CIFOR

Transforming REDD+

Lessons and new directions

Edited by

Arild Angelsen, Christopher Martius, Veronique De Sy, Amy E Duchelle, Anne M Larson and Pham Thu Thuy

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Center for International Forestry Research (CIFOR)
CIFOR advances human well-being, equity and environmental integrity by conducting innovative research, developing partners' capacity, and actively engaging in dialogue with all stakeholders to inform policies and practices that affect forests and people. CIFOR is a CGIAR Research Center, and leads the CGIAR Research Program on Forests, Trees and Agroforestry (FTA). Our headquarters are in Bogor, Indonesia, with offices in Nairobi, Kenya; Yaounde, Cameroon; Lima, Peru and Bonn, Germany.

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Foreword

As the country with the second largest area of tropical forest in the Amazon, in Peru we are well aware of the global importance of forest conservation for combatting climate change, and of the implications of climate change for people who live in and depend on forests.

The latest IPCC report, released in 2018, clearly demonstrates that we are already living with the effects of climate change, driven, in part, by deforestation and forest degradation. The consequences are increasingly evident. Climate change is critically affecting our biodiversity, which in Peru has implications for food security and for our internationally renowned national cuisine; it is affecting the provision of important ecosystem services, such as the regulation of water and carbon; and it is affecting well-being, particularly that of the indigenous peoples and local communities whose livelihoods are threatened.

In view of these problems, mechanisms like reducing emissions from deforestation and forest degradation (REDD+) connect international support to local actions in countries like ours, presenting a window of opportunity to plan measures to stop deforestation. There is no doubt that implementation is challenging. It means that all involved must intensify their commitment to take concrete steps, so that together we can respond to the urgent call to action of the IPCC report.

Peru has already started down the path to reducing deforestation. Our National Strategy on Forests and Climate Change defines our vision of how this will happen until 2030, and REDD+ provides a frame for important actions to reduce forest loss. As the primary cause of greenhouse gases in our country, deforestation is also one of the core concerns of our Nationally Determined Contribution to reduce emissions, which is currently under development. One of the ways we will tackle deforestation is to assign land tenure rights in an organised manner, so as to increase the value of forests and fight illegal activities.

One central factor in the design and implementation of these strategies is dialogue. We cannot move forward unless we involve everyone and work together towards a common goal. Countries need to make commitments, but so do subnational governments, while guaranteeing the participation of civil society, indigenous peoples' organisations and other relevant actors. This has been one of the biggest lessons we have learned while implementing REDD+ in Peru.

Indigenous peoples play a key role in this process, and the forest and climate change agenda has brought them into the ring. We have supported initiatives that improve the exercise of their rights, and that revalue ancestral knowledge and practices that are important today for the management of forest ecosystems and the maintenance of carbon stocks. In this regard, the Peruvian government is developing conservation mechanisms *with* indigenous peoples. And we encourage other actors to contribute to these efforts and to replicate them elsewhere.

The research in this book demonstrates the complexity of implementing REDD+, more than a decade after discussions first began at the United Nations Climate Change Conference in Bali. Implementation tends to bring out aspects that were not foreseen at the design stage, and the context and interactions among the actors involved lead to frequent adjustments in the field. This volume therefore presents important lessons, learned from a wide variety of initiatives that, although applied in diverse scenarios, share common challenges.

Fighting deforestation is a challenge, but it's also an opportunity. It is difficult because it is not about applying a single intervention but rather requires a whole series of interventions at the same time to be effective. For example, promoting deforestation-free agriculture through intensification, as discussed in the book, requires more than just forestry measures; it requires attending to land rights, law enforcement, and more. It's also an opportunity because the goals go beyond reducing deforestation towards improving indigenous peoples' exercise of rights, reducing poverty, guaranteeing food security, strengthening institutions, conserving biodiversity and creating jobs.

Achieving lower levels of deforestation and its co-benefits means not letting down our guard on the international political commitment to continue the fight against climate change; mobilising resources from international cooperation and the private sector; and supporting an increasing number of subnational governments to lead initiatives in their jurisdictions, in collaboration with civil society and indigenous peoples. For this, we can count on the lessons learned from rigorous analysis like that found in the chapters of this book, which helps us to make our interventions more effective and equitable.

There is no plan B: this is the only Earth that we have. We need to take these messages to our countries, our local governments and our communities. It’s going to be a race down the field, but I know we will make the goal. I know we can do this, because we have to.

Fabiola Muñoz
Minister of Environment
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The book you have in your hands, or are viewing on your screen, is the result of an extraordinary effort by a large number of people. First, we (the editors) would like to thank the 62 authors of this book, for their hard work and responsiveness to numerous comments and suggestions, and for (mostly) keeping very tight deadlines. Without your expertise, knowledge and dedication, there would be no book.

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Of course, any book needs a good editor for language, style and also content, and more so in this case, because most of the editors and authors are not native English speakers. Hence, special thanks are due to Erin O'Connell, who led the editing process, and to Sarah Oakes. We greatly enjoyed your critical editing; we learned a lot about the English language (where exceptions are sometimes more important than the rules), and about our own intellectual somersaults.

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Much of this book draws on the work of CIFOR's research project, the Global Comparative Study on REDD+ (GCS REDD+). We would like to thank all global, national and local partners who have worked on the project over the past 10 years. You are too many to list individually, but we truly appreciate working with you and are grateful for the many insights you have provided.

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While greatly appreciating the many contributions to the book, readers should note that any views expressed in the chapters are those of the authors. They do not necessarily represent the views of the editors, CIFOR, the authors' institutions, the financial sponsors or the reviewers.

Ås, Bogor, Wageningen, Lima and Hanoi, 21 November 2018

Arild Angelsen — Christopher Martius — Veronique De Sy
Amy E Duchelle — Anne M Larson — Pham Thu Thuy

Summary

REDD+ entered the global scene 10 years ago to great fanfare, with the promise of building a 'wooden bridge' towards a carbon-neutral economy. By making standing trees worth more than dead ones, the concept of reducing emissions from deforestation and forest degradation and enhancing forest carbon stocks (REDD+) was expected to be a quick, cheap and easy way to lessen the climate impacts of land-use change.

While it has not been quick, cheap or easy, REDD+ is still a valid idea, more so now than ever. Recent findings show land-oriented climate solutions – primarily those protecting and restoring the world's forests - could deliver more than one-third of the cost-effective mitigation needed to keep global warming below 1.5°C by 2030. Yet land-oriented climate solutions receive only 3% of climate funding, less than a tenth of what could be considered a fair share.

New warnings about the potentially disastrous consequences of rising GHG concentrations in the atmosphere bring the reality of climate change into sharp focus. But the combined national commitments under the Paris Agreement together fall far short of achieving the 1.5°C goal, placing the world on track to a temperature increase of 3.0–3.2°C by 2100 – with some countries in the fast lane towards 5°C. And a growing chorus of climate deniers in major emitting countries is influencing the global debate in alarming ways. The resulting noise risks drowning out voices of reason.

The title of this book has an intended double meaning. In 2007, REDD+ was envisioned as a catalyst for transformational change towards lasting climate mitigation in the forest and land use sector. Direct incentives – payments to forest-rich developing countries – were meant to be a game changer. And yet REDD+ itself – understood as the aggregate of the initiatives and policies aiming to achieve reduced emissions from forests in developing countries – has been transformed over the past 10 years. If it is to deliver on its promise of transformational change, REDD+ needs to adapt to a shifting landscape that includes a new global climate

change architecture, changing global politics, and shifting expectations from donors, REDD+ countries, private sector and local communities.

Transforming REDD+ continues our close examination of REDD+ progress since 2008. We point to critical issues and suggest how to move forward to make forest-based mitigation effective, efficient and equitable. Our goal is to be constructive critics: *critical*, because the world cannot afford policies and initiatives that don't help reduce emissions; and *constructive*, because if the world fails to reduce emissions from deforestation and forest degradation it is unlikely to stay below the 1.5°C (or even 2°C) target.

Through the Global Comparative Study on REDD+ (GCS REDD+), the Center for International Forestry Research (CIFOR) and partners have tracked REDD+ progress, taking a researcher's critical distance while also providing recommendations, information, analysis and tools for those in policy and practice. *Transforming REDD+* is based on 10 years of GCS REDD+ research and almost 500 scientific publications from the project, but also draws on the wider literature, on partner contributions and on policy debates at global, national and subnational levels.

Since 2007, over 50 countries have initiated REDD+ strategies, many subnational governments have made formal commitments to reducing deforestation, and more than 350 REDD+ projects and programmes have been implemented across the tropics. We now have experiences and data – even if far from perfect – that enable us to make preliminary conclusions about the design, implementation, progress and impacts of national and subnational REDD+ initiatives.

The fourteen chapters of this book are divided into four parts: finance and other key building blocks of REDD+, analyses of national politics, syntheses of impact assessments of national and subnational policies, and local REDD+ initiatives, and finally, a review of four evolving initiatives critical to achieving REDD+ as an objective.

In the first part, we start by noting that to be effective, efficient and equitable, REDD+ needs a clear theory of change – a road map to transformation. We review diverse theories offered by various actors in the REDD+ debate, each with their own perspective on how to reduce emissions from deforestation and forest degradation. We also highlight critical uncertainties around results-based payment, the lynchpin of the REDD+ theory of change. While initially conceived as a way to incentivise countries, forest owners and forest users to conserve forests, the nature and level of compensation and the exact beneficiaries remain unclear.

A global carbon market – of which REDD+ was to be an integral part – never materialised. Finance for REDD+ has been provided by only a small group of countries and multilateral institutions, and readiness funding is drying up. The funding debate should acknowledge that REDD+ countries and communities have shouldered much of the cost of putting REDD+ into practice. Results-based payment has not been the driving force it was expected to be, due to a lack of finance and other challenges, including questions of what to pay for, whom to pay and how to set reference levels. We note that results-based systems are at risk of bias through ‘cherry picking’ of numbers, and suggest ways to remedy this through a clearer rule book and institutional checks and balances.

Data and information are key to rational planning and policy design, implementation and evaluation. But the generation and use of information can be politicised by powerful agents of deforestation and forest degradation. We highlight both opportunities and challenges around information-driven change throughout the REDD+ policy process. National forest monitoring systems will need to address participation, transparency, accountability and coordination to counteract the differences in the capacities, resources and powers of various stakeholders.

The second part of the book looks at the national politics of REDD+. Reforming national policies and laws that conflict with the social and environmental goals of REDD+ was expected to be central to implementation. Yet while some policy reforms materialised, the goal of reducing emissions from forests still often plays second fiddle. Countries’ Nationally Determined Contributions (NDCs) under the Paris Agreement reflect the latest national commitments towards climate change actions. We analyse how forests feature within them and discuss opportunities and barriers – in particular, around realising the potential contributions of forests, and improving the comprehensiveness of NDCs through clear forest sector commitments.

Coordination, often cited as the solution to many challenges, is in reality hampered by the conflicting interests attached to land and forest use. It is important to distinguish between coordination failures that can be addressed through improved coordination, and those that arise from fundamental differences in goals and interests. We review experiences and lessons learned, and possible solutions, such as collaborative multi-actor processes and forums.

Land tenure and the rights of indigenous peoples and local communities have been prominent on the REDD+ agenda since its early days. Implementation has resulted in some progress on tenure, but not enough to ensure a proper functioning of REDD+. And while institutional and legal reforms have been observed in countries such as Indonesia, Peru and Tanzania, concrete local efforts are often not backed up with sufficient national policy support and reforms.

Ten years in, the world is now asking what REDD+ has achieved through international finance, national policies, subnational programmes and local projects. Has it reduced deforestation and forest degradation? Has it helped improve local livelihoods and forest governance? In the third part, we seek to address these questions.

A review of the available evidence on policy impacts finds that national and subnational policies contribute to forest conservation, but their effectiveness is low on average, especially in the tropics. No particular policy instrument stands out as a 'silver bullet', but improving the coherence and complementarity of the policy mix across government levels can enhance the effectiveness of policies – both individually and in combination. For local-level initiatives, the few studies that focused on carbon/land-use outcomes show – on balance – moderately encouraging results, while the more numerous studies on well-being highlight small and mixed results, which are more likely to be positive when incentive components are included.

While REDD+ was initially focused on large-scale results-based financial transfers to national governments, new complementary initiatives have emerged. The fourth part of the book reviews four of them. Jurisdictional approaches to low-emission rural development hold promise, as they align REDD+, sustainable supply chain initiatives, domestic policy and finance across an entire jurisdiction. New analysis of progress made by 39 subnational states and provinces highlights that most are advancing towards meeting their formal commitments to reducing deforestation; they have done so through integrated jurisdictional strategies, robust multi-stakeholder processes, and quantifiable, time-bound targets.

Private sector zero deforestation commitments have emerged, but private finance has not yet reached expected levels. We explore the dominant approaches to zero deforestation and review progress made across five key forest-risk commodities (palm oil, cocoa, coffee, beef and soy). Challenges remain, and lack of information and transparency makes it hard to assess progress. Private sector initiatives must align with national government regulatory frameworks, wider corporate sustainability policies, and consumer country government regulations, if commitments are to be effective.

Agriculture, as the largest direct driver of deforestation, is being addressed through climate-smart agriculture initiatives. Can sustainable intensification of agricultural production, a key component of climate-smart agriculture, conserve forests? Positive forest outcomes cannot be taken for granted, as higher yields can incentivise agricultural expansion into forests; policies therefore need to incorporate forest-specific measures to promote land-sparing outcomes.

Enhancement of forest carbon stocks (the plus part of REDD+) has come in the form of forest and landscape restoration initiatives. A review of 154 restoration projects in Latin America found that funding sources strongly influence the goal, activities and size of projects. A major challenge is to change incentive structures in order to promote sustainable land stewardship and degraded land restoration. Few restoration projects track forest carbon impacts, and many projects do not include the establishment of reference levels or carbon monitoring in their activities.

In the concluding chapter, we note that REDD+ has not achieved what many actors expected a decade ago. Using a medical metaphor, we ask why. Was REDD+ the wrong medicine? Was the dosage too small? Has the disease progressed too far? Or, will the medicine work, given more time?

The pathways to halving emissions by 2030 are clear: end the world's dependence on fossil fuels, invest in renewable energy technologies, reduce emissions from agriculture and deforestation, and remove massive amounts of carbon from the atmosphere – in part by building natural carbon sinks through restoration and reforestation. But as global inequality grows, so does the gap between the political will to meet the challenge of climate change and the required actions to steer away from destructive business-as-usual patterns. Forest-based mitigation needs to be incorporated in national development and climate action plans, and mainstreamed across sectors and levels of government. It also needs strong political commitment, inclusive decision-making processes, committed funding from both developed and developing countries, and transformational coalitions. A positive narrative on how forests contribute to economic development and climate goals will support this.

In its first decade, REDD+ inspired enormous enthusiasm for change and – despite many challenges – has begun to deliver on its potential. What the next 10 years will hold for REDD+ and other climate mitigation initiatives remains an open question. Now, however, we have lessons to guide us on where to prioritise our resources, policies and actions, so that we can effectively protect and restore the world's forests.

Chapter 1

Introduction

REDD+ enters its second decade

Arild Angelsen, Christopher Martius, Veronique De Sy, Amy E Duchelle, Anne M Larson and Pham Thu Thuy

1.1 Climate and politics

By the next football World Cup in 2022, the world will likely have spent its 1.5°C carbon budget; if annual CO_2 emissions remain at current levels, countries will have emitted enough carbon into the atmosphere to make staying below the 1.5°C target very unlikely. By 2040, without emissions reductions, the carbon budget available to keep global warming below 2°C will have been spent (Peters n.d.; Petersen *et al.* 2018). The consequences of continued and growing greenhouse gas (GHG) concentrations in the atmosphere will potentially be disastrous (IPCC 2018).

This climate reality, unfortunately, reflects the current lack of political commitment. Yes, the Paris Agreement (2015) was a major milestone, setting the world's ambition to keep global warming below 1.5°C of pre-industrial temperature – or at least below 2°C. But *the Guardian*'s George Monbiot (2015) summarised the feelings of many observers when he wrote: "By comparison to what it could have been, it's a miracle. By comparison to what it should have been, it's a disaster." Taken together, countries' targets as reflected in their Nationally Determined Contributions (NDCs) fall far short of achieving the 1.5°C goal. In fact, the NDCs put the world on track to

Transforming REDD+

REDD+ is an important part of forest-based climate change mitigation. This book summarises lessons from REDD+ implementation at multiple scales and explores new directions in these chapters:

REDD+ finance and building blocks

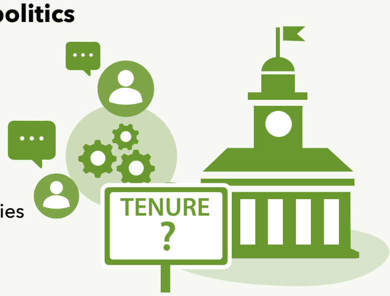
Theory of change (Chapter 2)

Financing REDD+ (Chapter 3)

Results-based payment (Chapter 4)

Information and policy change (Chapter 5)

National politics



NDCs and national climate policies (Chapter 6)

Multi-level governance (Chapter 7)

Land and carbon tenure (Chapter 8)

Assessing impacts

National and subnational forest conservation policies (Chapter 9)

Forests and carbon (Chapter 10)

People and communities (Chapter 11)

Evolving initiatives

Subnational jurisdictional approaches (Chapter 12)

The private sector (Chapter 13)

Climate-smart agriculture (Chapter 14)

Forest restoration (Chapter 15)

a temperature increase of 3.0–3.2°C by 2100 (UNEP 2017) – with some countries in the fast lane towards 5°C (du Pont and Meinshausen 2018). Unless countries change course, people born today will have to live on a very different planet than the one we now inhabit: higher temperatures, and more frequent and violent hurricanes, floods and wildfires (IPCC 2018) will dramatically change the global economic, social and political landscape.

But the pathways to halving emissions by 2030 are clear: end the world's dependence on fossil fuels, invest in renewable energy technologies, reduce emissions from agriculture and deforestation, and remove massive amounts of carbon from the atmosphere – in part by building sinks through restoration and reforestation (IPCC 2018).

A lot is expected from forests in this story. Protecting and restoring the world's forests, along with other land-oriented solutions, could deliver 37% of the greenhouse gas (GHG) emissions reduction needed to keep global warming below 2°C by 2030 (Griscom *et al.* 2017). Yet, only 3% of climate funding goes to such land-oriented climate solutions (WWF 2018) – less than a tenth of what could be considered a fair share.

Reducing emissions from deforestation and forest degradation and enhancing forest carbon stocks in developing countries (REDD+) debuted on the global stage more than a decade ago, generating widespread excitement and commitment of funds. Since tropical deforestation contributes around 10% of global GHG emissions (IPCC 2014), and because curbing it was expected to be "highly cost-effective" and "quick" (Stern 2007, ix), many hoped REDD+ would build a 'wooden bridge' towards a carbon-neutral economy by making live trees worth more than dead ones.

The conclusion from our 2012 book, *Analysing REDD+*, remains valid: "As an idea, REDD+ is a success story" (Angelsen *et al.* 2012). Yet a decade after being launched in the Bali Action Plan (UNFCCC 2007), broad consensus is that – in practice – REDD+ has not met the world's high expectations. Forest loss is high and, at continental level, on the rise (Box 1.1). Results-based payment was not quick and easy to implement, and REDD+ never received the funding it needed. In spite of this, a modified REDD+ has, albeit modestly, catalysed other approaches to protecting and restoring tropical forests, and has improved forest governance in many developing countries. Likewise, REDD+ has provided a platform for indigenous peoples and other marginalised groups to voice their concerns and ideas, and gain more visibility on the domestic and global stage.

In this book, we look back on 10 years of research and evidence, and ask: Has REDD+ made a difference? Why or why not? What are the critical issues? And where do we go from here?

