical frontiers. Emerging lessons from the Brazilian Amazon. Economic Development Institute, The World Bank, Washington, DC.

Manor, J. 2000 Local government in South Africa: potential disaster despite genuine promise. Paper prepared for the Department for International Development. Institute for Development Studies, Brighton, UK.

Manor, J. 2004 User communities: a potentially damaging second wave of decentralization? European Journal of Development Research 16(1): 192-213.

March, J. G. and Olsen, J. P. 1995 Democratic governance. The Free Press, New York.

Marfo, E., Colfer, C. J. P., Kante, B. and Elías, S. Forthcoming. From discourse to policy: the practical interface of statutory and customary land and forest rights. *In*: Larson, A. M., Barry, D., Dahal, G. R. and Colfer, C. J. P. (eds) Forests for people: community rights and forest tenure reform. Earthscan, London.

Margoluis, R., Stem, C., Salafsky, N. and Brown, M. 2009 Design alternatives for evaluating the impact of conservation projects. New Directions for Evaluation 2009(122): 85-96.

Mather, A. 1992 The forest transition. Area 24: 367-379.

Mather, A. S. 2007 Recent Asian forest transitions in relation to forest transition theory. International Forestry Review 9(1): 491-502.

Matope, J. J. 2000 Blantyre city environmental profile. Blantyre City Assembly/UNDP. http://74.125.77.132/search?q=cache:ceicj1VQn9sJ:staging.unchs.org/cdrom/governance/html/books%255Cbcep.df+forest+degradation+Blantyre&cd=5&hl=no&ct=clnk&gl=no&client=firefox-a#56 (9 Nov. 2009).

Mauro, P. 1995 Corruption and growth. The Quarterly Journal of Economics 110(3): 681-712.

Mawhood, P. 1983 Local government in the Third World. John Wiley, Chichester, UK.

Mayntz, R. 1993 Policy-netzwerke und die logik von verhandlungssystemen. *In*: Hertier, A. (ed.) Policy-analyse. Kritik und neuorientierung, 39-56. Politische Vierteljahresschrift, Opladen, Germany.

McKean, M. A. 1992 Success on the commons: a comparative examination of institutions for common property resource management. Journal of Theoretical Politics 4(3): 247-281.

McKinsey & Company 2009 Pathways to a low-carbon economy. Version 2.0 of the global greenhouse gas abatement cost curve. McKinsey & Company. 190p.

McShane, T. and Wells, M. (eds) 2004 Getting biodiversity projects to work: towards more effective conservation and development. Columbia University Press, New York. 464p.

Mello, R. and Pires, E. C. S. 2004 Valoração econômica do uso de técnicas de prevenção e controle de queimadas em cenários de produção familiar na Amazônia: um estudo de caso em comunidades rurais de Paragominas, Pará, Brasil. IPAM/CSF/CI, Belém, Brazil.

Méndez, F. and Sepúlveda, F. 2006 Corruption, growth and political regimes: cross country evidence. European Journal of Political Economy 22(1): 82-98.

Mendonça, M. J. C., Vera-Diaz, M. C., Nepstad, D., da Motta, R. S., Alencar, A., Gomes, J. C. and Ortiz, R. A. 2004 The economic cost of the use of fire in the Amazon. Ecological Economics 49(1): 89-105

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. and Zarin, D. http://www.REDD-OAR.org.

Meridian Institute 2009b REDD+ institutional options assessment. Prepared for the Government of Norway, by Streck, C., Gomez-Echeverri, L., Gutman, P., Loisel, C. and Werksman, J. http://www.REDD-OAR.org.

Merry, F. D., Amacher, G. S., Pokorny, B., Lima, E., Scholz, I., Nepstad, D. C. and Zweede, J. C. 2003 Some doubts about concession in Brazil. International Tropical Timber Organization Tropical Forest Update 13(3): 7-9.

Meyfroidt, P. and Lambin, E. F. 2009 Forest transition in Vietnam and displacement of deforestation abroad. Proceedings of the National Academy of Sciences 106(38): 16139-16144.

Minang, P., McCall, M. and Bressers, H. 2007 Community capacity for implementing Clean Development Mechanism projects within community forests in Cameroon. Environmental Management 39(5): 615-630.

Moeliono, M., Wollenberg, E. and Limberg, G. (eds) 2008 The decentralization of forest governance: politics, economics and the fight for control of forests in Indonesian Borneo. Earthscan, London.

Monela, G. C., O'ktingati, A. and Kiwele, P. M. 1993 Socio-economic aspects of charcoal consumption and environmental consequences along the Dar es Salaam–Morogoro highway, Tanzania. Forest Ecology and Management 58(3-4): 249-258.

Moore, H. and Vaughan, M. 1994 Cutting down trees: gender, nutrition, and agricultural change in the Northern Province of Zambia. Heinemann, Portsmouth, NH, USA.

Munslow, B., Katerere, Y., Ferf, A. and O'Keefe, P. 1988 The fuelwood trap. A study of the SADCC region. Earthscan, London.

MWLE 2002 National biomass study. Technical report. Forest Department, Ministry of Water, Lands and Environment, Kampala, Uganda. 118p.

Nagendra, H. 2008 Do parks work? Impact of protected areas on land cover clearing. AMBIO: A Journal of the Human Environment 37(5): 330-337.

Namara, A. and Nsabagasani, X. 2003 Decentralization and wildlife management: devolving rights or shedding responsibility? Bwindi Impenetrable National Park, Uganda. Environmental Governance in Africa Working Paper No. 9. World Resources Institute, Washington, DC.

Namaalwa, J., Hofstad, O. and Sankhayan, P. L. 2009 Achieving sustainable charcoal supply from woodlands to urban consumers in Kampala, Uganda. International Forestry Review 11(1): 64-78.

Naughton-Treves, L., Holland, M. B. and Brandon, K. 2005 The role of protected areas in conserving biodiversity and sustaining local livelihoods. Annual Review of Environment and Resources 30(1): 219-252.

Nelson, A. and Chomitz, K. M. 2009 Protected area effectiveness in reducing tropical deforestation: a global analysis of the impact of protection status. Evaluation Brief 7. The World Bank, Washington, DC. 31p.

Nelson, J. 2002 Building partnerships. United Nations, New York.

Nepstad, D., Carvalho, G., Cristina Barros, A., Alencar, A., Paulo Capobianco, J., Bishop, J., Moutinho, P., Lefebvre, P., Lopes Silva, U. and Prins, E. 2001 Road paving, fire regime feedbacks, and the future of Amazon forests. Forest Ecology and Management 154(3): 395-407.

Nepstad, D., Schwartzman, S., Bamberger, B., Santilli, M., Ray, D., Schlesinger, P., Lefebvere, P., Alencar, A., Prinz, E., Fiske, G. and Rolla, A. 2006 Inhibition of Amazon deforestation and fire by parks and indigenous lands. Conservation Biology 20(1): 65-73.

Niles, J. O., Boyd, W., Lawlow, K., Madeira, E. M. and Olander, L. 2009 Experience on the ground, in the forests. International Forest Carbon and the Climate Change Challenge Series – Brief No. 6. Nicholas Institute, Duke University, Durham, NC, USA.

Norris, R. (ed.) 2000 The IPG handbook on environmental funds: a resource book for the design and operation of environmental funds. Pact Publications, New York.

Ntsebeza, L. 1999 Land tenure reform in South Africa: an example from the Eastern Cape Province. Issue Paper No. 82. Drylands Programme, International Institute for Environment and Development, London.

Ntsebeza, L. 2002 Decentralization and natural resource management in rural South Africa: problems and prospects. Paper to the Conference on Decentralization and the Environment, Bellagio, Italy, 18-22 February 2002.

Oleas, R. and Barragán, L. 2003 Environmental funds as a mechanism for conservation and sustainable development in Latin America and the Caribbean. http://www.conservationfinance.org/Documents/CF_related_papers/Diagnostic-English_13ago03.pdf (10 Nov. 2009).

OSCE 2004 Best practises in combating corruption. Organization for Security and Co-operation in Europe, Vienna, Austria.

Ostrom, E. 1990 Governing the commons: the evolution of institutions for collective action. Cambridge University Press, New York.

Ostrom, E. 2003 How types of goods and property rights jointly affect collective action. Journal of Theoretical Politics 15(3): 239-270.

Ostrom, E. 2005 Understanding institutional diversity. Princeton University Press, Princeton, NJ, USA.

Ostrom, E. 2007 A diagnostic approach for going beyond panaceas. Proceedings of the National Academy of Sciences 104(39): 15181-15187.

Ostrom, E. 2009 A general framework for analyzing sustainability of social-ecological systems. Science 325(5939): 419-422.

Pacheco, P. 2003 Municipalidades y participación local en la gestión forestal en Bolivia. *In*: Ferroukhi, L. (ed.) Gestión forestal municipal en América Latina. CIFOR, Bogor, Indonesia.

Pagiola, S. 2008 Payments for environmental services in Costa Rica. Ecological Economics 65(4): 712-724.

Palm, C., Tomich, T., Van Noordwijk, M., Vosti, S., Gockowski, J., Alegre, J. and Verchot, L. 2004 Mitigating GHG emissions in the humid tropics: case studies from the Alternatives to Slash-and-Burn Program (ASB). Environment, Development and Sustainability 6(1): 145-162.

Palmer, C. and Engel, S. 2007 For better or for worse? Local impacts of the decentralization of Indonesia's forest sector. World Development 35(12): 2131-2149.

Parker, C. 2008 Co-benefits of the voluntary and compliance carbon markets. MSc Thesis, Imperial College, University of London, London.

Parker, C., Mitchell, A., Trivedi, M. and Mardas, M. 2009 The little REDD+ book. Global Canopy Programme, Oxford, UK.

Parsons, J. J. 1972 Spread of African pasture grasses to the American tropics. Journal of Range Management 25(1): 12-17.

Pattanayak, S. K. 2009 Rough guide to impact evaluation of environmental and development programs. SANDEE Working Paper No. 40-09. South Asian Network for Development and Environmental Economics, Kathmandu, Nepal.

Pattanayak, S. K., Wunder, S. and Ferraro, P. J. 2009 Show me the money: do payments supply ecosystem services in developing countries? Personal communication, November 2009.

Pearce, D., Putz, F. E. and Vanclay, J. K. 2003 Sustainable forestry in the tropics: panacea or folly? Forest Ecology and Management 172(2-3): 229-247.

Pedroni, L., Dutschke, M., Streck, C. and Porrúa, M. E. 2009 Creating incentives for avoiding further deforestation: the nested approach. Climate Policy 9(2): 207-220.

Peluso, N. 1995 Whose woods are these? Counter-mapping forest territories in Kalimantan, Indonesia. Antipode 27(4): 383-406.

Peña-Claros, M., Fredericksen, T. S., Alarcón, A., Blate, G. M., Choque, U., Leaño, C., Licona, J. C., Mostacedo, B., Pariona, W., Villegas, Z. and Putz, F. E. 2008a Beyond reduced-impact logging: silvicultural treatments to increase growth rates of tropical trees. Forest Ecology and Management 256(7): 1458-1467.

Peña-Claros, M., Peters, E. M., Justiniano, M. J., Bongers, F., Blate, G. M., Fredericksen, T. S. and Putz, F. E. 2008b Regeneration of commercial tree species following silvicultural treatments in a moist tropical forest. Forest Ecology and Management 255(3-4): 1283-1293.