Box 1.1 Tropical deforestation trends

Tropical continental deforestation trends in the last two decades are not encouraging. Satellite data show that annual forest cover loss[a] increased from 7.5 Mha in 2001 to 18.9 Mha in 2017 (Hansen *et al.* 2013b) (Figure 1.1). While all three continents saw a rise in forest cover loss, the increase is more pronounced for Africa (+303%) than for Asia (+166%) and Latin America (+87%). Almost half of tropical forest cover loss from 2001 to 2017 occurred in Latin America. However, the relative contribution to forest cover loss of each region changed within this period. Latin America contributed over half (56%) of forest cover loss in 2001, with both Africa and Asia equally sharing the rest. In 2017 the contribution of Latin America had decreased (to 41%) and that of Africa, increased (to 35%). Almost half (46%) of all forest cover loss occurred in just three countries: Brazil (27%), Indonesia (13%) and the Democratic Republic of the Congo (6%).

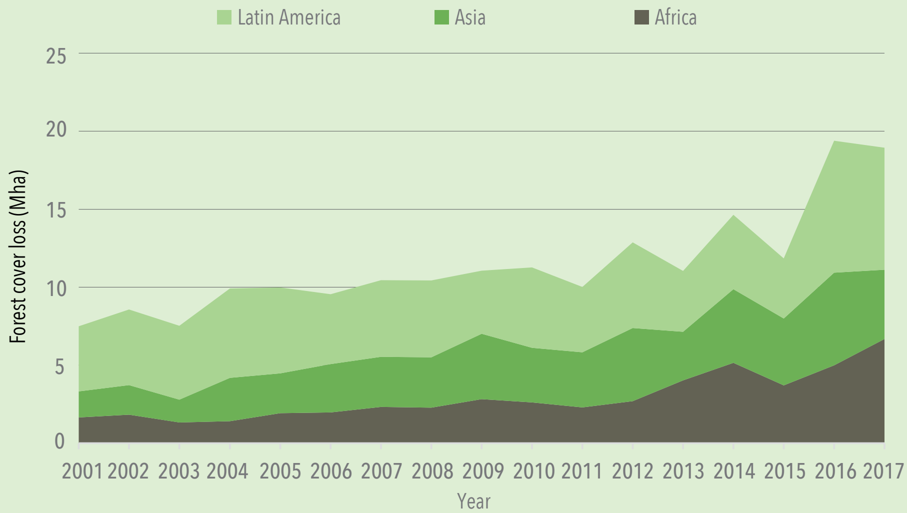


Figure 1.1 Annual tropical forest cover loss 2001–2017

Note: Forest cover is defined as more than 10% canopy cover.

Source: Hansen *et al.* (2013b)

While these continental trends are not encouraging, some trends in jurisdictions involved in REDD+ and low-emission development show a different picture (Stickler *et al.* 2018). A well-known example is the reduction of deforestation in the Brazilian Amazon post-2004 due to targeted policies and interventions in soy and beef supply chains (Nepstad *et al.* 2014).

A recent study on global land-change dynamics from 1982 to 2016 provides estimates for net forest cover change, considering the difference between forest cover loss and gain (Song *et al.* 2018). Forest cover gains in South America are small compared to the loss. Thus net forest cover loss in South America remains high with an annual net change of -1.41 Mha per year from 1982 to 2016. The three countries with the largest net tree cover loss during this period are all located in South America: Brazil, Argentina and Paraguay.

In Africa, tree cover gain almost compensated for tree cover loss, resulting in an annual net tree cover loss of only -0.19 Mha per year. Hotspots of forest cover loss in Asia can be found in Indonesia, Myanmar, Cambodia and Vietnam, also affecting primary forests. However, Asia has a net forest cover gain (+ 3.75 Mha per year) due to an increasing area of plantations in this region.

Overall, we conclude that deforestation rates are still on the rise across the tropics, with Africa becoming the most prominent region. While forest cover gains can be found, especially in Asia and to a lesser extent in Africa, this does not mean that natural primary forests are being restored. There is an ongoing decline of primary forest cover loss (Turubanova *et al.* 2018).

Note:

a Forest cover loss is not exactly the same as deforestation as it also includes changes in plantation forests and natural losses (e.g., from wildfires).

1.2 A shifting landscape

The title of this book, *Transforming REDD+*, has an intended double meaning. In 2007, REDD+ was envisioned as a catalyst for transformational change[1] towards lasting climate mitigation in the forest and land use sector. The use of direct incentives – through payments to countries, states, districts, communities and forest owners, stewards and users – was meant to be a game changer.

And yet, REDD+ itself[2], and the landscape in which it is embedded, have been transformed over the past 10 years. The world in 2018 is different than it was in 2007, and REDD+ needs to adapt to a changing reality if it is to deliver on its promise of transformational change. This reality includes:

A new global climate change architecture: The Paris Agreement (2015) represents a new framework for international efforts on climate mitigation and adaption. The Kyoto approach of a global emissions cap allocated to Annex I and possibly also middle-income countries was buried long before Paris. Nationally Determined Contributions (NDCs) – with country pledges – have taken centre stage.

This change has had several implications for REDD+ finance. The envisioned main source of funding – carbon markets – did not materialise. Funding has come mostly from development aid budgets and has not reached expected levels. Domestic funding for the forestry sector is getting scarcer, and REDD+ readiness

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1 Defined by Brockhaus and Angelsen (2012) as a "shift in discourse, attitudes, power relations and deliberate policy and protest action that leads policy formulation and implementation away from business-as-usual policy approaches that directly or indirectly support deforestation and forest degradation".

2 Here, REDD+ is understood as the aggregate of the initiatives and policies aiming to achieve reduced emissions and increased removals from forests in developing countries.

funding is drying up (Olesen *et al*. 2018; Chapter 3). Private sector funding is not as forthcoming as expected (Chapter 3). REDD+ countries and communities shoulder a large share of the costs, and will most likely continue to do so.

A changing global political climate: Strong political winds are blowing in directions that were hardly imaginable a few years ago. A new political reality dominates in key emitting countries, in which climate deniers have been elected to high offices, and the legitimacy of science, experts – and to some extent democracy – is questioned. As global inequality grows, these deniers appear to be drowning out voices of reason, exacerbating the gap between the political will to meet the challenge of climate change and the required actions identified in the IPCC 1.5 degree report (IPCC 2018).

This has implications for how to think about REDD+. A strengthened narrative for climate governance is needed, one that integrates the ways forests benefit both the planet and its people, especially the rural poor (Chapter 16). Climate action in general, and REDD+ in particular, need to deliver tangible results for many objectives: not only reduced emissions through maintained and increased forest area and stored carbon, but also improved biodiversity and other environmental services, as well as enhanced livelihoods and economic development.

An evolving REDD+: A decade of REDD+ initiatives at various scales has generated lessons about how REDD+ has evolved and the challenges it still needs to overcome. Since 2007, over 50 countries have initiated REDD+ strategies, subnational governments have experimented with jurisdictional REDD+ programmes, and more than 350 REDD+ projects have been implemented across the tropics (Simonet *et al*. 2015; Seymour and Busch 2016; Duchelle *et al*. 2018a). Although much of the initial theory of change of REDD+ was centred around the concept of payment for environmental services (PES), REDD+ implementation reflects a diverse bundle of policies, programmes and interventions that include enabling measures, disincentives and incentives. While the importance of tenure and rights remains, new ideas have come to the fore, including the need to engage the private sector and to situate REDD+ within broader jurisdictional approaches to low-emission rural development. Climate-smart agriculture and restoration have also moved up on the international agenda, providing a substantial mitigation potential (Griscom *et al*. 2017).

We have also learned that countries struggle to change the deforestation trajectory away from business as usual, coordination is weak or hampered by policy and political barriers, and the much-anticipated involvement of the private sector is still minimal. REDD+ should be integrated into countries' overall climate and development strategies, not least to better address the underlying causes (drivers) of deforestation and forest degradation.

Finally, REDD+ has to manage multiple and changing expectations from different actors. Many actors in the international community see REDD+ as an effective strategy to reduce emissions by phasing out destructive land-use practices through a transformation of underlying institutions and policies. In turn, forest-rich countries often expect REDD+ to be a complementary source of funding for investments in the forestry sector and to contribute to economic development. And local communities and civil society organisations (CSOs) in many countries expect REDD+ to transform existing forest governance so that their tenure security and rights are protected, and they are compensated for costly measures taken to address a problem they did not create.

1.3 Purpose of the book

This book aims to take stock of REDD+ progress, point to critical issues, and suggest how to move forward so that REDD+ and other, newer climate mitigation initiatives are effective, efficient and equitable. We aim to be constructive critics: *critical*, because the world cannot afford projects and policies that do not help reduce emissions; and *constructive*, because if the world fails to reduce emissions from deforestation and forest degradation it is unlikely to stay below the 1.5°C (or even 2°C) target. As we point to ways forward, we also aim to stimulate reflection and discussion.

In a previous book (Angelsen *et al*. 2012, 2–3), we proposed that REDD+ research is progressing through three generations or phases, mirroring the three phases of REDD+ itself: (i) designing REDD+ and learning from related experiences in the past; (ii) the political economy and implementation of REDD+; and (iii) assessing the impacts of REDD+. The first two edited REDD+ volumes from CIFOR were first-generation research outputs: 'Moving Ahead with REDD: Issues, options and implications' (Angelsen 2008) and 'Realising REDD+: National strategy and policy options' (Angelsen *et al*. 2009). The next volume, 'Analysing REDD+: Challenges and choices' (Angelsen *et al*. 2012), moved into second-generation research, analysing actual REDD+ design and early implementation.

The current and fourth volume includes research covering all three phases. We have data – albeit far from perfect – that enable us to make preliminary conclusions about the progress and impacts of national and subnational REDD+ initiatives. Yet, the basic design issues (e.g., of results-based payment systems) and coordination and implantation of REDD+ policies across levels and between sectors are still central to the REDD+ debate.

Research can contribute to global debate by bringing structure and clarity to issues. A major problem in public debates is the use of confusing and vague terms and concepts; problems multiply when these are used in research. But we realise that vague terms – as they are open to interpretation – have a political function

Box 1.2 The Global Comparative Study on REDD+

CIFOR's research project, the *Global Comparative Study on REDD+ (GCS REDD+)*, has accompanied REDD+ since 2008. We thus look back on 10 years of research on REDD+ policies and practices, in what is likely the largest global research programme on REDD+. We are working closely with research partners and stakeholders in forest-rich tropical countries to support REDD+ outcomes and impact by providing solid research-based evidence. We want to ensure that policy-makers and practitioner communities have access to – and use – the information, analyses and tools they need to design and implement REDD+ and other forest-based mitigation strategies in effective, efficient and equitable ways that also promote social and environmental co-benefits; and rigorously assess to what degree REDD+ has delivered.

The study has involved 22 countries so far, representing varying governance contexts, different stages of the forest transition curve, and diverse REDD+ capacities and readiness (Figure 1.2). A core set of comparative studies has been undertaken across all countries, including country profiles analysing national REDD+ strategy development. We conducted other studies in subsets of these countries, such as impact assessment of REDD+ projects, benefit-sharing mechanisms, and multilevel governance.

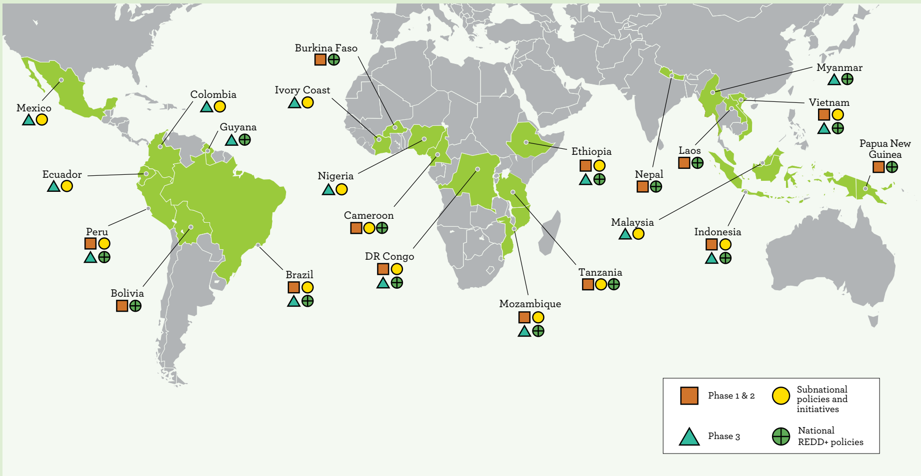


Figure 1.2 CIFOR's Global Comparative Study on REDD+ research countries

The project is organised into four research components: (i) national REDD+ policies and measures, (ii) subnational initiatives, (iii) monitoring and reference levels, and (iv) multilevel governance of REDD+ (Table 1.1). GCS REDD+ has been implemented in three phases: 2008–2011, 2012–2015 and the current phase, 2016–2020.

As of November 2018, the project has produced almost 500 scientific journal articles and book chapters, 5 books, and around 140 policy briefs and factsheets, and many have been translated into several languages. We also developed nine different tools to help policy-makers. All publications, tools and other knowledge products can be accessed through our website (www.cifor.org/GCS).

Continued to next page

Box 1.2 Continued

Table 1.1 Research and dissemination components of the Global Comparative Study on REDD+ (GCS REDD+)

I. REDD+ policies	Analysing effective, efficient and equitable (3E) REDD+ policies and measures at international, national and subnational levels; REDD+ policy architecture (mechanisms for REDD+ benefit sharing, safeguards information systems), media discourses and policy network analysis.
II. Subnational REDD+ and low-emission development initiatives	Assessing the performance of subnational REDD+ and other low-emission development initiatives, including subnational jurisdictional programmes and local-level projects
III. Measuring carbon emissions	Measuring carbon emissions and determining forest and carbon reference levels; measurement, reporting and verification (MRV) of forests and carbon; MRV capacity
IV. Multilevel governance of REDD+	Understanding the synergies and trade-offs in joint mitigation and adaptation and the challenges of multilevel and multi-sector governance and carbon management
V. Knowledge sharing	Partner engagement and dissemination

The following funding partners have supported GCS REDD+: Australian Agency for International Development (AusAID); CGIAR Research Program on Forests, Trees and Agroforestry (CRP-FTA) with financial support from the contributors to the CGIAR Trust Fund (www.cgiar.org/funders/); David and Lucile Packard Foundation; European Commission (EC); Government of Finland; International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU); Mott Foundation; Norwegian Agency for Development Cooperation (Norad); the Department for International Development (UKAID); and United States Agency for International Development (USAID).

in that they help actors reach agreement (Chapter 2). To rephrase Leo Tolstoy's Anna Karenina principle: *vague terms allow all parties to be happy in their own interpretation*. We question, however, the sustainability of that happiness.

Thus, we aim to clarify concepts and provide useful frameworks for thinking about REDD+. Beginning with the term 'REDD+', we note in Chapter 2 that a distinction must be made between REDD+ as an *outcome* (reduced emissions) and REDD+ as the *framework* (the activities) to achieve that outcome. We distinguish the term 'direct drivers' (deforesting activities and the associated actors, such as small-scale subsistence farmers, large-scale cattle ranchers, or palm oil companies) from 'underlying causes' such as export-promoting strategies, high population growth, or corruption (Chapter 5). Or take the concept of 'coordination problems', which refers to very different structural problems, from pure coordination problems which are relatively easier to solve, to bargaining problems with fundamental conflicts of interests (Chapter 7). We also question the 'politics of unsustainability', and call for a clarification of the objectives, diagnosis and prescriptions of multiple green initiatives (e.g., green growth and green economy) to avoid putting more concepts forward without addressing the roots of unsustainable development (Chapter 6).

This book is based on 10 years of GCS REDD+ research, but also draws on the wider literature and partner contributions. We selected 14 important issues to which research can contribute lessons, insights and future avenues. The resulting synthesis chapters are meant to be used as a reference for future debate and actions.

1.4 A guided tour

The chapters of this book are divided into four parts: Part I (Chapters 2–5) dissects finance and other key building blocks needed to reduce emissions from deforestation and forest degradation; Part II (Chapters 6–8) analyses national politics; Part III (Chapters 9–11) synthesises impact assessment studies on national policies and local REDD+ initiatives; finally, Part IV (Chapters 12-15) discusses four evolving initiatives critical to achieving REDD+ as an objective.

Part 1 REDD+ finance and building blocks

To be transformative, REDD+ requires an articulated theory of change. **Chapter 2** reviews diverse theories offered by different actors in the REDD+ debate on how to reduce emissions from deforestation and forest degradation. It highlights critical uncertainties around results-based payment, the lynchpin of the REDD+ theory of change, and points to flaws in the design of REDD+ if looked at through this analytical lens.

Chapter 3 tallies up REDD+ finance. A small group of countries and multilateral institutions dominate international REDD+ funding, and readiness funding is shrinking. Data reveal only modest contributions from the private sector (but data are scarce – another problem). The contributions of REDD+ countries and communities must be better acknowledged in the funding debate.

Chapter 4 looks at experience to date with results-based payment, focusing on three challenges: whom to pay, what to pay for, and how to set reference levels. It highlights the politics behind answering these questions, the risk of biases and of 'cherry picking' favourable numbers, and argues for a clear Paris Agreement rule book and institutional checks and balances.

Chapter 5 examines data and information, which are key to rational planning and policy design, implementation and evaluation. If the generation and use of information are influenced by powerful agents of deforestation and forest degradation, how can that information bring about transformational change? The chapter highlights both opportunities and challenges around information-driven policy change throughout the REDD+ policy process.

Part 2 National politics

Initially, national policy reforms were thought to be central to REDD+. But, while some policy reforms materialised, the goal of reducing emissions from forests is still not a priority in most countries, and curbing business-as-usual development policies and practices has been hard. NDCs reflect the latest national commitments towards climate change actions, and **Chapter 6** analyses how forests feature within them. The chapter examines progress, challenges and opportunities for countries in enhancing the role of forest-based mitigation, and discusses opportunities and barriers to realising the potential contributions of forests in the NDCs. NDCs and climate change policies will be ineffective if they do not have effective policies and measures addressing the drivers of deforestation and degradation.

Chapter 7 seeks to understand why coordination is so difficult, and finds answers in the conflicting interests attached to land and forest use. The authors note the importance of distinguishing between coordination failures that can be addressed through improved coordination, and those that arise from fundamental differences in goals and interests. The chapter reviews experiences and lessons learned, and the potential and challenges of solutions such as collaborative multi-actor processes and forums.

Land tenure and the rights of indigenous peoples and local communities have been prominent on the REDD+ agenda since its early days. **Chapter 8** concludes that REDD+ implementation has resulted in some progress on tenure, but not enough to secure local rights and ensure a proper functioning of REDD+. Institutional and legal reforms have been observed in Indonesia, Peru and Tanzania; however, local efforts are often not backed up with sufficient national policy support.

Part 3 Assessing impacts

Have REDD+ policies, subnational initiatives and local projects led to any forest impacts? Has REDD+ helped to improve local livelihoods and forest governance? The three chapters of this section aim to answer these questions, although only a few rigorous analyses have been undertaken to estimate such impacts.

Chapter 9 reviews evidence around three types of national and subnational policies: (i) enabling policies, like decentralisation and tenure reforms; (ii) incentive-based policies, like PES; and (iii) disincentive-based policies, like protected areas and other land-use restrictions. The chapter paints a heterogeneous picture, with too few studies to announce a policy winner. On average, the impact of REDD+ on forests has been positive, but well below what was predicted.

Despite the scarcity of studies focused on carbon outcomes, **Chapter 10** highlights moderately encouraging results from local REDD+ initiatives, in terms of forest conservation and carbon stock enhancement. Three projects using conditional incentives showed positive results for forests, through reducing the negative impacts of smallholder agriculture and firewood collection.

Chapter 11 shows that the well-being outcomes of early REDD+ interventions have been small or insignificant. While it is impossible to make firm conclusions about trade-offs between forest and well-being outcomes, evidence on similar local-level PES initiatives points to challenges in designing REDD+ initiatives that are both effective at reducing forest carbon emissions *and* strongly pro-poor.