Peskett, L. and Harkin, Z. 2007 Risks and responsibility in reduced emissions from deforestation and degradation. Forestry Briefing 15. Overseas Development Institute, London. http://www.odi.org.uk/resources/details.asp?id=426&title=risk-responsibility-reduced-emissions-deforestation-degradation.

Peskett, L., Huberman, D., Bowen-Jones, E., Edwards, G. and Brown, J. 2008 Making REDD work for the poor. Briefing paper prepared on behalf of the Poverty Environment Partnership (PEP). Oveseas Development Institute, London.

Pfaff, A., Robalino, J. and Sanchez-Azofeifa, G. 2008 Payments for environmental services: empirical analysis for Costa Rica. Terry Sanford Institute of Public Policy, Duke University, Durham, NC, USA.

Pinard, M. A. and Cropper, W. P. 2000 Simulated effects of logging on carbon storage in dipterocarp forest. Journal of Applied Ecology 37(2): 267-283.

Pinard, M. A. and Putz, F. E. 1996 Retaining forest biomass by reducing logging damage. Biotropica 28(3): 278-295.

Pinard, M. A., Putz, F. E. and Licona, J. C. 1999 Tree mortality and vine proliferation following a wildfire in a subhumid tropical forest in eastern Bolivia. Forest Ecology and Management 116(1-3): 247-252.

Pokorny, B., Sabogal, C., Silva, J. N. M., Bernardo, P., Souza, J. and Zweede, J. 2005 Compliance with reduced-impact harvesting guidelines by timber enterprises in *terra firme* forests of the Brazilian Amazon. International Forestry Review 7(1): 9-20.

Porras, I., Grieg-Gran, M. and Neves, N. 2008 All that glitters: a review of payments for watershed services in developing countries. Natural Resource Issues No 11. International Institute for Environment and Development, London. 130p.

Porter, G. and Young, E. 1998 Decentralized environmental management and popular participation in coastal Ghana. Journal of International Development 10(4): 515-526.

Poteete, A. R. and Ostrom, E. 2004 Heterogeneity, group size and collective action: the role of institutions in forest management. Development and Change 35(3): 435-461.

Project Catalyst 2009 Towards a global climate agreement. Synthesis Briefing Paper. Climate Works Foundation, San Francisco, CA. http://www.project-catalyst.info/images/publications/synthesis_paper.pdf. 35p.

Pulhin, J., Larson, A. and Pacheco, P. In press. Regulations as barriers to community benefits in tenure reform. *In*: Larson, A., Barry, D., Dahal, G. R. and Colfer, C. J. P. (eds) Forests for people: community rights and forest tenure reform. Earthscan, London.

Putz, F. E. and Redford, K. H. 2009 Dangers of carbon-based conservation. Global Environmental Change 19(4): 400-401.

Putz, F. E., Dykstra, D. P. and Heinrich, R. 2000 Why poor logging practices persist in the Tropics. Conservation Biology 14(4): 951-956.

Putz, F. E., Sist, P., Fredericksen, T. and Dykstra, D. 2008a Reduced-impact logging: challenges and opportunities. Forest Ecology and Management 256(7): 1427-1433.

Putz, F. E., Zuidema, P. A., Pinard, M. A., Boot, R. G. A., Sayer, J. A., Sheil, D., Sist, P., Elias and Vanclay, J. K. 2008b Improved tropical forest management for carbon retention. PLoS Biol 6(7): 1368-1369.

Raffles, H. 1999 Local theory: nature and the making of an Amazonian place. Cultural Anthropology 14(3): 323-360.

Ranganathan, J., Daniels, R. J. R., Chandran, M. D. S., Ehrlich, P. R. and Daily, G. C. 2008 Sustaining biodiversity in ancient tropical countryside. Proceedings of the National Academy of Sciences 105(46): 17852-17854.

RedLAC 2008 Measuring the impact of environmental funds on biodiversity: perspectives from the Latin America and Caribbean Network of Environmental Funds. The Latin American and Caribbean Network of Environmental Funds (RedLAC), Rio de Janeiro, Brazil.

REM 2006 Rapport de l'observateur independant no. 31/OI/REM. Resource Extraction Monitoring (REM), Yaoundé, Cameroon.

Repetto, R. and Gillis, M. (eds) 1988 Public policies and the misuse of forest resources. Cambridge University Press, Cambridge, UK. 432p.

Resosudarmo, I. A. P. 2005 Closer to people and trees: will decentralization work for the people and forests of Indonesia? *In*: Ribot, J. C. and Larson, A. M. (eds) Democratic decentralization through a natural resource lens, 110-132. Routledge, London.

Ribot, J. C. 2001 Integral local development: 'accommodating multiple interests' through entrustment and accountable representation. International Journal of Agricultural Resources, Governance and Ecology 1(3): 306-326.

Ribot, J. C. 2002 Democratic decentralization of natural resources: institutionalizing popular participation. World Resources Institute, Washington, DC.

Ribot, J. C. 2003 Democratic decentralisation of natural resources: institutional choice and discretionary power transfers in Sub-Saharan Africa. Public Administration and Development 23(1): 53-65.

Ribot, J. C. 2004 Waiting for democracy: the politics of choice in natural resource decentralization. World Resources Institute, Washington, DC. 140p.

Ribot, J. C. 2008 Building local democracy through natural resources interventions: an environmentalist's responsibility. A policy brief. World Resources Institute, Washington, DC.

Ribot, J. C. 2009 Forestry and democratic decentralization in Sub-Saharan Africa: a rough review. *In*: German, L., Karsenty, A. and Tiani, A. M. (eds) Governing Africa's forests in a globalized world, 29-55. Earthscan, Washington, DC, and CIFOR, Bogor, Indonesia.

Ribot, J. C. and Oyono, R. 2005 The politics of decentralization. *In*: Wisner, B., Toulmin, C. and Chitiga, R. (eds) Toward a new map of Africa, 205-228. Earthscan, London.

Ribot, J. C. and Oyono, R. 2006 Introduction: decentralisation and livelihoods in Africa. *In*: Ribot, J. C. and Oyono, R. (eds) African development , special issue, Implementing progressive new natural resources laws, 1-19.

Ribot, J. C., Agrawal, A. and Larson, A. M. 2006 Recentralizing while decentralizing: how national governments reappropriate forest resources. World Development 34(11): 1864-1886.

Ribot, J. C., Cchatre, A. and Lankina, T. 2008 Institutional choice and recognition in the formation and consolidation of local democracy. Conservation and Society 6(1): 1-11.

Rice, R. E., Gullison, R. E. and Reid, J. W. 1997 Can sustainable management save tropical forests? Scientific American 276(4): 44-49.

Richards, M. 2000 Can sustainable tropical forestry be made profitable? The potential and limitations of innovative incentive mechanisms. World Development 28(6): 1001-1016.

Richards, M. and Costa, P. M. 1999 Can tropical forestry be made profitable by internalizing the externalities? ODI Natural Resource Perspectives 46: 1-6.

Richards, M., Wells, A., Del Gatto, F., Contreras-Hermosilla, A. and Pommier, D. 2003 Impacts of illegality and barriers to legality: a diagnostic analysis of illegal logging in Honduras and Nicaragua. International Forestry Review 5(3): 282-292.

Robbins, P. 1998 Paper forests: imagining and deploying exogenous ecologies in arid India. Geoforum 29(1): 69-86.

Roberts, D. 2009 Securing finance for biofuels – where is the money coming from? Presentation to the World Biofuels Markets Conference. Brussels, Belgium, 16–18 March 2009.

Rock, M. T. and Bonnett, H. 2004 The comparative politics of corruption: accounting for the East Asian paradox in empirical studies of corruption, growth and investment. World Development 32(6): 999-1017.

Rørstad, P. K., Vatn, A. and Kvakkestad, V. 2007 Why do transaction costs of agricultural policies vary? Agricultural Economics 36(1): 1-11.

Ross, M. L. 2001 Timber booms and institutional breakdown in Southeast Asia. Cambridge University Press, Cambridge, UK.

RRI 2008 Seeing people through the trees: scaling up efforts to advance rights and address poverty, conflict and climate change. Rights and Resources Initiative, Washington, DC.

RRI and RFN 2008 Foundations for effectiveness: a framework for ensuring effective climate change mitigation and adaptation in forest areas without undermining human rights and development. Policy Brief. Rights and Resources Initiative, Washington, DC and Rainforest Foundation Norway, Oslo, Norway.

Rudel, T. K. 2007 Changing agents of deforestation: from state-initiated to enterprise driven processes, 1970–2000. Land Use Policy 24(1): 35-41.

Rudel, T. and Horowitz, B. 1993 Tropical deforestation: small farmers and land clearing in the Ecuadorian Amazon. Colombia University Press, New York.

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(1): 23-31.

Ruf, F. 2001 Tree crops and deforestation and reforestation agents: the case of cocoa in Côte d'Ivoire and Sulawesi. *In*: Angelsen, A. and Kaimowitz, D. (eds) Agricultural technologies and tropical deforestation, 291-315. CAB International, Wallingford, UK.

Sabogal, C., Pokorny, B., Silva, N., Bernardo, P., Massih, F., Boscolo, M., Lentini, M., Sobral, L. and Veríssimo, A. 2006 Manejo florestal empresarial na Amazônia Brasileira. Restrições e oportunidades para a adoção de boas práticas de manejo. CIFOR, Belem, Brazil. 71p.

Sachs, J. D. 2005 The end of poverty: how can we make it happen in our life time? Penguin Books, London.

Salafsky, N. R., Margoluis, R. and Redford, K. 2001 Adaptive management: a tool for conservation practitioners. Biodiversity Support Program, Washington, DC. http://www.worldwildlife.org/bsp/publications/aam/112/titlepage.htm (12 Nov. 2009).

Sander, K. and Zeller, M. 2007 Protected area management and local benefits: a case study from Madagascar. *In*: Tscharntke, T., Leuschner, C., Zeller, M., Guhardja, E. and Bidin, A. (eds) Stability of tropical rainforest margins, 363-385. Springer, Berlin.

Santilli, M., Moutinho, P., Schwartzman, S., Nepstad, D., Curran, L. and Nobre, C. 2005 Tropical deforestation and the Kyoto Protocol: an editorial essay. Climatic Change 71(3): 267-276.

Sargent, C. and Bass, S. (eds) 1992 Plantation politics – forest plantations in development. Earthscan, London.

Sarin, M., Singh, N., Sundar, N. and Bhogal, R. 2003 Devolution as a threat to democratic decision-making in forestry? Findings from three states in India. *In*: Edmunds, D. (ed.) Local forest management: the impacts of devolution policies, 55-126. Earthscan, London.

Sasaki, N. and Putz, F. E. 2009 Critical need for new definitions of 'forest' and 'forest degradation' in global climate change agreements. Conservation Letters 2(5): 226-232.

Saunders, J., Ebeling, J. and Nussbaum, R. 2008 Reduced emissions from deforestation and forest degradation (REDD): lessons from a governance perspective. Proforest, Oxford, UK. (Available from: www.proforest.net.)

Schlager, E. and Ostrom, E. 1992 Property-rights regimes and natural resources: a conceptual analysis. Land Economics 68(3): 249-262.

Schmitt, C. B., Burgess, N. D., Coad, L., Belokurov, A., Besançon, C., Boisrobert, L., Campbell, A., Fish, L., Gliddon, D., Humphries, K. *et al.* 2009 Global analysis of the protection status of the world's forests. Biological Conservation 142(10): 2122-2130.