Part 4 Evolving initiatives

REDD+ was initially focused on large-scale results-based financial transfers to national governments. In the past 10 years, however, new, complementary initiatives have emerged. This part of the book reviews four of them.

Chapter 12 introduces the concept of jurisdictional approaches to low-emission rural development. These are comprehensive approaches to forest and land use across one or more legally defined territories that align REDD+ incentives, sustainable supply chain initiatives, and domestic policy and finance. New analysis from 39 states and provinces in 12 countries – which hold 28% of the world's remaining tropical forests – shows strong commitments by these jurisdictions towards reducing deforestation, and clear actions towards meeting these goals.

The notion of 'shifting the trillions' towards more sustainable forest and land use exemplifies the high expectations for the private sector to contribute to reduced emissions. **Chapter 13** examines private sector commitments by exploring dominant approaches to zero deforestation, and reviews progress made across key forest-risk commodities. Challenges remain, and a lack of information and transparency makes it hard to assess progress. For commitments to be effective, private sector initiatives must align with government regulations in both producer and consumer countries, with wider corporate sustainability policies, and with consumer demand.

Chapter 14 asks whether and how sustainable intensification of agricultural production, a key component of climate-smart agriculture, can potentially conserve forests. The answer depends on the commodity, farm practices and context. Positive forest outcomes cannot be taken for granted, as higher yields can incentivise agricultural expansion into forests; policies therefore need to incorporate forest-specific measures to promote land-sparing.

Chapter 15 notes that causes of forest landscape degradation are similar across the tropics and vary predictably in line with deforestation. This chapter shares findings from restoration projects in Latin America that show how funding sources determine the goal, activities and size of projects. It highlights two challenges: to change incentive structures in order to promote sustainable land stewardship and degraded land restoration; and to secure adequate funding.

Finally, **Chapter 16** summarises the main findings of the book and provides an outlook on what should come next for REDD+ as it evolves.

Part 1

REDD+ finance and building blocks

Pathway to impact
Is REDD+ a viable theory of change?

Christopher Martius, Arild Angelsen, Anne M Larson, Pham Thu Thuy, Denis J Sonwa and Brian Belcher

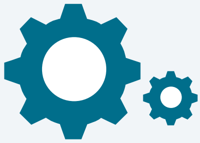
Key messages

- A REDD+ theory of change is expected to outline pathways using conditional incentives to achieve reduced emissions. But as practised, REDD+ has evolved into a diversity of measures, while the core element, conditionality, has rarely been applied.
- Confusion arises when actors fail to distinguish between REDD+ as the *outcome* of reduced emissions and the *framework* to achieve them. Convoluted objectives, unclear donor commitments, and competing ideas about what REDD+ is and should pay for (compensation level, beneficiaries), complicate its implementation.
- The way forward lies in recognising ideological differences for more constructive debates, clarifying technical objectives and embracing pragmatism in implementation.

Looking at REDD+ as a theory of change

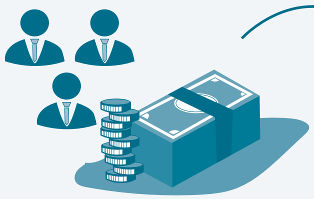
A theory of change is a roadmap that outlines how to build a successful transformation

Theory of change approaches are pragmatic tools for transformational change.

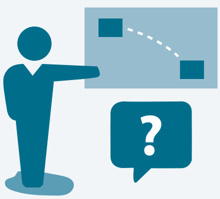


But traditional REDD+ definitions miss or poorly define key components of a functional theory of change.

These include 'power' of incentives, compensation nature and level, who beneficiaries are, and permitted offsetting.



On the ground, REDD+ has evolved to encompass broad, adaptive, non-conditional activities. Clarity on donors' roles, actions and the conditionality of their financial commitments is now needed.



Confusion arises when the objective of reduced emissions and the framework to achieve them aren't clearly defined. The success of REDD+'s broad objectives depends on broad policy reform.

Implementation must be more realistic and pragmatic, based on diagnosis and actioned through evidence-based policy-making.

2.1 Introduction

In 10 years, REDD+ has achieved much along the intended impact pathway. But it has not yet delivered the expected overall impact of reducing GHG emissions. Originally envisioned as a way to efficiently and quickly achieve wide-ranging changes in how tropical forests are managed through a payment for environmental services (PES) approach – with industrialised countries paying forest owners and users in developing countries to reduce emissions and increase removals of GHGs in line with global climate mitigation goals – REDD+ has in reality evolved into a diversity of adaptive, very often non-conditional activities (Sunderlin *et al*. 2015; Duchelle *et al*. 2018a).

Why the disconnect between concept and practice? The continued, sometimes fierce, debate about REDD+ (Fletcher *et al*. 2016, 2017; Angelsen *et al*. 2017) and its failure to provide significant emission reduction results so far (Seymour and Angelsen 2012; Sunderlin *et al*. 2017; Counsell 2018) suggests there are

Box 2.1 What is a theory of change?

A theory of change (ToC) is a model of a change process. It describes and explains how and why a set of activities (such as a project or programme) is expected to contribute to a process of change. A ToC details the main *actors* involved in the process, identifies their *actions* as a sequence of steps or stages in the process, and specifies the *theoretical reasons* for the changes (Coryn *et al.* 2011; Vogel 2012). Many key outcomes in a social change process can be defined as behavioural change; a ToC aims to explain *who* will do *what* differently and *why*? ToCs can be used as a planning tool, as a framework for monitoring and evaluation and, as in this chapter, as an analytical tool (Belcher *et al*. 2017; Belcher 2018).

A ToC recognises that social and ecological systems are complex and that causal processes are often non-linear, with multiple interactions and feedback loops (Douthwaite and Hoffecker 2017). Realistic ToCs include both short- and longer-term outcomes and reflect interactions of individuals, organisations and communities within complex systems.

ToCs are often presented as flow diagrams, with boxes for activities linked by arrows and organised by theme or by sets of actors in *impact pathways,* mapping a route from activities, via outputs, to outcomes and impact. In practice, many ToC modelling efforts end here, with a representation of the main impact pathways. However, a true theory of change also describes the causal assumptions, theoretical explanations and mechanisms by which each step is realised.

A ToC thus provides a useful framework for analysing the causal logic and assumptions in a project or programme. It should provide a plausible explanation as to why the activities should lead to the desired outcomes, and help identify assumptions, enabling factors and stumbling blocks (Harries *et al*. 2014; Maini *et al*. 2018). If there is an explicit ToC, it can be assessed for its completeness and coherence. But without an explicit ToC, it can be useful to trace the implicit ToC by asking the following questions: Who are the key actors? What do they need to do differently for the high-level changes to be realised? How are the interventions of the project expected to contribute to change? Why should each set of actors be expected to change their behaviour?

competing ideas about what REDD+ is, what its goals are, and how to achieve them. This is in part the result of its history, which is rooted in various conservation and development contexts, and a prolonged negotiation process that did not end even when REDD+ was finally formally concluded at the Conference of the Parties in Paris in 2015 (COP21).

In this chapter, we examine whether REDD+ as a concept is properly and sufficiently developed to achieve its proposed goals, by viewing it through a theory of change lens. As a roadmap to successful societal transformation (Weiss 1972, 1997; Box 2.1), a theory of change (ToC) explains how and why an initiative should work (Weiss 1995) and makes explicit the underlying mechanisms and assumptions that allow a proposed activity to achieve its expected outcomes and anticipated impact. In the case of REDD+, reduced deforestation and forest degradation – along with forest conservation, sustainable management of forests and the enhancement of forest carbon stocks – are expected to lead to lower emissions and higher removals (i.e., negative emissions).

Two questions can be asked: First, do REDD+ *projects* and *programmes* have a viable ToC? Second, as an overall *concept*, does REDD+ have a viable ToC? In other words, does REDD+ make realistic and adequate assumptions about how an exchange of (industrialised countries') money for (developing countries') emission reductions could work? The first question is discussed in other chapters (4, 7, 9, 12–14); the second is discussed here.

2.2 REDD+ theory of change shows gaps in policy and practice

Although the early phases of REDD+ lacked a true, formal ToC, we can infer one (Figure 2.1) from definitions given at the time. Angelsen *et al.* (2009: xiii) define the key principles of REDD+ in this way:

> *"A core idea 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."*

In ToC terminology, REDD+ payments (the activities) from some actors (donors) cause other actors (forest owners and users) to change their behaviour; this results in better forest management and/or less forest clearing, leading to reduced CO_2 emissions from deforestation and forest degradation and/or carbon stock maintenance/enhancement, and eventually to reduced CO_2 emissions from forests (the outcomes); ultimately, mitigating climate change (the impact) (the green boxes in Figure 2.1).

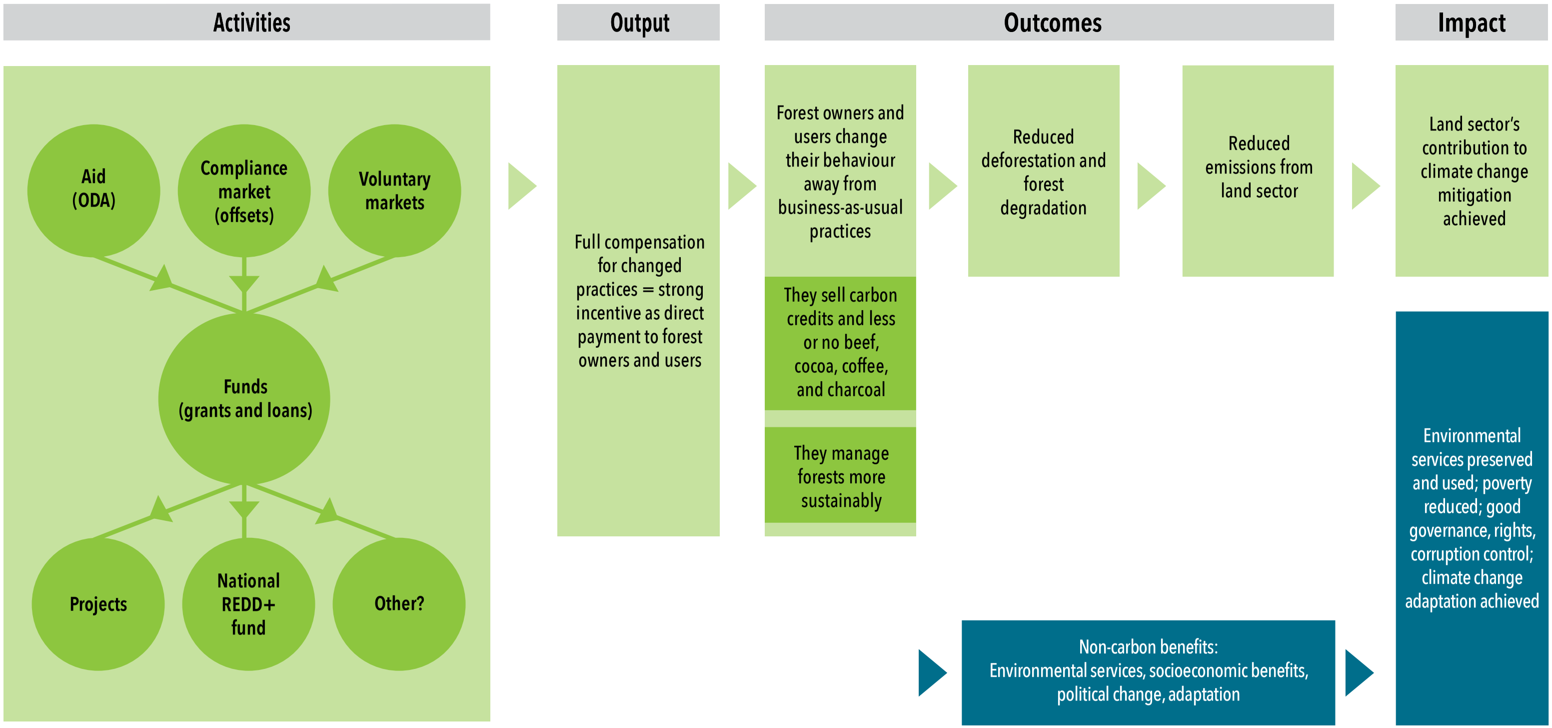


Figure 2.1 A theory of change for the original concept of REDD+

Note: Green and blue boxes represent carbon (green) and non-carbon (blue) benefits. The corresponding ToC steps are shown in grey boxes at the top.

ODA = official development assistance

First, note that the actor group 'forest owners and users' is treated as a homogenous group. In practice, there are many different actors, actions and interests subsumed within these processes, with multiple points of weakness and failure in the causal logic. The same is probably true for donors (they are implicit but not actually mentioned in the definition above); their actions, likewise, follow a variety of interests.

Next, observe the emphasis on *strong* incentives, *direct* payments, and *full* compensation in the citation from Angelsen *et al*. (2009). Part of the current debate circles around the incentives that did not come, the question of who should be paid (governments and project proponents also shoulder costs; Luttrell *et al*. 2013), and the expectation of full compensation (what is included in the opportunity costs that need to be compensated?) (Angelsen *et al*. 2017). These expectations for full compensation may have triggered eventual dissatisfaction on some sides, as the official REDD+ provisions (see below) were much more reserved about the point of full compensation of opportunity costs (only citing 'positive incentives', see UNFCCC 2011, Add.1; App. 1:26). There is also a group of REDD+ opponents who sharply question the validity of a monetary incentives approach to environmental and development problems (Cabello and Gilbertson 2012; Bayrak and Marafa 2016).

Now, note that the definition does not mention *offsets*. Carbon payments may or may not be based on REDD+ credits that are used as offsets in a compliance carbon market, yet many actors – including some environmental NGOs and academic scholars, and others in the aviation sector and fossil fuel industry – seem to equate REDD+ with offsets (Fiske and Paladino 2017).

Careful readers may have noticed a circularity here: REDD+ as an *action* (or 'intervention', the programme of payments and associated rules) leads to REDD+ as an *outcome*. REDD+ can indeed denote two different things, which often confuses the debate: the PES framework just described (action), but also – as implied by its name – the resulting reduced emissions (outcome). Equally within the 'action' definition, REDD+ can refer to results-based payment schemes (e.g., PES) only, or more broadly to any actions taken to achieve the outcome.

Finally, the inclusion of the non-carbon (social and environmental) benefits (blue boxes in Figure 2.1) – a part of the rationale that forest management requires working with the people on the ground – has led to complaints that REDD+ has lost its focus. However, including socioeconomic benefits for forest owners and forest-dependent communities would seem the only way to recognise their development aspirations; likewise adding environmental co-benefits is important to avoid having carbon objectives eclipse biodiversity concerns. That said, it is key to recognise that such co-benefits clearly add to the already convoluted outcome expectations, and thus have implications for the ToC.

2.3 UNFCCC decisions form an incomplete theory of change

We can draw a quite different ToC for REDD+ by looking at how it is officially enshrined in the Warsaw Framework, including pertinent UNFCCC decisions (Figure 2.2).

Two of the three REDD+ phases – Phase I on national strategies (readiness) and Phase II on implementation – reflect the fact that substantial international and national policy-making was and is required before results-based money can flow. During the readiness phase, some actors expected broad issues, such as tenure (Chapter 14) to be solved, and policies and laws that conflict with the social and environmental REDD+ goals, or with protection of indigenous and local communities' rights, to be removed (Fiske and Paladino 2017).

The formal components of Figure 2.2 comprise (in green): the four *elements* that are required for a country to join the REDD+ process; the eligible *actions*; the five 'allowable' intermediate *outcomes*, and the financial and other *support* needed from Parties, especially industrialised countries. Phase III (results-based payments) would complete the process, with the eligible actions converted into outcomes, and impact (climate change mitigation) to follow.

This is the UNFCCC setup for REDD+ (UNFCCC 2011, Add.1), but these components hardly describe a fully functional ToC. A major point of weakness is seen in the imbalanced expectations: REDD+ makes clear and strong assumptions about the recipients of funds (i.e., expecting that forest owners and users 'change their behaviour' to reduce emissions) but is less emphatic about donor obligations. While significant donor support has obviously materialised, there are no viable global or national carbon markets, and there is insufficient time and support for readiness (Chapter 4; see also Tiani *et al*. 2015); this indicates insufficient 'behavioural change' in donor countries. This form of REDD+ also adds the Cancún safeguards (blue box), to guarantee environmental and social co-benefits, procedural consistency, and the risks of reversals and emissions displacement ('leakage').

This analysis shows, first, that REDD+ is not very prescriptive about the financing side; while donors hold considerable sway over how the negotiations go, they are not bound by very strong provisions. Failing to describe the role of a major actor group is a weakness in any intervention logic. This is true even if, given lack of donor enthusiasm and the variety of national circumstances in recipient countries, a generic approach was essential to pave the way for a future viable REDD+. Historically, REDD+ brought previous official development assistance efforts for sustainable tropical forest management into the newly emerging global climate change regime (Scherr *et al*. 2004), and thus brought together different communities of practice, which did not easily integrate (Schipper and Pelling 2006).

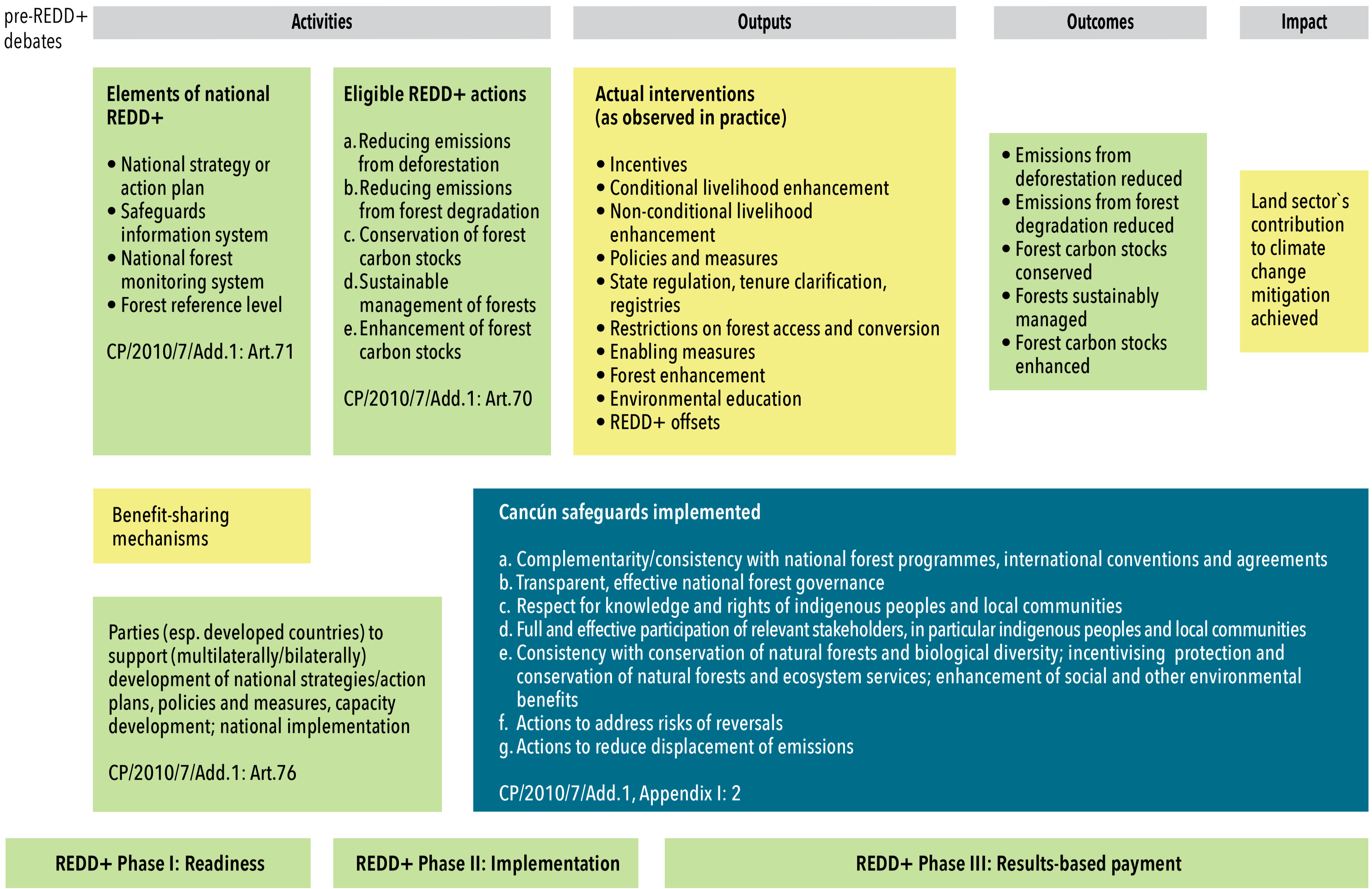


Figure 2.2 The UNFCCC REDD+ decisions in a theory of change (Warsaw Framework)

Note: Green and blue boxes represent formal decisions on carbon (green) and co-benefits (blue). Yellow boxes represent crucial elements in the ToC that are not formally part of the Warsaw Framework. The corresponding ToC steps are shown in grey boxes at the bottom.