Schneider, V. 2003 Akteurskonstellationen und netzwerke in der politikentwicklung. *In*: Schubert, K. and Bandelow, N. C. (eds) Lehrbuch der politikfeldanalyse, 107-146. Oldenbourg, München, Germany.

Schroeder, R. 1999 Shady practices: agroforestry and gender politics in The Gambia. University of California Press, Berkeley, CA, USA.

Schulze, M., Grogan, J. and Vidal, E. 2008 Technical challenges to sustainable forest management in concessions on public lands in the Brazilian Amazon. Journal of Sustainable Forestry 26(1): 61-75.

Schwartzman, S. 2009 Brazil national and state REDD. EDF Policy Brief. Environmental Defense Fund, New York. http://www.environmentaldefensefund.com/documents/10438_Brazil_national_and_state_REDD_report.pdf (13 Nov. 2009).

Schwarze, R., Niles, J. O. and Olander, J. 2002 Understanding and managing leakage in forest-based greenhouse-gas-mitigation projects. Philosophical Transactions of the Royal Society of London A 360: 1685-1703.

Scott, W. R. 1995 Institutions and organizations. Sage, Thousand Oaks, CA, USA.

Scrieciu, S. S. 2007 Can economic causes of tropical deforestation be identified at a global level? Ecological Economics 62(3-4): 603-612.

Seymour, F. J. In press. Forests, climate change, and human rights: managing risks and trade-offs. *In*: Humphreys, S. (ed.) Human rights and climate change. Cambridge University Press, Cambridge, UK.

Seymour, F. and Dubash, N. 2000 Right conditions: The World Bank, structural adjustment, and forest policy reform. World Resources Institute, Washington, DC. 156p.

Shackleton, S. E. and Campbell, B. M. 2001 Devolution in natural resource management: institutional arrangements and power shifts. A synthesis of case studies from southern Africa. SADC Wildlife Sector Natural Resource Management Programme, Lilongwe, Malawi and WWF (Southern Africa), Harare, Zimbabwe.

Shah, A. 2006 Corruption and decentralized public governance. World Bank Policy Research Working Paper No. 3824. The World Bank, Washington, DC.

Shively, G. E. 2001 Agricultural change, rural labor markets, and forest clearing: an illustrative case from the Philippines. Land Economics 77(2): 268-284.

Shively, G. and Pagiola, S. 2004 Agricultural intensification, local labor markets, and deforestation in the Philippines. Environment and Development Economics 9(2): 241-266

Shrestha, R. A. M., Alavalapati, J., Seidl, A., Weber, K. and Suselo, T. R. I. 2007 Estimating the local cost of protecting Koshi Tappu wildlife reserve, Nepal: a contingent valuation approach. Environment, Development and Sustainability 9(4): 413-426.

Sims, K. 2008 Evaluating the local socio-economic impacts of protected areas: a system level comparison group approach. Global Environment Facility Impact Evaluation Information Document No. 14. Global Environment Facility, Washington, DC.

Sist, P. and Bertault, J.-G. 1998 Reduced impact logging experiments: impact of harvesting intensities and logging techniques on stand damage. *In*: Bertault, J. G. and Kadir, K. (eds) Silvicultural research in a lowland mixed dipterocarp forest of East Kalimantan, 139-161. Centre de coopération internationale en recherche agronomique pour le développement (CIRAD-Forêt), Montpellier, France.

Skutsch, M. 2005 Reducing carbon transaction costs in community based forestry management. Climate Policy 5: 433-443.

Skutsch, M., Karky, B., Zahabu, E., McCall, M. and Peters-Guarin, G. 2009a Community measurement of carbon stock change for REDD. *In:* Collaborative Partnership on Forest, special study on forest degradation. FAO, Rome

Skutsch, M., Zahabu, E. and Karky, B. 2009b Community forest management under REDD: policy conditions for equitable governance. Paper prepared for the 13th World Forestry Congress: Forests in development, a vital balance. Buenos Aires, Argentina. 18-25 October 2009.

Smith, J., Colan, V., Sabogal, C. and Snook, L. 2006 Why policy reforms fail to improve logging practices: the role of governance and norms in Peru. Forest Policy and Economics 8(4): 458-469.

Smith, J., Obidzinski, K., Subarudi, S. and Suramenggala, I. 2003a Illegal logging, collusive corruption and fragmented governments in Kalimantan, Indonesia. International Forestry Review 5(3): 293-302.

Smith, R. J., Muir, R. D. J., Walpole, M. J., Balmford, A. and Leader-Williams, N. 2003b Governance and the loss of biodiversity. Nature 426(6962): 67-70.

Somanathan, E., Prabhakar, R. and Mehta, B. S. 2009 Decentralization for cost-effective conservation. Proceedings of the National Academy of Sciences 106(11): 4143-4147.

Southgate, D. and Runge, C. F. 1990 The institutional origins of deforestation in Latin America. University of Minnesota, Department of Agriculture and Applied Economics, Staff Paper No. P90-5. University of Minnesota, St Paul, MN, USA.

Southgate, D., Salazar-Canelos, P., Camacho-Saa, C. and Stewart, R. 2000 Markets, institutions, and forestry: the consequences of timber trade liberalization in Ecuador. World Development 28(11): 2005-2012.

Souza, C., Firestone, L., Silva, L. M. and Roberts, D. 2003 Mapping forest degradation in the eastern Amazon from SPOT 4 through spectral mixture models. Remote Sensing of Environment 87: 494-506.

Spergel, B. and Taieb, P. 2008 Rapid review of conservation trust funds. Conservation Finance Alliance, Washington, DC.

Stern, N. 2006 The Stern review: the economics of climate change. Cambridge University Press, Cambridge, UK.