Source: UNFCCC 2011

Second, important questions are left to countries and implementers to define, including: (i) benefit-sharing mechanisms (yellow box) that decide on equity, transparency and justice (Loft *et al*. 2017a; Wong *et al*. 2017); (ii) arrangements for financial accountability (Williams and De Koning 2016); (iii) safeguard information systems (Menton *et al*. 2014; Jagger and Rana 2017); (iv) how to effectively address the drivers of deforestation and forest degradation (De Sy *et al*. 2015; Weatherley-Singh and Gupta 2015); and (v) how to organise REDD+ governance across levels and sectors of government (Libert Amico *et al*. 2018). By leaving these decisions for later definition (i.e., to be operationalised under the different national circumstances and reflecting local variability) it was possible to reach international agreement – principles of national sovereignty and implementation neutrality were respected. But this openness creates challenges in practice (e.g., while given broad liberty on how to implement their safeguard information systems, some countries were actually asking for *more* external guidance; Menton *et al*. 2014).

2.4 Current REDD+ debates and practices reveal wide variety of ToCs

Analysis of REDD+ interventions shows that it has changed from a rather rigid instrument into a basket of options (Duchelle *et al*. 2018a), and a diversity of ToCs associated with them. The number of formally eligible actions (Figure 2.2) pales against the many interventions and instruments that actually make up REDD+ in the vast majority of projects (Sunderlin *et al*. 2015). Interestingly, many of them represent non-conditional transfers ('real interventions' in Figure 2.2; see also Duchelle *et al*. 2018a), and the core element of conditionality has barely been tested in policy or practice.

REDD+ theories and debates (Figure 2.2) were important to start the process and inform the readiness and implementation phases, and debate continues to this day. But REDD+ has several seemingly parallel and sometimes incompatible rationales, reflecting different underlying ideologies (Hiraldo and Tanner 2012; Table 2.1). Policies and projects often explicitly avoid politics (Ferguson 1994; Li 2007; Myers *et al*. 2018). But it is important to recognise the ideology in apparently non-ideological environmental and development debates "precisely because it is unacknowledged or disguised" (Sunderlin 2002, 3).

Hiraldo and Tanner (2012) identified three ideologies affecting REDD+ (Table 2.1): *market liberalism,* which aims to correct a market failure using PES; *institutionalism*, which dwells on the centrality of functional institutions, good governance and the rule of law; and *rights advocacy*, which is focused on the well-being of forest communities, and their fair and equal participation, rights and knowledge.[1] Other

1 Hiraldo and Tanner (2012) further identified *bio-environmentalism* – attempting to use carbon markets to achieve greater environmental sustainability within the planet's ecological boundaries; as this is basically a market-based approach, we categorised it in the first row in Table 2.1.

Table 2.1 Main rationales underlying REDD+ theories of change

Rationale	Description	Main policy	Underlying ideology	Key proponents
Economic incentives	Excessive emissions are a market failure, to be corrected though PES	Payments for environmental services (PES/ market approach)	Neoclassical environmental economics (rational choice); 'bio-environmentalists' (Hiraldo and Tanner 2012)	Key donors, World Bank, UN-REDD, Green Climate Fund (GCF), many NGOs
Institutional change and coordination	Good climate policy will be enshrined in laws, regulations and institutions	Institutional reforms; laws and regulations related to climate change	Institutionalism Managerial paradigm (Sunderlin 2002)	UN-REDD Programme
Empower local people, women and marginalised groups	'All you need is rights' to achieve long-lasting impact	Tenure reforms and local rights; gender mainstreaming	Deforestation resulting from unbalanced power, which allows forest exploitation by commercial outsiders	Rights and Resources Initiative (RRI), indigenous peoples' organisations, gender organisations, civil society organisations
Information	Equipped with the right and sufficient information, stakeholders can make the right decisions	Public information and transparency; information exchange and coordination among stakeholders	Available information and enlightened public debate producing socially and environmentally optimal outcomes[1]	UN-REDD Academy; academics
Planning	Rational planning by governments at various levels and in its diverse sectors is the key	Planning, and command and control measures	Deforestation is a result of insufficient (landscape) planning and zoning	National administrations; some donors

rationales see *information* exchange or *planning* as key (Sunderlin 2002); but their seemingly technical nature (i.e., promoting ideas such as 'best information' and 'efficient planning') hides that they are also rooted in ideology.

Why do we discuss ideologies? Because an awareness of underlying ideological divergences could help understand debates as well as the motives for resistance to change, paving the way for more informative and constructive dialogue and problem-solving. In the REDD+ debate, it is easy to see how unaccounted-for ideologies underpin different positions, hence leading to different versions of a ToC and a stalling of dialogue (see Chapter 11). Obviously, each of these have valid points, and "models and arguments [are] valid […] in specific circumstances" (Rodrik 2010, 34).

2.5 The way forward: Transforming REDD+

Interpreting REDD+ as a theory of change has shown us various flaws in the concept. REDD+ has clearly achieved visible advances along the impact pathway (e.g., triggering important international dialogue on deforestation-related emissions and building national capacity (Chapters 5–7). Unfortunately, it has not yet achieved widespread impact – specifically, it has not been as effective and efficient as hoped in reducing emissions, and not as quickly as expected (Chapters 10–12).

But in our opinion, believing that 'REDD+ is dead' is premature. While we don't intend to paint yet another – perhaps the 'perfect' – ToC, we think that our analysis, coupled with the experience to date, can help to identify approaches that might avoid some of the more unproductive parts of the debates, and constructively move forward towards REDD+ as an outcome.

Definitions of REDD+. The central confusion between the *framework* to achieve REDD+ and the *outcome* of reduced emissions could be resolved by adopting clearer language. While diversity in the interpretation of REDD+ needs to be embraced, everyone needs to be clearer about which definition they are using during the debates.

Diversity within the REDD+ framework. The framework has seen a diversification of REDD+ activities on the ground into a broad, opportunistic and adaptive basket of options; many of these lack conditional incentives. This puts the implementation reality in stark contrast to the idea of REDD+ as 'pure' PES.

Clearer contexts and pathways for REDD+ as a PES mechanism. REDD+ requires both global climate benefits, and local social and environmental benefits, expanding the 'normal' PES context of local benefits, thereby adding a layer of complexity. Much more needs to be done to develop the international carbon market, increase public and private funding, and maintain readiness support (see Chapter 3). We believe that recognising the current diversity is more conducive to achieving REDD+ in a real, diverse world of nationally, environmentally and socially varying circumstances than fighting over ideological positions.

Scope of REDD+ as a PES mechanism. Even with the Warsaw Framework in place, there is still a lack of clarity on defining what REDD+, as a PES mechanism, should become (i.e., the 'strength' of incentives; the nature and level of compensation; who the beneficiaries should be; and the extent to which offsetting should be permitted). The Warsaw Framework does not have a plan for funding the envisioned REDD+ system. These problems, still much debated, will need resolution soon. Some require action at the national and subnational levels; others need mutually agreeable definitions that please both donors and recipients, negotiable in each individual case.

A skewed view of actors. REDD+ makes clear assumptions about what fund recipients need to do, but provides much less guidance about donor commitments. A functional ToC should encompass all relevant actors, and REDD+ needs to become clearer about the obligations on the donor side of the equation (e.g., to provide sufficient funding, and to set policy frameworks that will enable the emergence of viable carbon markets, to ramp up demand for REDD+).

An acute case of 'objectives overload'. Additional objectives were added when it became clear that REDD+ in its original simplicity was not feasible. Some of these, such as stronger provisions for the participation of indigenous and forest-dependent communities, are essential for the REDD+ ToC to function. Yet they can overcomplicate the picture when responsibility for their resolution lies outside the forestry sector, where REDD+ often resides (e.g., tenure; Chapter 14). While REDD+ cannot succeed without changes in broader development trajectories, rule of law, transparency, etc., it alone cannot solve all these concerns. The current ToC overlooks the fact that REDD+ requires an enabling policy environment. For REDD+ to succeed in the context of the Paris Agreement, decision-making must become more realistic and pragmatic – in both national and local contexts – in deciding what and what not to include.

In this chapter we have tried to take a fresh view of REDD+ by applying a ToC lens. In debates, 'REDD+ veterans' often are able to tell us exactly why a certain provision was or was not included. For example, there are no hard definitions for benefit-sharing mechanisms so as to not violate recipient countries' sovereignty; no hard commitments for the donor community were established, in order to avoid scaring them away; and because views on carbon market finance and offsets diverged too much, they were deliberatively left out. There was good, but sometimes only tactical and not strategic, logic behind all the decisions leading up to the Warsaw Framework. Hence the question driving this chapter: is the resulting REDD+ ToC still viable?

REDD+ gives the answer itself. It has achieved much to 'pave the impact pathway', probably because its emerging flexible, multifaceted nature allowed it to fit into the diverse environmental, social and political realities of many tropical forest countries. It also seems to be surrounded by unproductive debate – in part because underlying ideological positions and definitions are not made explicit. It is facing powerful opposition – stemming from vested interests (Chapter 5) and hidden in placeholder debates, e.g., about cooperation (Chapter 11). REDD+ has not achieved the expected outcomes yet, and this is painful given the urgency of the emissions reduction (IPCC 2018). To respond to this urgency in a proactive way, the donor community must embrace the flexibility that allows REDD+ to thrive, step up to build carbon markets, foster market demand and provide the necessary funding. And the world will need to get used to the reality that achieving lasting policy reform takes time.

Chapter 3

Financing REDD+

A transaction among equals, or an uneven playing field?

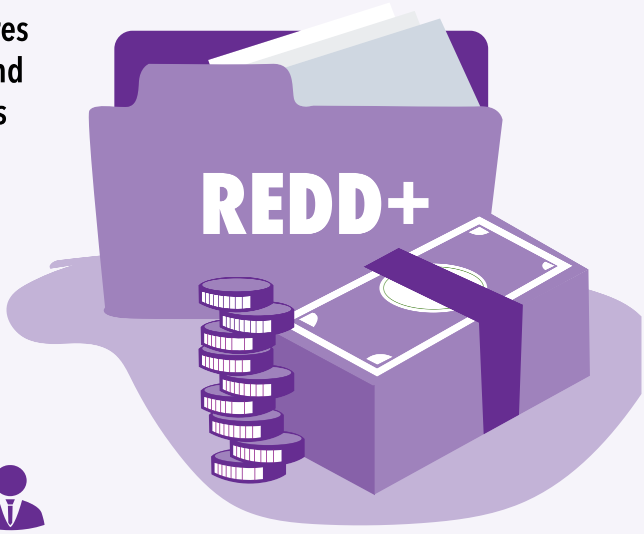
Stibniati S Atmadja, Shintia Arwida, Christopher Martius and Pham Thu Thuy

Key messages

- A small group of donors and multilateral institutions dominate international REDD+ funding, making it potentially vulnerable to political fluctuations. Readiness funding from established mechanisms is drying up, jeopardising newcomers' ability to tap into future public or private funding.
- REDD+ needs political and financial support from both REDD+ developing countries and developed countries. Developing countries and communities have already contributed their own funding and support to REDD+ implementation, and this should be better acknowledged in global REDD+ funding discourse and negotiations.
- High expectations of private sector finance are not matched by observed flows and commitments, and the best available data on private sector REDD+ initiatives has limited depth and coverage. Enhancing private sector investment in REDD+ requires enabling conditions such as carbon rights, tenure security and law enforcement.

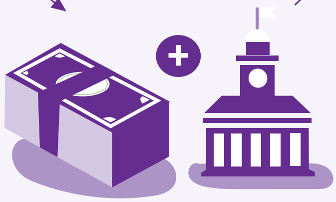
Financing REDD+ in a nutshell

Harnessing forests' potential to mitigate climate change requires money to compensate for costs and to provide the financial incentives for change. REDD+ is expected to facilitate this.



A small group of donors and multilateral institutions dominate international REDD+ funding, making it vulnerable to political fluctuations.

Lack of readiness funding can jeopardise newcomers' ability to tap into future public or private funding.



REDD+ needs both political and financial support at the national level from REDD+ developing countries.

Established readiness funding is drying up, so newcomers face more funding challenges than did 'early movers' in REDD+.

REDD+ countries and communities shoulder a lot of REDD+ costs, which are not well-documented; global funding discussions need to acknowledge this contribution.

Private sector finance has not materialised as expected, and there is a lack of data on progress towards commitments.

The private sector does not see the business case for REDD+, in part due to the many risks involved, e.g., lack of tenure security, carbon rights and law enforcement.

3.1 The REDD+ finance landscape

Harnessing forests' potential to mitigate climate change requires funding to cover the costs of changing policies and practices, as well as to provide financial incentives for change. A review of 13 countries showed that expectations around results-based payment drive progress in establishing national REDD+ policies and initiatives (Brockhaus *et al*. 2017) – but the needs far exceed the available funds.

Most countries are currently in the readiness and implementation phases of REDD+ (Chapter 2). Readiness funding allows countries to improve forest governance, to develop national strategies and institutions, to enable stakeholders to invest in forests, and to acquire the skills and technologies to monitor, report and verify carbon released by (or sequestered in) forests.

Current available estimates of direct global REDD+ funding (i.e., for activities explicitly labelled as REDD+) rely mainly on data from public funding sources, mostly grants. A few countries account for a large proportion of international public funding; between 2008 and 2015, 87% of official development assistance (ODA) for activities explicitly labelled as REDD+ was committed by Norway, Germany, the United Kingdom, the United States and Australia (Olesen *et al*. 2018) (Figure 3.1).

Around 25–33% of this funding is channelled via multilateral funds managed by a handful of institutions: the World Bank, the UN-REDD programme, the Global Environment Facility (GEF) and the Green Climate Fund (GCF) (Norman and Nakhooda 2014; Olesen *et al*. 2018). For donors, these multilateral mechanisms secure a high level of governance and lower transactions costs (compared to direct engagement with recipient countries) and offer donors a degree of control on how the fund mechanisms are governed (UK-DECC 2014). However, the strict formal requirements posed by these funds are challenging for recipients to meet, and lead to high transactions costs and capacity building needs.

3.2 The key challenges

3.2.1 Donor funding is not enough and is vulnerable to political fluctuations

Current donor-driven funding is insufficient to realise tropical forests' mitigation potential, and is vulnerable to changes in political leadership, public opinion, and economic interests within and between donor and recipient countries (Wolosin and Lee 2014; Angelsen 2017). Global estimates of finance pledged or committed to support REDD+ efforts are USD 1.1–2.7 billion per year (Norman and Nakhooda 2014; Olesen *et al.* 2018) – a wide range, mainly due to differences in what is labelled REDD+ (Figure 3.1).[1] By some estimates, the world needs at

1 For example, Olesen *et al*. (2018) estimated that EUR 19.4 billion (USD 21.5 billion) was committed between 2008 and 2015 for activities explicitly labelled as REDD+ and for those not labelled as REDD+ but sharing the same objectives, while Norman and Nakhooda (2014) estimated USD 9.8 billion was pledged between 2006 to 2014 to support REDD+.

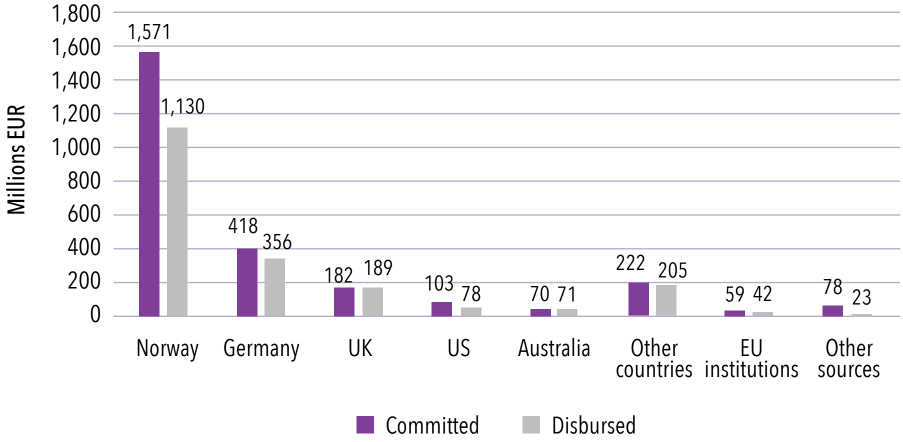


Figure 3.1 ODA cumulative commitments and disbursements for activities labelled as REDD+, 2008–2015

Source: Organisation for Economic Cooperation and Development (OECD) Creditor Reporting System (CRS) database, as calculated in Olesen *et al*. (2018)

least USD 15 billion per year, compared to the USD 1–2 billion currently available (Norman and Nakhooda 2014). This takes into account estimates by the Eliasch Review (i.e., by 2030, the cost to halve emissions from the forest sector could be around USD 17–33 billion per year, including global carbon trading) and Morris and Stevenson (2011) (i.e., by 2020 the cost to halve deforestation is between USD 15 and USD 60 billion). Côte d'Ivoire, for example, needs USD 289 million per year to meet its objective of 20% forest cover by 2030; this is 10 times the 2015 total of USD 28.1 million, mobilised for all REDD+ activities from domestic and international sources (Falconer *et al*. 2017).

Many factors external to REDD+ countries' ability to reduce emissions from forests can pose significant hurdles for fundraising. Donors and recipients need to find the most suitable partner to implement REDD+ actions. During the early phases of REDD+, this matching process faces high communication, monitoring and transaction costs, and favours countries that have REDD+ proponents headquartered in the donor countries, those who received aid from the donor country in the past, or proposed projects clustered with other projects funded by the donor (Gallemore and Jespersen 2016). Targeting such countries may be more efficient for donor countries in the short term, but it is not inclusive and not necessarily equitable, sustainable or efficient for global emissions reduction.

Box 3.1 Accounting of REDD+ finance in Vietnam

Available data show that, since 2009, REDD+ in Vietnam has primarily been funded by ODA. In 2016, the main sources were bilateral government funding – mainly from Germany, the United States, Japan and Norway (USD 38.07 million) – and multilateral institutions, such as UN-REDD and the Forest Carbon Partnership Facility (USD 39.25 million). Private sector contributions were much smaller, at USD 0.46 million (MARD 2016). The Vietnamese government estimated that it contributed USD 5.6 million of domestic public funding for implementation of its national REDD+ programme. This was to cover the operations of the Vietnam REDD+ Office, the formulation of relevant policies and strategies, scientific research, and the piloting of methodologies for a national forest monitoring system (MARD 2016).

Is this an accurate account of REDD+ finance in Vietnam? No, because it does not capture all state budget allocations for the implementation of REDD+ activities, and because discrepancies within REDD+ financial data and statistics pose a major challenge to building a comprehensive and accurate dataset.

Accounting challenges for REDD+ domestic funding in Vietnam include:

- **Difficulty aggregating data across sectors**. As REDD+ requires cross-sector coordination, funding for REDD+ is not classified as a separate budget line in the state budget. Thus, it can be funded through various initiatives such as Vietnam's Green Growth Programme, its Nationally Determined Contribution Implementation Plan and its National Strategy on Climate Change. Lack of consistency among data from different programmes overseen by different ministries makes aggregation and analysis a major challenge.
- **Inconsistency in documenting financial data for REDD+**. Data on REDD+ have been collected at different scales (e.g., through REDD+ activities, projects and the national programme), at different times using different data sources. Donors provide annual financial reports by December, but the government's report is released only in June of the following year.
- **Lack of clarity in REDD+ priorities and activities**. The country's legal framework does not provide clear guidance on REDD+ priorities. This leads to different definitions and terminologies used to determine whether funding for a particular expenditure can be classified as REDD+; as a result the management of REDD+ investments lacks focus.

3.2.2 REDD+ countries, including communities, are filling the funding gap

Despite the funding gaps in REDD+, action continues to take place on the ground (see list of REDD+ initiatives in Simonet *et al*, 2018a). Government, communities, some companies and NGOs in REDD+ countries at national, subnational and local levels are shouldering part of the funding gap. For example, Vietnam (Box 3.1), Indonesia, Ecuador and Ethiopia contributed their own domestic resources to carry out awareness-raising activities, refine their monitoring and evaluation frameworks, and cover operational costs of REDD+ activities at subnational level. Indonesia contributed IDR 3,354 billion (USD 250.6 million) for climate change mitigation – more than 30 times the IDR 105.4 billion (USD 7.87 million) in donor grants (Haryanto 2017).[2] In Ecuador, the government provided more than three times the amount committed to the country in international REDD+ funding from 2009 to 2014 (Silva-Chávez *et al*. 2015). However, these countries' contributions are not well documented, are difficult to aggregate, and are not integrated into global discourses on climate finance (Box 3.1).

REDD+ countries are also bearing high costs. For example, in the Tigray region of Ethiopia, male and female farmers provide 20 days of compulsory unpaid labour during the dry (off-peak) season to implement water and soil rehabilitation programmes, including afforestation (Kumasi and Asenso-Okyere 2011; Gromko 2016). GCS REDD+ analysis of 22 subnational early REDD+ initiatives in five countries found that small-scale or subsistence stakeholders bore the most significant opportunity costs in terms of number of people affected (Luttrell *et al*. 2016). A high proportion of villages (62%) and subnational institutions (40%) carry significant implementation costs without receiving any monetary benefits (Luttrell *et al*. 2016). Given the UNFCCC principle of 'common but differentiated responsibilities and respective capabilities', the fact that developing countries are shouldering substantial costs without being acknowledged is a major equity concern.

3.2.3 Private sector funding remains important, but data are missing

Given the large size of private investments in the forestry and agriculture sectors as compared to international public funding, the private sector has been expected to take on a larger role in financing REDD+ initiatives – either by developing forest carbon projects or by committing to 'forest-friendly' investments and supply chains (Badgery-Parker 2013; Castrén *et al.* 2014; Clarke *et al.* 2016).

Despite these expectations, little is known about the private sector's REDD+ financing and investments (Henderson and Coello 2013; Tennigkeit *et al.* 2013). Publicly available global data on private sector sources of funding come mainly from the voluntary carbon markets (Wolosin *et al*. 2016). This paints only part of the picture, since private sector involvement in, for example, deforestation-free supply chains (Chapter 13) could be much more significant, but is difficult to quantify. Most companies are reluctant to share complete information on their progress towards implementing their commitments (Haupt *et al*. 2018). Private companies are not convinced of the REDD+ business case (CDP 2018); risks related to land tenure, carbon ownership, and nesting rules for carbon credits – which companies feared may lead to loss of carbon rights generated by private projects nesting in jurisdictional/national REDD+ programmes – make REDD+ investment less attractive than other investments (CDP 2018).

2 USD 1 = IDR 13,381.87, the World Bank official exchange rate, 2017 (https://data.worldbank.org/indicator/PA.NUS.FCRF)

Good governance is essential for private sector funding to be meaningful for REDD+. Experience from other sectors reveals that turning assets from public to private (e.g., by privatising forest ecosystem services) needs to be carefully regulated and monitored to avoid regulatory capture (Perotti and Bortolotti 2005). For example, early in REDD+ implementation 'carbon cowboys' benefited by exploiting local people's lack of understanding about how carbon markets function, and private plantations often had negative effects on local communities and the environment through misallocation of public funds for reforestation and dispossession of local communities from land held under customary law (e.g., Barr *et al.* 2010; Landry and Chirwa 2011; Andersson *et al.* 2016). Meanwhile, socially responsible enterprises suffered because they lacked the political, regulatory and law enforcement support to implement proper safeguards.

The private sector also needs government support – through improved land-use planning, regulation and public funding – to maintain interest in putting commitments into action (Haupt *et al*. 2018). Governments need to adopt and enforce existing laws, formulate policies and support the poorest farmers through their transition to REDD+. In return, the public sector expects the private sector to finance REDD+, but funding to create the enabling conditions for REDD+ is drying up.

3.2.4 REDD+ readiness funding is quickly disappearing – but it is still needed

The first generation of REDD+ countries took risks, but in return they gained early access to readiness funds. This has led to a better understanding of drivers, stronger engagement of stakeholders in national forest policy discussions (Duchelle *et al*. 2018a), and the establishment of national MRV systems and capacity (Romijn *et al*. 2015). Second-generation REDD+ countries can benefit from the foundations built by the first wave, but readiness funds are now dwindling.

Multilateral funding programmes are an important means of distributing REDD+ funds globally. They have a comparative advantage over bilateral funding mechanisms in that they have specialised capacity – both technical (e.g., following UNFCCC guidelines) and governance (e.g., fiduciary and safeguards) – and can cultivate large networks of countries engaged in similar activities. These programmes significantly influence how funds are structured, used, provided and reported by REDD+ countries and donors.

The leading multilateral funding mechanisms focused on REDD+ readiness are the Forest Carbon Partnership Facility Readiness Fund (FCPF-RF), the UN-REDD National Programmes (NP), and the Forest Investment Program (FIP) of the Climate Investment Funds (CIF); we exclude the recently established Green Climate Fund from this list because of its limited focus on REDD+. FCPF-RF and UN-REDD-NP are due to end in 2020, while FIP is facing a potential deficit of USD 51.2 million

(CIF 2017; FCPF 2017; UN-REDD+ Programme 2018). However, many donors that contribute to these three funds also provide funding to REDD+ countries directly through bilateral agreements.

Countries that have not yet applied for readiness funding are competing for an increasingly small pool from multilateral mechanisms. Among 39 countries that mention REDD+ in their NDCs, 12 countries participate in UN-REDD, 2 receive FCPF readiness funding, and 5 (Angola, Bahamas, Palau, Rwanda, and Saint Vincent and the Grenadines) have neither received an FCPF Readiness Grant nor are they a participant of UN-REDD (Figure 3.2). And although the Green Climate Fund's Readiness Programme will extend beyond 2020, it is capped at USD 1 million per year per country and can also be used for activities not directly related to REDD+ readiness.

2011	Democratic Republic of the Congo[b], Ghana[b], Indonesia, Nepal[b]
2012	Costa Rica[b], Ethiopia, Liberia, Republic of the Congo, Vietnam[b]
2013	Cameroon[b], Chile, El Salvador, Mozambique[b,c], Nicaragua[c], Uganda[b]
2014	Cambodia[b], Côte d'Ivoire, Guatemala, Guyana[b], Honduras, Laos, Mexico, Panama, Peru, Suriname[b]
2015	Bhutan[b], Burkina Faso, Colombia[b], Dominican Republic, Fiji[b], Madagascar[b], Nigeria, Pakistan, Papua New Guinea[b], Sudan[b], Thailand[b,c], Togo[b], Uruguay[b,c], Vanuatu[b]
2016	Argentina
2017	Belize[b,c], Central African Republic, Paraguay
2018	Kenya
n/a	Angola[b,c], Bahamas[b,c], Burundi[b], Chad[b], Equatorial Guinea[b], Guinea Bissau[b], India[b], Ivory Coast[b], Malawi[b], Myanmar[b], Palau[b,c], Rwanda[b,c], South Sudan[b], Saint Vincent and the Grenadines[b,c], Tanzania[a,b] Zambia[b], Zimbabwe

Figure 3.2 Year of REDD+ Readiness Preparation Grant Agreement from FCPF by country, countries mentioning REDD+ in their INDCs or participating in UN-REDD+

Note: Colours group countries by time of grant agreement related to disbursements of at least USD 3 million. Purple = early, White = mid, Grey = late/no grant agreement as of 2017

a Did not seek Readiness Preparation Grant from FCPF but is a partner country
b INDC document mentions 'REDD+' (Source: World Bank 2016)
c Countries that are not a participant of the UN-REDD Programme

Source: Author compilation from documents at https://www.forestcarbonpartnership.org/redd-countries-1

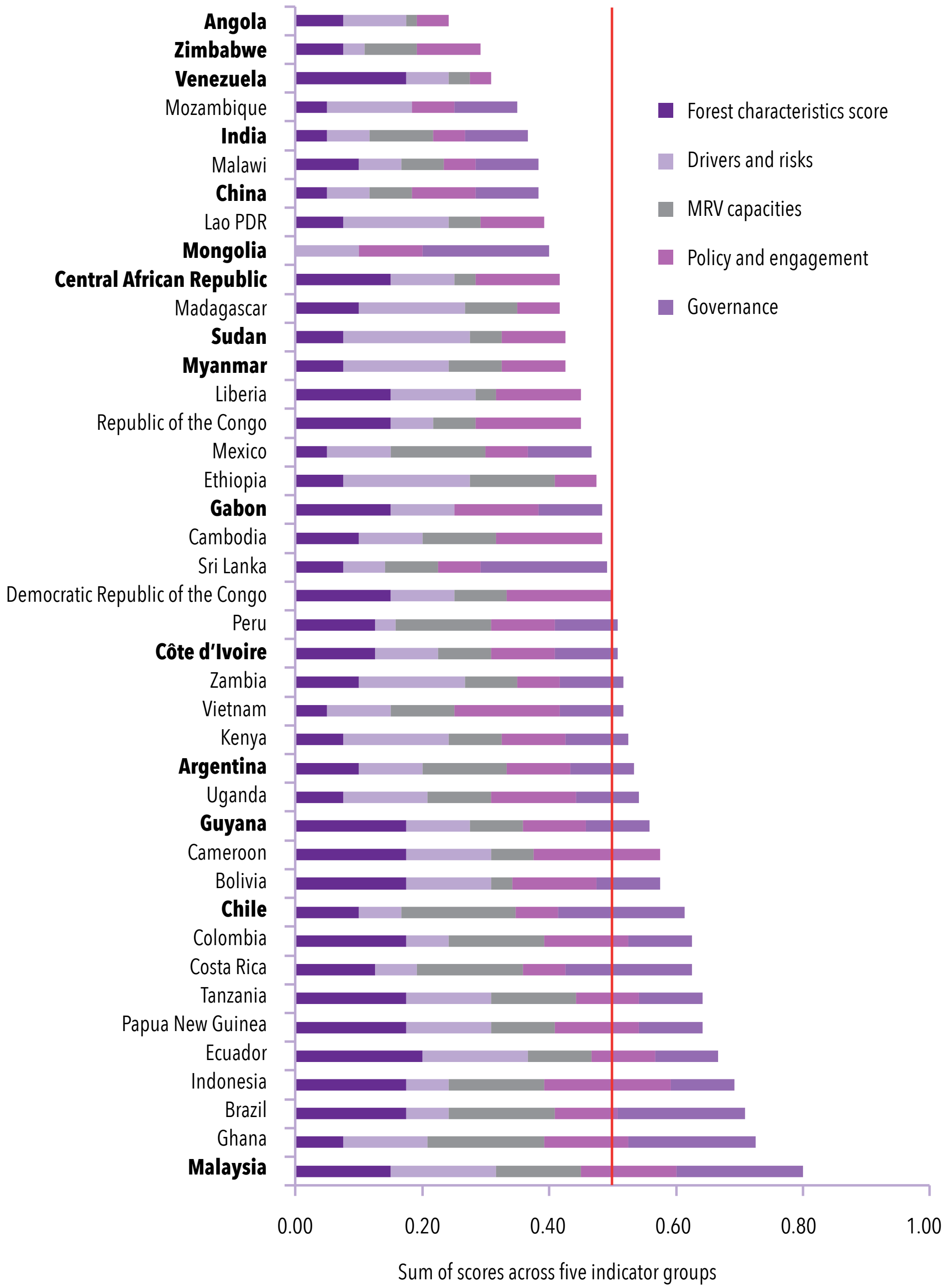


Figure 3.3 Assessment of REDD+ effectiveness and capacity to access international REDD+ funds across 41 countries

Note: Horizontal axis is the sum of scores across indicator groups, ranging from 0 to 1; the red line denotes 0.50. Countries highlighted in bold have a low (<0.5) score for access to international funds designated explicitly for REDD+.

Source: Olesen *et al*. 2018 based on 2008–2015 ODA data from the Organisation for Economic Co-operation and Development (OECD)

The projected country demand for REDD+ related activities in 2017 was USD 500,000 per year per country (Green Climate Fund 2016). This may be sufficient if all potential REDD+ countries could be 'REDD+ ready' by 2020, but unfortunately that is unlikely. A review of 41 REDD+ countries found that 19 of them still have low effectiveness (Olesen *et al*. 2018); of those, 10 have low scores for access to international funds explicitly for REDD+ and came late – or not at all – to the FPCF funding pipeline (Figure 3.3). Of the remaining 21, only 3 countries (Argentina, Ecuador and Ghana) scored well in all indicator groups, including access to REDD+ funding. And, as mentioned previously, poor REDD+ readiness can jeopardise access to private financing for REDD+.

3.3 The way forward

Countries need to have better access to diverse sources and modes of financing, and have institutions to manage them (Box 3.2). Those that do not will need to deftly court donors or be left with few funding options. As countries look for other sources of funding, including private investments and domestic sources, the role of the traditional gatekeepers of REDD+ is likely to diminish. REDD+ cannot remain the domain of a few donors or institutions. This may come as a relief to the handful of donor countries shouldering most of the burden for REDD+ thus far.

Box 3.2 Case study: Indonesia's Environmental Fund Management Agency

In anticipating the third phase of REDD+ (results-based payments) and other climate funding, the Government of Indonesia established the Environmental Fund Management Agency (*Badan Pengelola Dana Lingkungan Hidup* – BPDLH), based on Government Regulation No. 46/2017 on Environmental Economic Instruments, signed on 10 November 2017.

The financial aspects of BPDLH will be managed by the Ministry of Finance, while the technical and coordination aspects will be managed by the Ministry of Environment and Forestry's Directorate General of Climate Change Control. The institution will handle a variety of financing flows, such as grants, loans and equities, including large grants such as Norway's 2010 Letter of Intent, at USD 1 billion. This diversity is considered important to secure long-term funding. The rules and regulations for allocating funds are still under preparation.

BPDLH aims to increase transparency and accountability in managing climate funds. It will have a checks and balances mechanism involving a custodian bank as a trustee, who will carry out asset safekeeping, bookkeeping, and reporting on managed funds. A Presidential Regulation (Perpres) on the Establishment of the Public Service Fund for the Management of Environmental Funds will be issued soon to regulate operational modalities of BPDLH and establish standard operational procedures at subnational level.

The process of establishing this fund started mid-2015. It was delayed due to the need to consult with ministries involved in implementing environmental and climate change programmes, including Ministries of Finance, of Environment and Forestry, of Energy and Mineral Resources, and of Transportation.

Between 2008 and 2015, ODA commitments to activities labelled as REDD+ equalled EUR 2.7 billion in total, while ODA for those with REDD+ objectives but not labelled as such was EUR 16.7 billion (Olesen *et al*. 2018). To better tap into this 'REDD+ like' funding, countries such as Indonesia are developing flexible mechanisms that can channel funding to different sectors, using a variety of financial instruments (e.g., grants, loans and equity) from both private and public sources (Box 3.2). If the definition of REDD+ is better aligned to what countries need, there could be stronger domestic support for REDD+ and a wider variety of business opportunities that complement its goals.

Developing countries' own contributions to REDD+ must be recognised in light of the 'common but differentiated responsibilities and respective capabilities' principle. This includes better monitoring of domestic climate finance (e.g., budget tagging) for analysis and documentation. Seymour and Angelsen (2012, 320) note that framing REDD+ in terms of aid "creates an unfortunate domestic political dynamic in recipient countries and raises sovereignty concerns". Instead, they argue that REDD+ funding should be "a transaction among equal partners in the context of an international agreement". The needs and preferences of developing countries should determine how REDD+ is being negotiated and financed.

Companies must overcome their reluctance to contribute more to REDD+ objectives, and show more transparency about their progress towards commitments (e.g., zero deforestation pledges). There are simply not enough data to assess whether private sector investments are central – or detrimental – to REDD+ objectives. Global debate needs to address how to regulate, monitor and enforce private sector investments that are environmentally sustainable.

Finally, readiness funding should be provided to countries that still need it. This funding is arguably producing some of the largest benefits of REDD+ seen to date: more national dialogue and awareness, clearer national strategies, and improved forest monitoring and institutions. These benefits need to be extended to all forested countries. Although the Green Climate Fund is envisioned to support some REDD+ readiness activities, it lacks the targeted funds and broad REDD+ expertise of the FCPF-RF and UN-REDD-NP. For REDD+ to be successful, newcomers must be able to develop a basis for it and tap into future public or private funding.

Results-based payment

Who should be paid, and for what?

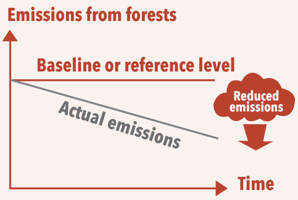
Arild Angelsen, Erlend AT Hermansen, Raoni Rajão and Richard van der Hoff

Key messages

- Results-based payment (RBP), the main innovation brought by REDD+, has also been the most challenging to implement. Three key challenges for RBP are: what to pay for, how to set reference levels, and whom to pay; these challenges are at risk of biases, including a 'cherry picking' of numbers.
- Current and emerging RBP initiatives are hybrid approaches. As such, they make compromises on key RBP principles, such as payment based solely on results, recipient discretion (on how to achieve results) and independent verification of results.
- Minimising these risks requires learning from previous experiences to develop a clear rule book for the Paris Agreement, as well as institutional checks and balances. Managing these risks would help preserve the effectiveness (environmental integrity) and efficiency of RBP in REDD+, and thus its long-term political credibility and financing.

Results-based payment in a nutshell

CHALLENGES	KEY ISSUES	WAYS FORWARD
What to pay for?	- What in the impact chain should be paid for? - Which goals should be incentivised?	- Focus on carbon, with safeguards and other non-carbon benefits as constraints - Incentives during all three REDD+ phases
Reference levels	- Poor or missing data - No consensus on methods - Forecasting uncertainty	- Develop a clear Paris Agreement rule book - Independent, third party review of FRELs/FRLs is needed
Who should be paid?	Many stakeholders deserve payment: forest owners, forest stewards and forest users; project proponents and governments agencies	- As a rule, pay those who incur the costs of reducing emissions - Manage fragmented finance through national REDD+ coordination offices
Biases (Cherry picking)	- Strong monetary and political interests in results - Self-serving biases in data selection and analysis	- Establish a clear rule book in the Paris Agreement - Ensure third-party assessment of results - Promote transparency and public debate



4.1 Introduction

Results-based payment (RBP) distinguishes REDD+ from previous large-scale forest conservation initiatives, and is a dominant theory of change in the REDD+ discourse (Chapter 2). Payment is contingent on results, which are normally operationalised as reduced emissions. Yet what is simple in theory is also the most challenging to implement. This chapter reviews three key challenges: what to pay for, what is the reference level, and whom to pay?