Sunderlin, W., Hatcher, J. and Liddle, M. 2008a From exclusion to ownership? Challenges and opportunities in advancing forest tenure reform. Rights and Resources Initiative, Washington, DC.

Sunderlin, W. D., Dewi, S., Puntodewo, A., Müller, D., Angelsen, A. and Epprecht, M. 2008b Why forests are important for global poverty alleviation: a spatial explanation. Ecology and Society 13(2): 24. http://www.ecologyandsociety.org/vol13/iss2/art24/ (18 Nov. 2009).

Sutter, C. 2003 Sustainability check-up for CDM projects. Wissenschaftlicher Verlag, Berlin.

Tacconi, L. 2007a Decentralization, forests and livelihoods: theory and narrative. Global Environmental Change 17(3-4): 338-348.

Tacconi, L. 2007b Verification and certification of forest products and illegal logging in Indonesia. *In*: Tacconi, L. (ed.) Illegal logging: law enforcement, livelihoods and the timber trade. Earthscan, London.

Tacconi, L. (ed.) 2007c Illegal logging: law enforcement, livelihoods and the timber trade. Earthscan, London

Tacconi, L., Boscolo, M. and Brack, D. 2003 National and international policies to control illegal forest activities. Report for the Ministry of Foreign Affairs, Government of Japan. CIFOR, Bogor, Indonesia.

Tahmina, Q. A. and Gain, P. 2002 A guide to NGO–business partnerships. Society for Environment and Human Development, Dhaka, Bangladesh.

Taylor, P. L. 2005 A fair trade approach to community forest certification? A framework for discussion. Journal of Rural Studies 21(4): 433-447.

Tewari, A. and Phartiyal, P. 2006 The carbon market as an emerging livelihood opportunity for communities of the Himalayas. ICIMOD Mountain Development No. 49. Central Himalayan Environmental Association, Nainital, India. p. 26-27.

TFF 2008 Tropical Forest Foundation News (spring 2008). http://www.tropicalforestfoundation.org/newsletters/newsletter2008_spring.pdf (16 Aug. 2008).

The Nature Conservancy 2009 Submission to the United Nations Framework Convention on Climate Change regarding Views on issues relating to indigenous peoples and local communities for the development and application of methodologies for reducing emissions from deforestation and forest degradation in developing countries. http://unfccc.int/resource/docs/2009/smsn/ngo/099.pdf.

Tieguhong, J. C. and Betti, J. L. 2008 Forest and protected area management in Cameroon. Tropical Forest Update 18/1. The International Tropical Timber Organization.

Tole, L. 2001 Jamaica's disappearing forests: physical and human aspects. Environmental Management 28(4): 455-467.

Tomaselli, I. and Hirakuri S. R. 2008 Converting mahogany. ITTO Tropical Forest Update 18/4

Tomlinson, F. 2009. Do harvesting impacts determine patterns of non-forest vegetation in dipterocarp forest in Sabah 15 years post-logging? MSc Thesis, University of Aberdeen, Aberdeen, UK.

Toni, F. 2006a Gestão florestal na Amazônia brasileira: avanços e obstáculos em um sistema federalista. CIFOR, Bogor, Indonesia and International Development Research Centre, Ottawa, Canada.

Toni, F. 2006b Institutional choice on the Brazilian agricultural frontier: strengthening civil society or outsourcing centralized natural resource management? Paper to 11th Biennial Conference of the International Association for the Study of Common Property. Bali, Indonesia, 19-23 June 2006.

Topp-Jørgensen, E., Poulsen, M. K., Lund, J. F. and Massao, J. F. 2005 Community-based monitoring of natural resource use and forest quality in montane forests and miombo woodlands of Tanzania. Biodiversity and Conservation 14(11): 2653-2677.

Torres-Duque, C., Maldonado, D., Perez-Padilla, R., Ezzati, M., Viegi, G. and on behalf of the Forum of International Respiratory Societies Task Force on Health Effects of Biomass Exposure 2008 Biomass fuels and respiratory diseases: a review of the evidence. Proceedings of the American Thoracic Society 5(5): 577-590.

Transparency International 2002 Corruption in South Asia: insights and benchmarks from citizen feedback surveys in five countries. Transparency International, Berlin.

Treisman, D. 2007 What have we learned about the causes of corruption from ten years of cross-national empirical research? Annual Review of Political Science 10: 211-244.

Tucker, C. 1999 Private versus common property forests: forest conditions and tenure in a Honduran community. Human Ecology 27(2): 201-230.

Twidell, J. and Weir, T. 2006 Renewable energy resources. 2nd ed. Taylor and Francis, Oxford, UK. 601p.

UNDP, UNEP, WB and WRI 2003 World resources 2002-2004: decisions for the Earth: balance, voice and power. United Nations Development Programme, United Nations Environment Programme, World Bank, World Resources Institute, Washington, DC.

UNFCCC 2007 Reducing emissions from deforestation in developing countries: approaches to stimulate action. 2/cp.13. United Nations Framework Convention on Climate Change, Bonn, Germany.

UNFCCC 2009a Article for the REDD+ mechanism. United Nations Framework Convention on Climate Change, Bonn, Germany. http://unfccc.int/files/kyoto_protocol/application/pdf/papuanewguinea070509.pdf (12 Nov. 2009).

UNFCCC 2009b Cost of implementing methodologies and monitoring systems relating to estimates of emissions from deforestation and forest degradation, the assessment of carbon stocks and greenhouse gas emissions from changes in forest cover, and the enhancement of forest carbon stocks. Technical Paper FCCC/TP/2009/1. United Nations Framework Convention on Climate Change, Bonn, Germany. http://unfccc.int/resource/docs/2009/tp/01.pdf.