The notion of positive incentives was part of the initial definition of REDD in the Bali Action Plan (UNFCCC 2007); an explicit link to RBP was then established by the Warsaw Framework for REDD+ in 2013 (Voigt and Ferreira 2015), and later solidified in the Paris Agreement (UNFCCC 2015, Art. 5.2). To enable results-based payment distribution across eligible countries, the Green Climate Fund (GCF) – the funding arm of UNFCCC – in 2017 made USD 500 million available (Box 4.1). Another multilateral mechanism is the Carbon Fund under the World Bank's Forest Carbon Partnership Facility (FCPF) (Box 4.2). Notable bilateral initiatives are Norway's International Climate and Forest Initiative (NICFI), established in 2008, and Germany's REDD Early Movers programme (2011). The Brazilian Amazon Fund (2008) is by far the largest recipient of this finance (Box 4.3).

Box 4.1 The Green Climate Fund: USD 500 million for REDD+

Simone C Bauch

The Green Climate Fund (GCF), an operating entity of the UNFCCC's Financial Mechanism, was established at COP16 (2010) in Cancún. At its 18th board meeting, in September 2017, it published its first request for proposals for REDD+ results-based payment. This request for proposals focuses on the third phase of REDD+ and indicates a flexible funding envelope of USD 500 million. Countries compliant with UNFCCC requirements are eligible to request payment for results (reduced emissions from land use and land use change) accrued between 2014 and 2018; they have until 2022, or until funds are spent, to make the request. In line with existing bilateral and multilateral REDD+ processes, the GCF pre-set a price of USD 5 per tCO_2e. No single country can request more than USD 150 million, and at least three concept notes must be submitted to the GCF Secretariat to start the request for proposals evaluation process. Countries retain ownership of emission reductions paid for by the GCF and thus can count them towards achieving their Nationally Determined Contributions. Proceeds must go to REDD+ activities, and both the generation of the REDD+ emission reductions and the use of funds must follow Cancún and GCF safeguards processes.

Currently only three countries are eligible for the request for proposals: Brazil, Colombia and Ecuador. Brazil is the only one that could easily exceed the 150 million threshold for its historically reduced emissions, while the others could request smaller amounts. It remains to be seen if these countries can have their REDD+ results-based payment proposals approved within the current GCF funding allowance or whether they would have to wait for the GCF replenishment process.

Box 4.2 The Emission Reduction Program Buffer: Supporting both mitigation and non-carbon benefits

The Carbon Fund is part of the Forest Carbon Partnership Facility (FCPF), a global partnership of governments, businesses, civil society and indigenous peoples, led by the World Bank. The Fund's Methodological Framework, which is supported by main donors, has introduced a yet untested innovation in the form of the Emission Reduction Program Buffer. It aims to bridge: (i) payment for achieved forest mitigation (as measured in tCO_2e per year), and (ii) payment for achievement and demonstration of "those non-carbon benefits that contribute to the long-term sustainability of REDD+ implementation" (FCPF 2015).

Between 10% and 55% of the RBP could be withheld (or 'buffered') as a carbon insurance for subsequent accounting periods. The amount depends on how five broad categories of risks have been addressed and documented: (i) statistical uncertainty on MRV data; (ii) lack of broad and sustained stakeholder support; (iii) lack of institutional capacities/coordination; (iv) lack of long-term effectiveness in addressing underlying drivers; and (v) exposure and vulnerability to natural disturbances.

Source: FCPF (2015)

RBP funding can come from compliance carbon markets (offsets), from voluntary carbon markets, or from public sources. Before COP15 in Copenhagen (2009), many thought REDD+ would become part of a global carbon market, with REDD+ credits representing a form of results-based payment (Angelsen 2008). The failure to establish a broader cap-and-trade system explains why, to date, funding has come from public sources rather than carbon markets (Chapter 3). International REDD+ funding can thus be seen as a "light form of result-based aid" (Angelsen *et al.* 2017, 719).

The attractiveness of paying only for demonstrated and verified results has remained strong. In Norway, the clear incentives and perceived low-risk (for donors) of RBP was a key factor in the successful establishment of NICFI. In contrast to other forms of aid – the results of which may never materialise due to, for instance, corruption or inefficacies – RBP was seen as a safe bet as it only pays for results achieved (Hermansen and Kasa 2014). Yet challenges abound.

4.2 Challenges facing RBP

We define RBP as 'a transfer of money conditional upon achieving a predetermined performance target' (for related definitions, see Eichler 2006, 5; Klingebiel and Janus 2014; Angelsen 2017; van der Hoff *et al.* 2018). RBP can refer to an international agreement, such as between a donor country or multilateral organisation and a recipient country, or a domestic arrangement, such as a government-sponsored payment for environmental services (PES) system.

Box 4.3 The Amazon Fund: To reward past or future results?

The formal methodology for RBP to the Amazon Fund, developed by Brazil and agreed upon by donor countries, veils clashing interpretations on what constitutes 'results' (van der Hoff *et al.* 2018). Brazil views RBP as a reward for past achievements and as financial support for the implementation of national forest policies, and this is reflected in the calculation of the limit up to which it can receive result-based funds. This reward is also understood to accumulate over time, leading national policy-makers to believe that the reduction of deforestation rates between 2006 and 2016 merits an international financial compensation of USD 21.5 billion (Box 4.4). Following this line of reasoning, Brazil has received less than 6% of its total reward, even though donations have increased since 2013. In contrast, donor countries view RBP as a financial incentive for contributions to *future* climate change mitigation. This is reflected both as a condition of the contractual agreement and in donor behaviour (Figure 4.1).

Since 2013, Norway and, to some extent, Germany have enacted their policies to make donations in any given year for results obtained in the preceding year. Representatives of donor countries have argued that making payment for results obtained too far in the past would not align with the aim of stimulating new results. On this note, in 2016 Norway sent a warning to Brazil that donations may dry up if deforestation rates continue to rise, especially since the calculation of a new RL in the same year had drastically reduced the Amazon Fund's upper limit for raising funds (Box 4.4). This approach contrasts with the donation behaviour of Petrobras (Brazil's largest oil company), which has consistently paid for results achieved in 2006, the year with the largest 'stock' of results.

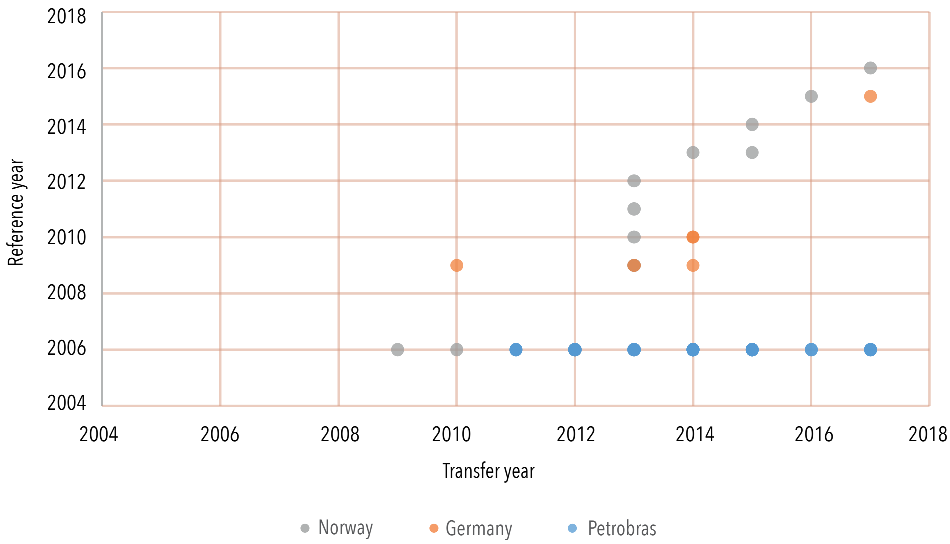


Figure 4.1 Relation between payment years (horizontal) and reference years (vertical)

Note: Bubbles correspond to one payment, independent of the amount paid.

Source: Amazon Fund. www.fundoamazonia.gov.br/en/home; see also BNDES (2018)

Box 4.4 A calculated approach to calculating reference levels

An illustrative example on the impact of reference levels (RL) is seen by comparing the RL used by the Amazon Fund and the forest reference emission level (FREL) submitted to UNFCCC by Brazil. The starting year of the RL of the Amazon Fund is flexible: the RL is the average of the past 10 years, and updated every 5 years. For example, deforestation rates between 2006 and 2010 were compared with an RL equal to the average deforestation during the 1996–2005 period. According to this logic, the Amazon Fund has reported to have a cumulative 'earned' payment (or fundraising limit) of USD 21.5 billion, based on results obtained between 2006 and 2016 (BNDES 2018). By contrast, Brazil's FREL to the UNFCCC has fixed the starting year at 1996, which implies that the period for calculating average deforestation rates increases by 5 years every 5 years. The high deforestation years (until the mid-2000s) are therefore kept in the formula. Brazil's FREL would yield a cumulative payment level of USD 36.4 billion by 2016. Compared with the Amazon Fund's calculation of USD 21.5 billion (Box 4.3), the difference is nearly USD 15 billion – more than the total international REDD+ funding accumulated worldwide.

In contrast to Brazil, Peru has witnessed increasing deforestation rates since the early 2000s. In its submission, the FREL is estimated by extrapolating this trend, resulting in an estimated FREL in 2020 which is 20% above the 2015 level. In other words, the country may obtain an emission reduction even with an increase in deforestation. A realistic business-as-usual scenario might well imply increasing rates of deforestation, and can thus be defended. An asymmetry arises, however, when countries with increasing rates of deforestation adjust their FRELs upward (compared with the historical average), while those with downward trends do not.

Judging the 'veracity' and technical rigour of an RL is a difficult task, since it involves affirming that a given future is more or less likely to take place. Although the FRELs of Brazil and Peru have been approved by the UNFCCC, these two examples illustrate critiques by, for example, Hargita *et al.* (2015, 346) who note that methodological choices for FREL risk a cherry-picking search "for the most profitable approach" by recipient countries. In particular, while Brazil has the right to present different FRELs for both a national fund and to the UNFCCC, the presence of two FRELs imply that the country has different expectations of future deforestation and notions of what counts as 'reductions', depending on the audience. Likewise, it is difficult to explain to the taxpayers of donor countries why a given country has two FRELs, or why they should provide RBP 'reduced emissions' even with deforestation on the rise, as has been debated in the cases of Guyana and Peru.

Perrin (2013) proposes three defining elements of an RBP: (i) payment based on predefined results; (ii) recipient discretion to decide how to achieve results; and (iii) independent verification of results. Currently, most international REDD+ funding for RBP fails to fully meet this definition. First, payment is not necessarily based on predefined results but on historical ones, and it includes multiple objectives and constraints, like safeguards. Second, recipient discretion is not fully applied. Third, independent (third-party) verification may or may not be used. Ultimately, the actual payment often becomes a matter of negotiation between the two parties.

The existence of hybrid arrangements can, in part, be understood in terms of a long list of challenges in RBP design and implementation. These include: what

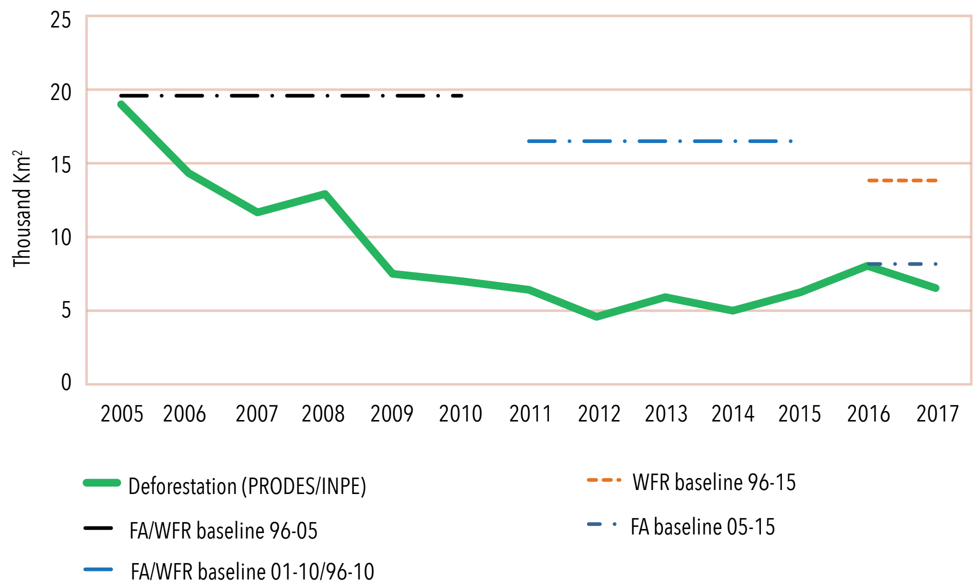


Figure 4.2 Deforestation and different reference levels (baselines) for the Brazilian Amazon

Note: FA = Amazon Fund; WFR = Warsaw Framework for REDD+ (UNFCCC submission); numbers refer to historical year for calculating reference level.

to pay for; how to measure and verify results; whom to pay; how much to pay; how to set reference levels (RLs); the spending pressures of donors; risk sharing; mobilising sufficient funding, including up-front funding; avoiding adverse distributional impacts; preconditions beyond the stated results; cherry picking among uncertain figures for self-benefit; and aligning policies to REDD+ and RBP (Müller *et al.* 2013a; Angelsen 2017; van der Hoff *et al.* 2018). We have selected three of these challenges to discuss here – what to pay for, how to set RL, and whom to pay – and offer suggestions on how to deal with them.

4.2.1 What to pay for?

The phased approach of REDD+ indicates that the focus of international financial support should evolve along the impact chain: from capacity building (inputs and activities) in Phase 1, to policy reforms (outputs) successfully implemented (outcomes) in Phase 2, to actual emission reductions (impacts) in Phase 3 (Angelsen 2017). Since reducing emissions is the ultimate aim of REDD+, there are strong reasons to link payments to actual outcomes and impacts, rather than to inputs and activities. For example, an improved monitoring system does not guarantee reduced deforestation, nor does a seemingly good policy that is not implemented effectively. However, this focus on actual emissions reduction places high demands on recipients to invest in the setting of RLs, in data collection and in monitoring

(Skutsch *et al.* 2014). In contrast to traditional forms of aid, RBP also puts a higher share of the risk on the recipients, as the ultimate impact depends on factors outside their control (Mumssen *et al.* 2010). For these and other reasons, "there is an increasing inclination to also count incentives for the provision of inputs … as results" (Helland and Mæstad 2015, 4).

Another line of discussion asks which other goals (outcomes or impacts) to incentivise, beyond carbon (Box 4.2). REDD+ is about reducing emissions and increasing removals ('enhancement of forest carbon stocks'); however, non-carbon benefits (NCBs) have become more prominent over time. Some fear the "carbonization of forest governance" (Gupta *et al.* 2012, 727), leading to other forest values and policy objectives being ignored. Meanwhile, others stress that since climate change is such a formidable challenge, it should remain the focus of REDD+, and suggest that other instruments are better suited to tackle other objectives, such as poverty reduction. It is also worth noting that the UNFCCC mandate concerns only climate, i.e., "stabilization of greenhouse gas concentrations in the atmosphere" (UNFCCC 1992, Art. 2).

In practice, however, other objectives are important for donors, REDD+ governments and project proponents. The Carbon Fund (FCPF) has proposed a buffer programme that addresses both permanence and NCBs (Box 4.2). Likewise, a functioning safeguard information system is one of the four prerequisites for RBP according to the Warsaw Framework for REDD+.[1] As such, payment is to be made for emissions reduction, within a set of constraints to ensure that safeguards and other NCBs are not jeopardised.

An alternative is to award NCBs directly by paying for the achievement of non-carbon goals, as happens in the voluntary carbon market. For example, mitigation projects with Verified Carbon Standard (VCS) certification achieved an average price of USD 2.3 per tCO_2e in 2016, while those that also complied with Climate, Community & Biodiversity (CCB) Standards received USD 3.9 per tCO_2e – a premium of 70% (Hamrick and Gallant 2017).

As for the results themselves, they must be defined, measured, reported and verified. There is no objectively correct methodology to estimate what results might be. This ambiguity allows direct monetary and political interests – combined with the uncertainty of numbers and the flexibility of the guidelines – to create a fertile ground for 'gaming', i.e., selection and use of data for own benefits. Gaming does not imply fabricating data (although that might happen), rather it points to processes where the unavoidable choices in data generation and use are influenced by self-interest. Different stakeholders have different interests in what

1 The three other prerequisites are: a national REDD+ strategy, a national forest reference emission level (FREL) and/or forest reference level (FRL), and a national forest monitoring system (UNFCCC 2011, Decision 1, Art. 71). See also Chapter 2.

should be measured (or not), the *magnitude* of the selected variables, and *how* such variables should be measured, aggregated and verified.

Political factors may complicate an accurate functioning of RBP; for example, the differing interpretations of what constitutes 'results' (van der Hoff *et al*. 2018). On the one hand, payments are based on demonstrated emissions reductions achieved in the past, and recipient countries may view them as a reward for their efforts. On the other hand, donors expect these financial resources to be reinvested in policies and strategies for future emissions reductions. From a recipient perspective, RBP may in practice become the worst of two worlds: limited or no upfront finance (as in a pure RBP system), with high expectations and control over how these funds are used (as in traditional development aid).

Among donors, cherry-picking of favourable numbers may play an important role in legitimising REDD+ initiatives. For example, after 10 years of NICFI funding, a causal link to decreasing Brazilian deforestation rates is yet to be proven with analytical rigour. Yet Norwegian politicians repeatedly point to the success of the initiative; for example, how many years of annual Norwegian emissions the reduced deforestation in Brazil equates to (70 years; Riksrevisjonen 2018). This is not to deny that Norwegian funding and the Amazon Fund have played a positive role in Brazil's efforts to set targets for reductions in deforestation and to keep forests on the agenda in spite of domestic political, economic and social turmoil. But it does illustrate that reference levels also play a political role in donor countries, and this should be acknowledged in the context of REDD+.

4.2.2 How to set reference levels?

Reference levels are ultimately linked to the question of what to pay for. A result in the form of an emission reduction (ER) is defined simply as the actual emission (AE) over a given time period, relative to the counterfactual or RL ($ER = AE - RL$). The RL is therefore key, not only for the level of payment, but also as a benchmark from which to evaluate policy/project effectiveness and success.

The exercise of setting an RL is by nature a hypothetical one: what would the state of deforestation and forest degradation – and resulting emissions – be in the absence of REDD+? Deforestation rates typically vary from year to year, adding noise to the data. At low rates, deforestation forest degradation and forest regrowth can be hard to detect and monitor. Equally, there is no scientific consensus on the most appropriate methodology, on which factors to include in the estimation of RLs, or on the time period for which to calculate historical deforestation (or emissions).

The UNFCCC has provided some guidance. COP15 (2009) encouraged developing countries to establish forest reference emission levels (FRELs) or forest reference levels (FRLs), noting that they "should do so transparently taking into account historical data, and adjust for national circumstances" (UNFCCC 2009, Decision 4, Art. 7). The Warsaw Framework for REDD+ extended these guidelines, also encouraging countries to submit FRELs/FRLs. As of mid-2018, 34 countries have submitted their RLs (UNFCCC 2018). All use historical averages, but many also adjust for national circumstances, e.g., deforestation trends.

At the project level, the VCS has various methods for setting REDD+ baselines.[2] The approach for 'unplanned deforestation' uses historical deforestation as the point of departure, but may also include drivers (population growth, in particular).

RLs may also be candidates for gaming, as defined above. The time period, definitions and statistical approaches for estimating historical emissions vary in the UNFCCC submissions, and this may greatly affect the actual RL – and hence the estimated emissions reduction. Box 4.4 illustrates this in the case of Brazil. There are few formal checks and balances in place to avoid inflated RLs. Country submissions are subject to a technical assessment by UNFCCC "to offer a facilitative, non-intrusive, technical exchange of information …" (UNFCCC 2013, Decision 13, Annex). While there may be good reasons for this consensus approach, it also limits the scope for critical assessment to detect systematic biases across submissions.

4.2.3 Whom to pay?

The next question is which entity should receive the payment. Who 'owns' the emissions reduction? At the international level, the main rule is payment between (groups of) countries, with the recipient country often establishing a special body for this purpose, e.g., Brazil's Amazon Fund and Guyana's REDD+ Investment Fund. There are also examples of RBP flowing directly to subnational or even local recipients, but these often involve different finance modalities (e.g., carbon trading) that have developed in parallel to mainstream RBP for REDD+ (van der Hoff *et al.* 2015). Prominent examples of this are seen in the jurisdictional approach (Chapter 12).

Trickier yet is the domestic distribution of international or national REDD+ finance, often referred to as the benefit-sharing mechanism/system. REDD+ implementation involves a broad network of different stakeholders at different levels of forest governance (Gebara *et al.* 2014; May *et al.* 2016). Luttrell *et al.* (2013) distinguish between six potential recipients of REDD+ finance: (i) actors with legal land rights (typically the state or large-scale private land owners); (ii) actors achieving emissions reduction (typically companies, or forest and farming communities); (iii) low-emitting forest stewards (typically conservation areas and indigenous peoples); (iv) actors incurring the costs of REDD+ implementation (project proponents and local/national authorities); (v) effective facilitators of REDD+ implementation (NGOs, government); and (vi) the poorest groups in the region (as a way to achieve other objectives and boost public acceptance). This leads to the question, should governments incentivise and compensate the actors that contribute to direct drivers

2 https://verra.org/methodologies/

of deforestation and forest degradation (e.g., cropland and pasture expansion, forest fires and logging) or those who address the underlying drivers (e.g., land tenure, road construction, corruption) (Weatherley-Singh and Gupta 2015)? We propose some guiding principles in the next section.

Brazil offers an example of how these questions could be dealt with practically. To comply with the Warsaw Framework for REDD+, in 2016 the country created the National REDD+ Committee (CONAREDD+), with representatives from federal, state and municipal-level government, and civil society. CONAREDD+ agreed that the federal government has the right to receive RBP of up to 40% of the country's fundraising limit as set by UNFCCC, with the remaining 60% to be distributed to states of the Legal Amazon, based on deforestation reduction (carbon flow) and forest cover (carbon stock).[3] The governments of these states are likely to adopt a passive model, inspired by the Amazon Fund, which evaluates projects put forward by NGOs and public agencies, rather than actively and strategically distributing funds to stakeholders and regions with high risk of deforestation.

India, by contrast, provides an example of strategic distribution of funds to regions, although this is not part of any REDD+ scheme as such. Forest-enhancing fiscal incentives have, since 2014, been part of the central government's allocation of tax revenue to its 29 states. Between 2015 and 2019, an estimated USD 6.9–12 billion per year will be distributed based on the states' forest cover in 2013; equivalent to USD 174–303 per ha and year (Busch and Mukherjee 2018). This represents the first large-scale ecological fiscal transfers for forest cover, and could serve as a model for other countries.

4.3 Ways forward

What are possible ways to handle these challenges? Quick fixes rarely exist, and we face various dilemmas. The Paris Agreement's rule book (i.e., the decisions made to operationalise the agreement) should, on the one hand, be stringent enough to function in governance regimes across the globe by providing effective and efficient standards and limiting the scope for gaming; on the other, it should be flexible enough to account for different capacities and contexts across countries. The rule book must also include mechanisms for high-forest/low-deforestation countries and regions, which struggle to maintain low rates of deforestation but cannot use historical deforestation rates as RLs to claim emissions reductions.

4.3.1 What should be paid for?

RBPs should provide incentives during all three REDD+ phases. The phased approach to REDD+ aims to accommodate the fact that countries were – and still are – at very different stages in terms of monitoring and implementation capacities.

3 http://redd.mma.gov.br/images/central-de-midia/pdf/Documentos/conaredd-resolucao-no6-20170621-final.pdf

We suggest that donors consider opening up RBP for results achieved in the two first phases of REDD+, such as completion of a national REDD+ strategy, MRV systems and verified pilots. That said, not all types of support lend themselves to RBP, and 'pure' readiness funding is still needed (Chapter 3). Otherwise, donors risk encouraging some forest-rich countries to game results to become eligible for RBP, when in reality they need funds to build capacity.

Focus on carbon, with safeguards and other non-carbon benefits as constraints or additional incentives. We only partially share concern over the potential carbonisation of forest governance to the detriment of other forest benefits. Conserving standing forests is largely compatible with other objectives, including biodiversity conservation (Strassburg *et al*. 2010). As much as a fifth of the household income in forest communities is derived from natural forests (Angelsen *et al*. 2014), and local REDD+ initiatives have generally had a positive, albeit minor, impact on local livelihoods (Chapter 11). Hence, the key challenge is not that the focus of REDD+ may become too narrow, but that funds need to be mobilised to create some modestly sized and effective RBP systems.

4.3.2 How should reference levels be set?

The Paris Agreement rule book should clarify key aspects of RBPs. These include: defining deforestation and forest degradation; standardising the period for calculating historical emissions; specifying the eligible national conditions for payment; and outlining a small set of estimation methods. Flexibility in RL-setting was perhaps the price paid to ensure widespread buy-in, and there is a real risk of overcomplicating the rules, causing high transaction costs and administrative burdens on REDD+ countries, as well as excluding countries with low monitoring capacities (Bucki *et al*. 2012). But the system will eventually need to converge on universal rules for the sake of fairness, effectiveness (environmental integrity) and efficiency.

Independent, third party review is needed. A third-party mechanism (independent from UNFCCC and GCF) should be established to critically review the proposed FRELs/FRLs. Given the critical role of RLs in determining payments and measuring effectiveness and success of projects and policies, the current UNFCCC practice of countries suggesting their own RLs – both for REDD+ and LULUCF (land use, land use change and forestry) – raises pertinent questions. Independent evaluations could be commissioned to get critical reviews and stimulate debate.

4.3.3 Who should be paid?

Allocation of REDD+ funds must be based on incurred costs and attribution of results. The original idea of REDD+ as PES was to pay local forest owners/users the opportunity costs of forest conservation; that is, the foregone agricultural rent from not converting forest land to crops or pasture, or the reduced harvesting of forest products. Governments would also be compensated for tax revenue losses related to REDD+, and other stakeholders who shoulder transaction costs to generate the results were to be rewarded. The question of fairness and benefit sharing still remains complex; for example, how much deforestation and forest degradation can be deemed fair and legal, or whether rights have been granted through questionable political processes. Benefit sharing is ultimately linked to the allocation of rights to land and carbon (Chapter 8). There is also substantial uncertainty around whether all (or most) of the results achieved will be rewarded by donor countries (Box 4.3).

National REDD+ coordination offices will be key to managing fragmented REDD+ finance. REDD+ finance is likely to become more fragmented, as there are multiple openings for it in the Paris Agreement, for instance in terms of carbon trading (UNFCCC 2015, Decision 1, Art. 6) and adaptation (UNFCCC 2015, Decision 1, Art. 9). More fragmented financing increases the need for national coordination, and this should be supported and strengthened.

4.4 Only by recognising the pitfalls can we avoid them

Results-based payment has attractive features, and has been an important part of the theory of change behind REDD+ (Chapter 2). The ultimate question is whether RBP is more effective than non-conditional support in delivering reduced emissions from deforestation and forest degradation, and in enhancing forest carbon stocks. Chapters 9 and 10 address the extent to which RBP-based policies and projects have delivered more results than non-conditional ones. But, in general the empirical evidence is weak: RBP has not been tested at scale, real-life interventions use hybrid approaches, and data and methodological challenges abound (Chapter 10). Yet RBP remains dominant in the global REDD+ rhetoric, by both proponents and critics of REDD+, and a more nuanced discussion could help move the discussion – and action – to take the necessary steps ahead.

The political dimension of RBP needs to be recognised (Myers *et al.* 2018) and openly discussed. We have proposed several steps to limit the scope for gaming, including a clear rule book and third-party verification. We also need transparency of information to facilitate open, public debates among stakeholders, including researchers. Over time, REDD+ countries also need to align future RLs with their long-term development strategies, making sure they are consistent with their Nationally Determined Contributions and other international commitments. Donor countries, on the other hand, should provide a long-term and predictable system for results-based funding, to reduce uncertainty among REDD+ countries about whether they will be rewarded for effective and costly actions.

Chapter 5

Information and policy change

Data on drivers can drive change – if used wisely

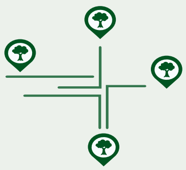
Veronique De Sy, Martin Herold, Maria Brockhaus, Monica Di Gregorio and Robert M Ochieng

Key messages

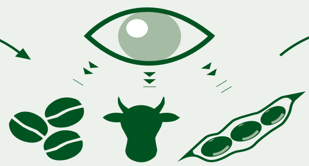
- Information use throughout the REDD+ policy process is influenced by interests of powerful agents of deforestation and forest degradation. Actors have different capacities and resources to access, process and provide information, as well as to contribute to policy decisions about REDD+.
- Information on direct drivers and underlying causes of tropical forest change is improving with new technologies and data sources. However, guidance and (financial) support are needed to move from technical data to actionable information, and ultimately effective REDD+ interventions.
- New information technologies offer new opportunities, but also come with diverse implications and new risks. National forest monitoring systems will need to address participation, transparency, accountability and coordination to counteract the differences in the capacities, resources and powers (decision-making or political) of various stakeholders.

Information-driven REDD+ in a nutshell

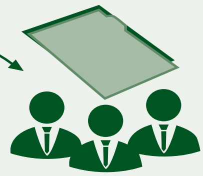
Collecting, analysing and sharing information on forest and land use changes, consequences and causes of forest change can support the REDD+ policy process.



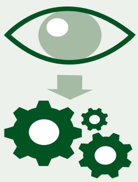
Deriving information on drivers of tropical forest loss is complex but essential. Information is improving with new technologies and data sources.



National monitoring and international tracking of drivers are limited by a persistent lack of data on how various drivers of land-use change affect forest emissions.



Powerful deforestation agents heavily influence information on drivers, including how this information is generated and how visible it is.



Monitoring systems should include mechanisms for participation, transparency and accountability to counteract the differences in capacities, resources and power of stakeholders.

Recent developments in machine learning algorithms, processing capabilities and cloud-based services (FAO SEPAL, Google Earth Engine) enable more efficient mapping of forest and land use change.

Advances in mobile technology, and interactive monitoring solutions are also promising for monitoring drivers of forest change.

5.1 Introduction

Collection, analysis and sharing of information on forest cover and carbon stocks is a core component of REDD+. Robust and transparent national forest monitoring systems for measurement, reporting and verification (MRV) activities (UNFCCC 2009, Decision 4; UNFCCC 2011, Decision 1) allow countries to track their progress in reducing emissions from deforestation and forest degradation and enhancement of carbon stocks. In addition, information about the extent and state of forests, consequences of forest loss, causes of deforestation and forest degradation, policy options and their impact, can assist in the design, implementation and evaluation of dedicated mitigation actions to tackle these activities (Chapter 6). As such, information is an important element for effective policy change away from business-as-usual practices that directly or indirectly support deforestation and forest degradation (Brockhaus and Angelsen 2012).

The reality on the ground shows a lack of information-driven REDD+ policy change. While forest conversion to commodity-driven agriculture is an important cause of forest emissions, REDD+ strategies are often focused on approaches such as fuelwood efficiency, alternative livelihood programmes, and other interventions targeting smallholders (Kissinger *et al.* 2012; Salvini *et al.* 2014). The creation, selection and interpretation of information to support REDD+ policy change is not a neutral technical endeavour; it has a strong political dimension in that actors tend to select and use information in ways that reflect their interests (Brockhaus and Angelsen 2012). In addition, actors have different capacities and levels of financial resources to access, process and provide information, as well as to contribute to platforms where policy decisions about REDD+ are made (Brockhaus and Angelsen 2012; Gallemore *et al.* 2015).

Our objective is to explore opportunities and obstacles for information-driven policy change throughout the REDD+ policy process. We focus on information about the drivers of deforestation and forest degradation to illustrate that, while information itself can be a tool for transformational change, its generation, presentation and use are part of a political process – and often a power game. We first identify ways to assess drivers of deforestation and forest degradation; then we discuss the role of information gained through this assessment, as well as the main obstacles to the effective use of information at various stages of policy processes, and the political dimensions of how information is used (or not).

5.2 Assessing drivers of deforestation and forest degradation

The term ‘driver’ is used in multiple ways, and different conceptual frameworks exist (Angelsen and Kaimowitz 1999; Geist and Lambin 2002). When assessing and monitoring drivers to support the design and implementation of REDD+, it is important to make a distinction – within the common use of the term – between direct (proximate) drivers, underlying causes, and agents of deforestation and forest degradation. *Direct drivers* are human activities or immediate actions that directly impact forest cover and result in a loss of carbon (e.g., agriculture expansion, infrastructure extension and wood extraction). *Underlying causes* are complex interactions of social, economic, political, cultural and technological processes that are often distant from their area of impact (e.g., rising global market prices, national policies that provide incentives for agricultural expansion, and public resettlement schemes) (Geist and Lambin 2002; Rudel *et al.* 2009a; Boucher *et al.* 2011). *Agents* of deforestation and forest degradation are individuals, households or companies linked to both the direct drivers and the underlying causes (e.g., farmers, mining companies, governments and consumers).

Improved spatial assessments using remote sensing and ground data (e.g., national forest inventories) have proven useful for assessing direct drivers by linking forest-cover change and related emissions to specific land-use activities. These assessments can provide information on region-specific direct drivers (Figure 5.1) and on their spatial and temporal dynamics (De Sy *et al.* 2015; Graesser *et al.* 2015; Curtis *et al.* 2018; Stickler *et al.* 2018). Remote sensing can provide information on the intensity, shape and pattern of land-use and forest-cover change, and can be enriched with data obtained through local and community-based monitoring (Torres and Skutsch 2015). Recent developments in machine learning algorithms, processing capabilities and cloud-based services (e.g., FAO's System for Earth Observation Data Access, Processing and Analysis for Land Monitoring [SEPAL], Google Earth Engine) enable more efficient mapping of forest and land-use change (e.g., detection of direct drivers) (Bey *et al.* 2016; Petersen *et al.* 2018). Interactive monitoring solutions and advances in mobile technology (Pratihast *et al.* 2016) are also promising for on-the-spot monitoring of direct drivers of deforestation and forest degradation. These can be integrated into online portals and databases (e.g., Global Forest Watch, CIFOR's Atlas of Deforestation and Industrial Plantations in Borneo), making them increasingly accessible to a wider, non-expert audience (Petersen *et al.* 2018).

Underlying causes of forest change across multiple scales, and their relative contribution and interaction, are often analysed with: statistical studies (e.g., spatially-explicit econometrics); place-based empirical studies; value chain analysis; and economic simulation models using political, economic and social indicators (Kissinger *et al.* 2012; Meyfroidt *et al.* 2013; Goetz *et al.* 2015). A persistent methodological challenge is finding causal attribution and quantifying the impact of various underlying causes and agents on land use (change) and forest emissions, especially since local land use is increasingly influenced by global socioeconomic and political processes (Meyfroidt *et al.* 2013; Efroymson *et al.* 2016).

Integrating assessments of direct drivers and underlying causes into ongoing national forest/land-use monitoring systems will make them more relevant for policy development and assessment. While a number of studies have assessed

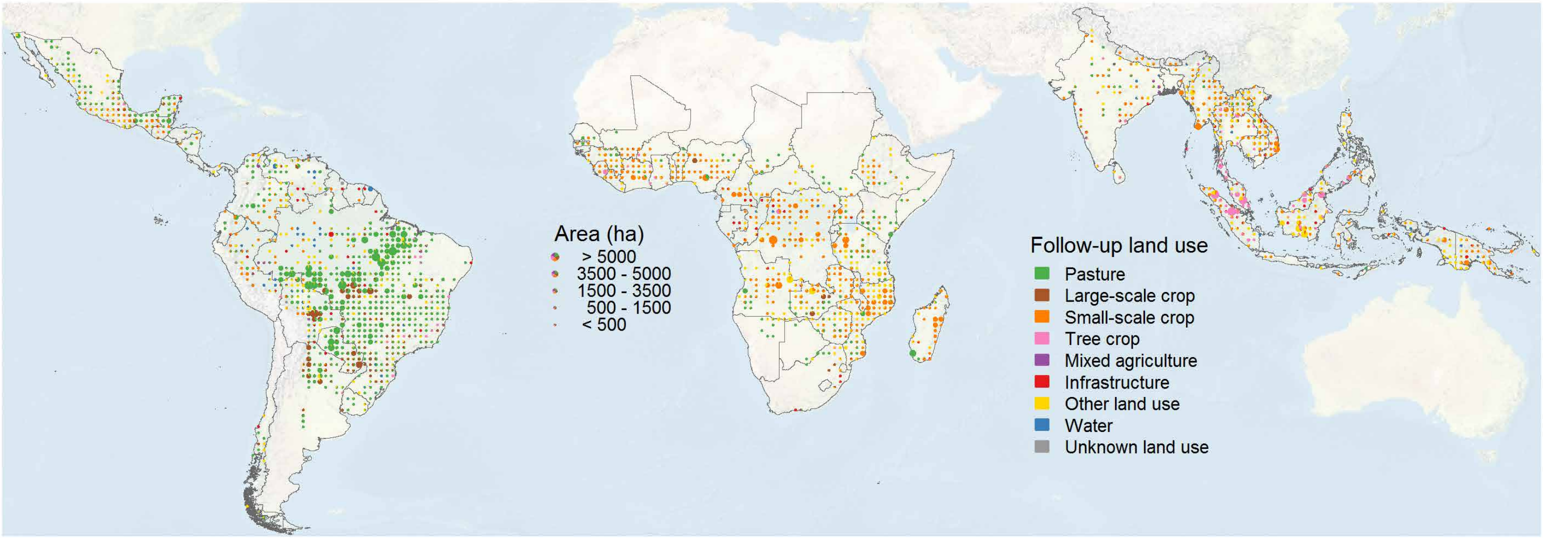


Figure 5.1 Direct drivers of deforestation in the tropics (1990–2005): Forest area (in ha) lost to different subsequent land uses

Source: De Sy *et al.* (2015) for South America; similar method was used to extend analysis to Central America, Africa and Asia direct drivers and underlying causes in an integrated and systematic manner (Müller *et al.* 2013b; Khuc *et al.* 2018), appropriate methods for national-scale monitoring of drivers and causes are still limited (De Sy *et al.* 2012). Incorporating the assessment of these drivers and causes into national forest/land-use monitoring systems will likely add complexity and increase monitoring costs. As such, financial support and guidance on how REDD+ countries can develop cost-effective and policy-relevant operational monitoring of different types of drivers is essential.

The increasing interconnectedness of underlying causes of forest change (e.g., globalisation of trade, and international political forces) can result in the displacement of land use – i.e., a migration of land-use activities from one country to another (Meyfroidt *et al.* 2013). This shows that global monitoring and tracking of direct drivers and underlying causes are also needed. Periodic comparative global assessments of direct drivers (De Sy *et al.* 2015; Curtis *et al.* 2018) provide a way to assess the effectiveness of efforts to curb national and global forest change emissions. Additionally, information on how forest change is linked to international trade and investment patterns and related commodity supply chains is essential (Zaks *et al.* 2009; Karstensen *et al.* 2013) because it enables civil society actors to call for action on tackling these drivers (agenda setting) and to assess the sustainability efforts of those who have committed to specific targets (implementation and evaluation of policies). Box 5.1 provides an example of tracing soy supply chains in Brazil with an open-access supply chain transparency platform.