UNFCCC 2009c Reordering and consolidation of text in the revised negotiating text. Advance version. 1F5C CSeCp/tAemWbGerL 2C0A0/92 009/INF.2. United Nations Framework Convention on Climate Change, Bonn, Germany.

UN-REDD Programme 2009 Background analysis of REDD regulatory frameworks. The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries, Geneva.

van Noordwijk, M., Tomich, T. P., Winahyu, R., Murdiyarso, D., Suyanto, Partoharjono, S. and Fagi, A. M. 1995 Alternatives to slash-and-burn in Indonesia. Summary report of phase 1. ASB Indonesia Report 4. World Agroforestry Centre, Bogor, Indonesia.

van Rouveroy van Nieuwaal, E. A. B. 1987 Chiefs and African states: some introductory notes and an extensive bibliography on African chieftaincy. Journal of Legal Pluralism (25 & 26): 1-46.

Vatn, A. 2005 Institutions and the environment. Edward Elgar, Cheltenham, UK. 481p.

Vatn, A., Vedeld, P., Petursson, J. G. and Stenslie, E. 2009 The REDD direction. The potential for reduced carbon emissions, biodiversity protection and enhanced development. A desk study with focus on Tanzania and Uganda. Noragric Report. Norwegian University of Life Sciences, Ås, Norway. 140p.

Venkataraman, C., Habib, G., Eiguren-Fernandez, A., Miguel, A. H. and Friedlander, S. K. 2005 Residential biofuels in South Asia: carbonaceous aerosol emissions and climate impacts. Science 307(5714): 1454-1456.

Verchot, L. and Petkova, E. 2009 The state of REDD negotiations: consensus points, options for moving forward and research needs to support the process. Unpublished manuscript. CIFOR, Bogor, Indonesia.

Veríssimo, A., Cochrane, M. A. and Souza Jr, C. 2002 National forests in the Amazon. Science 297(5586): 1478.

Villegas, Z., Peña-Claros, M., Mostacedo, B., Alarcón, A., Licona, J.C., Leaño, C., Pariona, W. and Choque, U. 2009 Silvicultural treatments enhance growth rates of future crop trees in a tropical dry forest. Forest Ecology and Management 258(6): 971-977.

von der Goltz, J. 2009 High stakes in a complex game: a snapshot of the climate change negotiating positions of major developing country emitters. Working Paper 177. Center for Global Development, Washington, DC.

von Thünen, J. H. 1966 The isolated state. Wartenberg, C. M. trans. Translation of: Der isolierte Staat (1826). Pergamon Press, Oxford and New York. 304p.

Vosti, S. A., Carpentier, C. L., Witcover, J. and Valentim, J. 2001 Intensified small-scale livestock systems in the western Brazilian Amazon. *In*: Angelsen, A. and Kaimowitz, D. (eds) Agricultural technologies and tropical deforestation. CAB International, Wallingford, UK.

Wadsworth, F. H., Zweede, J. C. 2006 Liberation: acceptable production of tropical forest timber. Forest Ecology and Management 233(1): 45-51.

Walker, P. and Peters, P. 2001 Maps, metaphors, and meanings: boundary struggles and village forest use on private and state land in Malawi. Society and Natural Resources 14: 411-424.

Weber, E. 1998 Pluralism by the rules: conflict and co-operation in environmental regulation. Georgetown University Press, Washington, DC.

Weinhold, D. and Reis, E. 2008 Transportation costs and the spatial distribution of land use in the Brazilian Amazon. Global Environmental Change 18(1): 54-68.

Wells, M. 1991 Trust funds and endowments as a biodiversity conservation tool. Policy Research Working Paper No. 1991-26. Environment Department, The World Bank, Washington, DC.

Wells, M. and Brandon, K. 1992 People and parks: linking protected area management with local communities. The World Bank, Washington, DC. 116p.

Wells, M., Guggenheim, S., Khan, A., Wardojo, W. and Jepson, P. 1999 Investing in biodiversity. A review of Indonesia's integrated conservation and development projects. Directions in Development. The World Bank, Washington, DC.

Wells, M. P., McShane, T. O., Dublin, H. T., O'Connor, S. and Redford, K. H. 2004 Do integrated conversation and development projects have a future? *In*: McShane, T. and Wells, M. (eds) Making biodiversity projects work: towards more effective conservation. Columbia University Press, New York.

Wemaere, M., Streck, C. and Chagas, T. 2009 Legal ownership and nature of Kyoto units and EU allowances. *In*: Freestone, D. and Streck, C. (eds) Legal aspects of carbon trading: Kyoto, Copenhagen and beyond. Oxford University Press, Oxford, UK.

Wertz-Kanounnikoff, S. and Kongphan-apirak, M. 2009 Reducing emissions from deforestation and forest degradation: a preliminary survey of emerging REDD demonstration and readiness activities. Working Paper. CIFOR, Bogor, Indonesia.

White, A. and Martin, A. 2002 Who owns the worlds forests? Forest tenure and public forests in transition. Forest Trends and Center for International Environmental Law, Washington, DC.

Wilson, E. 2009 Company-led approaches to conflict resolution in the forest sector. The Forest Dialogue, London.

Wily, L. A. no date [*c*. 2000] Making woodland management more democratic: cases from eastern and southern Africa. Drylands Programme, International Institute for Environment and Development, London. Mimeo.

Winders, W. 2009 The politics of food supply: U.S. agricultural policy in the world economy. Yale University Press, New Haven, CT, USA.

Wittayapak, C. and Vandergeest, P. (eds) 2009 The politics of decentralization: natural resource management in Asia. Mekong Press, Chiangmai, Thailand.

Wittman, H. and Caron, C. 2009 Carbon offsets and inequality: social costs and co-benefits in Guatemala and Sri Lanka. Society and Natural Resources 22(8): 710-726.

Wollenberg, E., Anderson, J. and Edmunds, D. 2001 Pluralism and the less powerful: accommodating multiple interests in local forest management. International Journal of Agricultural Resources, Governance and Ecology 1(3/4): 199-222.

Wollenberg, E., Moeliono, M., Limberg, G., Iwan, R., Rhee, S. and Sudana, M. 2006 Between state and society: local governance of forests in Malinau, Indonesia. Forest Policy and Economics 8(4): 421-433.

World Bank 1997 World development report. Oxford University Press, New York.

World Bank 2004 Sustaining forests: a development strategy. The World Bank, Washington, DC.

World Bank 2006 Strengthening forest law enforcement and governance. Addressing a systemic constraint to sustainable development. Report No. 36638-GLB. The World Bank, Washington, DC. http://www.illegal-logging.info/uploads/Forest_Law_FINAL_HI_RES_9_27_06_FINAL_web.pdf.

World Bank 2008a Capacity building. The World Bank Carbon Finance Unit, Washington, DC. http://wbcarbonfinance.org/Router.cfm?Page=CapBuilding&ItemID=7 (12 Nov. 2009).

World Bank 2008b The World development report 2007: agriculture for development. The World Bank, Washington, DC.

World Bank 2009a Ease of doing business index. The World Bank, Washington, DC. http://www.doingbusiness.org/EconomyRankings/ (12 Nov. 2009).

World Bank 2009b Projects and operations: project portfolio advanced search. http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/0,,menuPK:51563~pagePK:95873~piPK:95910~theSitePK:40941,00.html (22 Sep. 2009).

World Bank 2009c World Bank poverty impact evaluations database. http://go.worldbank.org/DOKOVUWXR0 (12 Nov. 2009).

World Bank 2009dWorld development report 2009: reshaping economic geography. The World Bank, Washington, DC.

World Bank 2009e Making smart policy: using impact evaluation for policy making, case studies on evaluations that influenced policy. Doing Impact Evaluation No. 14. The World Bank, Washington, DC.

WRI 2000 A first look at logging in Gabon. A Global Forest Watch – Gabon Report. World Resources Institute, Washington, DC.

WRI 2009 The duality of emerging tenure systems. World Resources Institute, Washington, DC. http://www.wri.org/publication/content/8069 (1 Nov. 2009).

Wunder, S. 2003 Oil wealth and the fate of the forest: a comparative study of eight tropical countries. Routledge, London.

Wunder, S. 2005 Payments for environmental services: some nuts and bolts. CIFOR Occasional Paper No. 42. CIFOR, Bogor, Indonesia. 24p.

Wunder, S. 2008 How do we deal with leakage? *In*: Angelsen, A. (ed.) Moving ahead with REDD: issues, options and implications, 65-75. CIFOR, Bogor, Indonesia.

Wunder, S. and Albán, M. 2008 Decentralized payments for environmental services: the cases of Pimampiro and PROFAFOR in Ecuador. Ecological Economics 65(4): 685-698.

Wunder, S., Campbell, B., Frost, P. G. H., Sayer, J. A., Iwan, R. and Wollenberg, L. 2008a When donors get cold feet: the community conservation concession in Setulang (Kalimantan, Indonesia) that never happened. Ecology and Society 13(1): 12.

Wunder, S., Engel, S. and Pagiola, S. 2008b Taking stock: a comparative analysis of payments for environmental services programs in developed and developing countries. Ecological Economics 65(4): 834-852.

Wünscher, T., Engel, S. and Wunder, S. 2008 Spatial targeting of payments for environmental services: a tool for boosting conservation benefits. Ecological Economics 65(4): 822-833.

Xu, Z., Xu, J., Deng, X., Huang, J., Uchida, E. and Rozelle, S. 2006 Grain for green versus grain: conflict between food security and conservation set aside in China. World Development 34(1): 130-148.

Yao, C. E. and Bae, K. 2008 Firewood plantation as an alternative source of energy in the Philippines. Journal of Forest Science 24(3): 171-174.

Young, K. R. 1994 Roads and the environmental degradation of tropical montane forests. Conservation Biology 8(4): 972-976.

Zahabu, E. 2008 Sinks and sources. PhD thesis, University of Twente, Enschede, The Netherlands.

Zahabu, E., Malimbwi, R. and Ngaga, Y. 2005 Payments for environmental services as incentive opportunities for catchment forest reserves management in Tanzania. Paper to the Tanzania Association of Foresters Meeting. Dar es Salaam, Tanzania, 6–9 November 2005.

Zarin, D. J., Schulze ,M. D, Vidal, E. A., Lentini, M. 2007. Beyond reaping the first harvest: What are the objectives of managing Amazonian forests for timber production? Conservation Biology 21(4):916-925

REDD+ must be transformational. REDD+ requires broad institutional and governance reforms, such as tenure, decentralisation, and corruption control. These reforms will enable departures from business as usual, and involve communities and forest users in making and implementing policies that affect them.

Policies must go beyond forestry. REDD+ strategies must include policies outside the forestry sector narrowly defined, such as agriculture and energy, and better coordinate across sectors to deal with non-forest drivers of deforestation and degradation.

Performance-based payments are key, yet limited. Payments based on performance directly incentivise and compensate forest owners and users. But schemes such as payments for environmental services (PES) depend on conditions, such as secure tenure, solid carbon data and transparent governance, that are often lacking and take time to change. This constraint reinforces the need for broad institutional and policy reforms.

We must learn from the past. Many approaches to REDD+ now being considered are similar to previous efforts to conserve and better manage forests, often with limited success. Taking on board lessons learned from past experience will improve the prospects of REDD+ effectiveness.

National circumstances and uncertainty must be factored in. Different country contexts will create a variety of REDD+ models with different institutional and policy mixes. Uncertainties about the shape of the future global REDD+ system, national readiness and political consensus require flexibility and a phased approach to REDD+ implementation.

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