5.3 Information on drivers of deforestation and forest degradation in the REDD+ policy process

All stages of the REDD+ policy process – from agenda setting to policy design to implementation to formal and informal policy evaluation – require reliable information on drivers of deforestation and forest degradation in order to effect changes in existing policies. The REDD+ policy arena is characterised by a multitude of international, national and local actors who operate within existing institutions and who may have different interests and ideas about how to manage forests. Information is an inherent part of these institutions, interests and ideas (i.e., the 4Is political economy framework, Brockhaus and Angelsen 2012). Information is used selectively, it can be biased and it might be ignored; in itself, information is a fundamental power resource that actors use to advance their own interests in the policy process.

REDD+ monitoring systems are generally seen as being mostly technical and thus impartial, outside the domain of politics (Gupta *et al.* 2012). However, many researchers question this framing, arguing that what should be measured, reported and verified, how and by whom, are fundamentally political questions (Gupta *et al.* 2014). Ochieng *et al.* (2016) argue that national monitoring systems

Box 5.1 Tracing soy supply chains in Brazil with Trase

Toby Gardner

Agricultural expansion to produce commodities such as soy, palm oil, timber and beef is driving two thirds of tropical deforestation worldwide. Yet the complexity and opacity of supply chains are major barriers to improving the sustainability of production and trade in these commodities. It is very hard to take action if trading companies and consumer markets don't know where their supply chains start or end, who is involved in them, or whether they are exposed to risks as a result.

Trase is an open-access supply chain transparency platform (www.trase.earth) designed to address this problem, using publicly available data to map the links between consumer countries, via trading companies, to the places of production, in unprecedented detail. Trase combines detailed per-shipment customs data with other supply chain information to show how commodity exports are linked to agricultural conditions – including specific environmental and social risks – in the regions where they are produced, and identifies the exporting and importing companies along the way.

Of all the forest-risk commodities, the most traded in international markets is soy – including soybeans, oil and cake. In 2016, three South American countries – Brazil, Argentina and Paraguay – together produced almost 50% of the world's soy, with Brazil poised to overtake the United States as the world's largest producer of soy. Soy production is linked to substantial direct and indirect deforestation and habitat conversion of some of South America's most iconic biomes, particularly the Brazilian Cerrado and the Gran Chaco in Argentina, Paraguay and Bolivia. The majority of Brazilian soy is produced for export, with expansion driven by demand from overseas consumers, particularly in Europe and China.

Trase data show that around 60% of Brazilian soy exports in 2016 went to China, and that these exports were associated with approximately half of the total deforestation risk associated with exported soy. While many European countries imported much smaller amounts of soy than China, Trase's high-resolution supply chain maps show that these imports were often associated with a higher deforestation risk per tonne.

The blanket transparency of subnational commodity supply chains provided by Trase is also key to being able to assess and monitor the effectiveness of zero-deforestation commitments. Yet data published in the 2018 Trase Yearbook show that, during the last decade, soy traders in the Brazilian market with zero deforestation commitments have been associated with similar levels of deforestation risk as companies that have not made such commitments – demonstrating the scale of the challenge ahead.

By linking soy traders and buyers to the places where soy is grown, Trase is starting to be used, alongside other information, by both companies and investors to filter and identify risks, highlight opportunities for new partnerships and investment to improve sustainability, and monitor progress over time.

require mechanisms (e.g., institutional arrangements, procedures for conflict resolution and data exchange) for coordination, participation, transparency and accountability. Such mechanisms could help to ensure the credibility and legitimacy of measured and reported REDD+ carbon impacts and drivers of forest change in the eyes of all stakeholders, and to counteract their differences in capacities, resources and power.

Table 5.1 The role of information on drivers of deforestation and forest degradation in REDD+ policy processes and main obstacles to effective information use

<table>
<tr><th>Stage in policy process</th><th>Role of information about drivers of deforestation and forest degradation</th><th colspan="2">Main obstacles to effective use of this information</th></tr>
<tr><td>Agenda setting</td><td>To identify key drivers and attribute emissions to specific causes and agents.</td><td>Limited (operational) methods and data for systematic analysis of drivers and for attribution of emissions to drivers;
Powerful influence of dominant business-as-usual interests on policy agenda through media and policy coalitions.</td><td></td></tr>
<tr><td>Policy design</td><td>To inform design of appropriate policies aimed at key drivers and agents of forest change;
To inform design of national forest monitoring and MRV systems.</td><td>Lack of (sub)national socioeconomic data and information on underlying causes of forest change;
Selective use of information on drivers to protect interests;
Lack of dialogue between monitoring experts, policy-makers and civil society.</td><td rowspan="3">Different capacities and resources to access and provide information and to contribute to policy decisions;
Lack of mechanisms in national forest monitoring systems to ensure:
• coordination and data exchange between ministries and across sectors;
• transparency and timely access to information;
• stakeholder participation.</td></tr>
<tr><td>Policy implementation</td><td>To implement effective MRV systems of REDD+ activities on the ground;
To enable law enforcement.</td><td>Lack of resources to act on information;
Lack of trust and cooperation of government agencies, forest communities and civil society.</td></tr>
<tr><td>Policy evaluation</td><td>To set FRELs;
To evaluate impacts of REDD+ activities and policies on forest emissions, and adapt policies accordingly;
To enable accountability.</td><td>Selective use of information (e.g., on FRELs) to demonstrate success;
Ignoring information to avoid effective REDD+ activities and protect business-as-usual interests;
Lack of powerful coalitions and (access to) information to hold agents of deforestation accountable.</td></tr>
</table>

Table 5.1 gives an overview of the role of information about drivers of deforestation and forest degradation at each stage of political process, along with the main obstacles hampering effective use of this information.

5.3.1 Agenda setting

A robust assessment of the key direct drivers and underlying causes of forest change is essential for countries during agenda setting. Such an assessment can help attribute emissions to specific causes and agents, to inform REDD+ priorities and scope.

Even in the presence of sufficient information, policy agendas are influenced by certain drivers that gain prominence over others. In the agenda-setting phase, different actors compete to frame REDD+ in their preferred way. For instance, actors often form policy coalitions around a common understanding of REDD+ and use the media to draw public attention to a particular interpretation of who and what is causing deforestation and forest degradation, as well as possible solutions. Comparative research indicates that the policy coalitions that are most prominent in the media do not challenge business-as-usual trajectories (Luttrell *et al.* 2013; Brockhaus *et al.* 2014; Brockhaus and Di Gregorio 2014; Cronin *et al.* 2016; Khatri *et al.* 2016; Gebara *et al.* 2017; Pham *et al.* 2017a). For example, in Indonesia and Papua New Guinea the most vocal coalition, dominated by state actors, largely focuses on issues of funding for REDD+ activities by industrialised countries (Brockhaus *et al.* 2014). Calls for transformational change, often led by civil society organisations, are overpowered and silenced by those supporting business-as-usual practices in many REDD+ countries (Di Gregorio *et al.* 2013, 2015).

5.3.2 Policy design

Current national forest monitoring systems often lack not only information on direct drivers and agents driving forest change, but also basic socioeconomic and other data on underlying causes of forest change. Such information is relevant for national policy design to gain a deeper understanding of how, for example, national-level economy and policies affect the direct drivers and agents. Incorporating information on underlying causes adds complexity to REDD+ monitoring and requires a higher degree of coordination of monitoring activities across government agencies and sectors (Chapter 7).

Even when information on the direct drivers or underlying causes of forest change is available, it is not necessarily incorporated into national strategies. Direct interventions in national REDD+ readiness plans have often focused on reducing forest degradation (e.g., sustainable forest management, fuelwood efficiency) rather than deforestation driven by, e.g., large-scale agriculture or infrastructure development (Kissinger *et al.* 2012; Salvini *et al.* 2014), which might even be supported through other policies and perverse incentives (Di Gregorio *et al.* 2012). This illustrates that policy action tackling larger, more powerful agents of forest change is often discouraged, and information about commodity-driven deforestation is ignored or not produced. At the same time policy action against smallholder practices such as shifting cultivation might be highlighted, because it supports established policy approaches and legal norms. Such selective use of information about direct drivers of forest change risks justifying attempts by the state to gain control over forested land and disempower smallholders (Box 5.2) (Fox *et al.* 2009; Moeliono *et al.* 2017; Pham *et al.* 2018). Similarly, some stakeholders would argue, that Indonesia's One Map Policy – which aims to integrate existing maps of regions across the archipelago into a single map to help resolve land conflicts – does not provide a comprehensive view of land use and rights by all stakeholders, since indigenous land claims remain excluded from the initiative (Jong 2018).

Analysis of the process of developing the MRV system in Peru (Kowler and Larson 2016) demonstrates that the complex technical nature of monitoring systems has hindered the interest, participation and inclusion of actors such as regional governments and forest communities. While experts play an important role in the design of monitoring systems, policy-makers and civil society actors also need to understand and have a voice in the monitoring decisions that affect them. The design process should also facilitate dialogue and communication, to stimulate mutual trust and the legitimacy of the monitoring system (Kowler and Larson 2016).

5.3.3 Policy implementation

Information on the spatial distribution, intensity and type of direct drivers and on the underlying causes that lead to forest change can provide an essential data stream for countries to implement effective REDD+ activities on the ground, and track progress. Timely information on forest change and associated direct drivers can assist law enforcement agencies in monitoring compliance with forest policies.

Both government agencies and civil society show strong interest in the use of near-real time forest alert or early warning systems to detect illegal logging and forest conversion, e.g., the Brazilian Ministry for Science and Technology's Real Time System for Detection of Deforestation (DETER) and Amazon Conservation and partners' Monitoring of the Andean Amazon Project (MAAP) in Peru (Early Warning Working Group 2018). Local and indigenous communities can also use early warning alerts to identify threats to their territories and share information with local authorities. Identification of the direct driver (e.g., mining, palm oil plantation) is a key step in early warning systems to determine the appropriate follow-up actions and government agencies to involve (Finer *et al.* 2018). Yet multiple challenges, such as the lack of cooperation between agencies, limited resources to act on information, lack of trust between civil society and law enforcement, lack of political will, corruption and other governance issues, hamper the effective use of early warning information (Mora 2018). Effective government institutions, coordination and clear responsibilities to process and respond to this kind of information are essential to convert data into action (Finer *et al.* 2018).

Box 5.2 Shifting cultivation: The importance of information and perception

Moira Moeliono

REDD+ targets areas of remaining tropical forests, where shifting cultivation is often the basis of local livelihoods. The shifting cultivation system is characterised by a rotational farming technique where land is cleared for cultivation (frequently by fire) and then left fallow to regenerate for several years. If the fallow period is sufficiently long, this can be a productive and sustainable adaptation to challenging environmental conditions. CO_2 emitted during burning can be more than offset by the sequestration in vegetation regrowth during the fallow phase.

The case of Vietnam shows how information and misinformation about shifting cultivation determines how it is treated. At national level, shifting cultivation is considered the main direct driver of tropical deforestation and forest degradation. This results in national policies aimed at its eradication, while information on other direct drivers such as large-scale conversion of forest to plantations is less acknowledged in policy documents and debates. Defining shifting cultivation as an unproductive and destructive practice is also used to legitimise centralised forest management and top-down claims on land, thereby ignoring local management systems and imposing conservation programmes. At provincial level, persistence of shifting cultivation is considered a failure of policy performance and therefore no data are collected, thereby rendering the practice invisible to the state. At district and community levels, it is more important to maintain security rather than risk protest by 'ethnic' communities, so the practice is ignored and allowed to continue (Pham *et al.* 2018).

Shifting cultivation is thus a political issue with different interpretations and conflicting perspectives at different levels of government and stakeholders. The politics are shaped by institutional 'stickiness' (i.e., resistance to change), interests and ideas at each level. More importantly, by focusing on shifting cultivation, the other major drivers of deforestation are not addressed in policy.

5.3.4 Policy evaluation

Information on agents and drivers of deforestation and forest degradation plays multiple roles in policy evaluation. It gives more insight into the extent to which a particular policy has been effective in reducing forest emissions that are connected to particular agents or drivers, with the aim of revising the policy if needed. In the context of results-based payment for REDD+, it can provide valuable information for setting forest reference (emission) levels (FRELs/FRLs) (Chapter 4). Information on agents of deforestation and forest degradation can also be a powerful tool for civil society to hold these agents accountable for their actions, and to demand that drivers be addressed (e.g., commitments made by state and non-state actors in the New York Declaration on Forests).

As actors can show success or results in this stage to gain or maintain financial or popular support, they may use or bias information to their advantage. FRELs, for example, are the basis for evaluation of REDD+ results, and will thus affect payment opportunities and levels. This makes the very definition of FREL highly political in nature. Evidence suggests that countries (those paying and those delivering results) may ‘cherry pick’ and negotiate the information that is most beneficial for their situation (Chapter 4). While information on drivers can support more targeted and effective REDD+ policy action, such actions can trigger resistance and counter-actions to avoid disturbing the status quo. Powerful actors may try to use policy revisions to their advantage to protect business-as-usual interests. The revision of the Brazilian Forest Code in 2012, for example, ended up weakening forest protection, and is seen as a victory of larger-scale business-as-usual interests driving deforestation and forest degradation (May *et al.* 2016).

Holding state and businesses accountable often requires strong civil society organisations and other independent agencies (Weber and Partzsch 2018). Indicators of accountability include clarity of roles, clear reporting, frequent monitoring and clear rationales for decision-making (Secco *et al.* 2014). For most REDD+ countries, there are no clear roles for these stakeholders in REDD+ MRV, nor are there reporting channels between MRV participants (Ochieng *et al.* 2016). In order to enforce accountability, coalition-building with powerful agents of change is a strategic action, but access to information is a prerequisite (Di Gregorio *et al.* 2012; Brockhaus *et al.* 2014; Korhonen-Kurki *et al.* 2017, 2018).

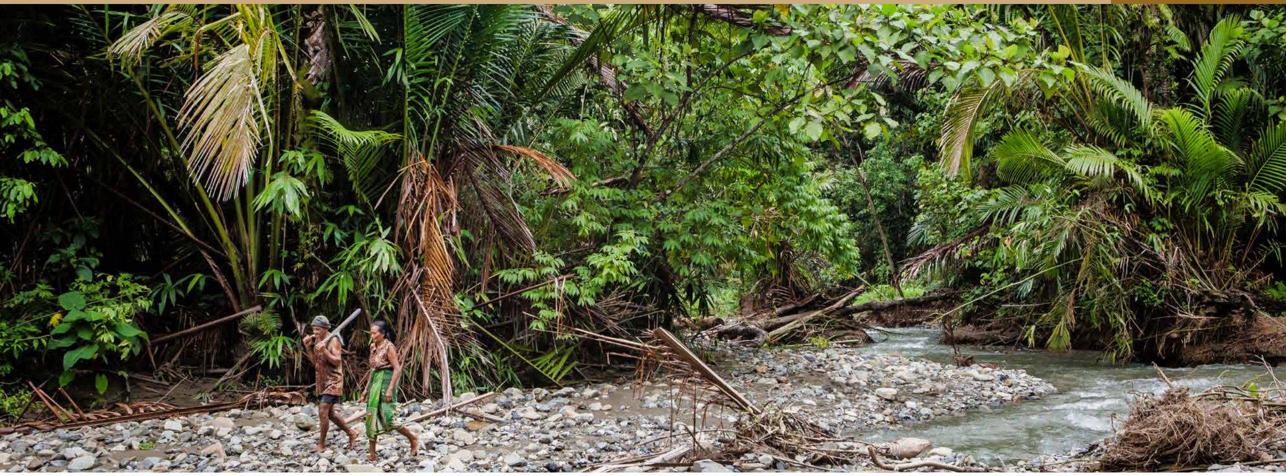
5.4 Lessons and ways forward

Building national and international capacities for assessing and tracking drivers of forest change is a complex but crucial undertaking. A wide variety of spatial and non-spatial information, coming from different sources and involving many stakeholders, will have to be integrated if an information system is to be adequate to support decision-making and evaluate the effect of interventions. While data availability has improved significantly in recent years, the chain from technical data to actionable information – and ultimately effective interventions – needs to be strengthened. Research institutes and REDD+ countries need to work together towards operational and integrated monitoring of different types of drivers, to support the REDD+ policy processes.

More systematic and transparent assessments of direct drivers and underlying causes of forest change at national and international levels can leverage action against business-as-usual practices at the global level. Experiences of REDD+ policy processes have shown that information and discourses about drivers of forest change are often purposely hidden or neglected by powerful agents, hindering the transformational changes needed to change behaviour in business-as-usual land-use decisions. Thus, paying attention to implementing mechanisms – institutional arrangements, procedures and tools – for coordination, participation, transparency and accountability in REDD+ monitoring systems, and supporting stakeholders who want to use information to strengthen policies and actions addressing drivers, are crucial for information-driven policy change.

Part 2

National politics



Strategic alignment

Integrating REDD+ in NDCs and national climate policies

Pham Thu Thuy, Moira Moeliono, Arild Angelsen, Maria Brockhaus, Patricia Gallo, Hoang Tuan Long, Dao Thi Linh Chi, Claudia Ochoa and Katherine Bocanegra

Key messages

- Many developing countries' Nationally Determined Contributions (NDCs) recognise the important role of forests and have put forward mitigation measures; however, these measures do not directly aim at reducing emissions.
- REDD+ is included in most developing countries' NDCs and climate change policies, but drivers of deforestation and forest degradation are not fully acknowledged.
- NDCs will be ineffective in achieving their intended outcomes unless they include clear policies and measures to tackle the drivers of deforestation and forest degradation, as well as a transparent monitoring and evaluation framework.

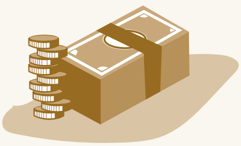
Nationally Determined Contributions and REDD+ in a nutshell

REDD+ and NDCs will be ineffective in achieving their intended outcomes unless they include clear policies and measures to tackle the drivers of deforestation and forest degradation, as well as a transparent monitoring and evaluation framework.

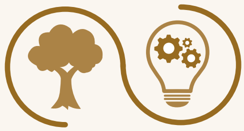
Countries have made significant progress in:

1. enhancing global and national recognition of the role of forests

2. developing more detailed policies and measures to reduce emissions

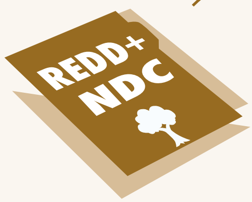


3. mapping out available funding resources for NDCs

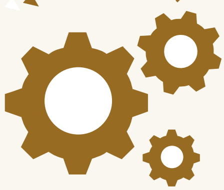


4. improving the monitoring and evaluation framework

How can countries enhance the role of forests in climate policies?



Strengthening global and national recognition of the role of forests in (I)NDCs



Implementing effective policies and measures in addressing drivers of deforestation and degradation

Securing adequate funding sources from both developed and developing countries

Implementing accountable and transparent land-use accounting and measurement, reporting and verification

6.1 Introduction

In 2015, 196 countries made history when they collectively decided under the Paris Agreement to transform their development trajectories in order to reduce global emissions. The agreement requires countries to prepare, communicate and maintain increasingly ambitious Nationally Determined Contributions (NDCs). By April 2018, 197 countries had submitted their NDCs or Intended NDCs (INDCs). Although implementation of the measures in these submitted (I)NDCs is expected to result in considerably lower global emission levels than business-as-usual scenarios, the committed reduction policies and measures are not sufficient to meet the Paris Agreement target. As agriculture, forestry and other land uses (AFOLU) are responsible for roughly a quarter of global emissions, the forest sector will need to play an even larger role in reducing emissions (Smith *et al.* 2014), and therefore should be well covered within any climate agreements (Seymour and Busch 2016), including (I)NDCs.

Since 2015, countries have also developed and implemented various new strategies in parallel to NDCs, from REDD+ to green growth to green economy and low-emission development strategies. Despite a lack of universal, commonly agreed definitions for these new strategies (Wentworth and Oji 2013; Box 6.1), they essentially share the same objective: to merge environmental protection and economic development (Brand 2012; Watson *et al.* 2013; Jacob *et al.* 2013), with forests playing a crucial role (Hein *et al.* 2018). Identifying potential synergies and trade-offs among these processes is crucial to supporting each of these initiatives to achieve their intended outcomes (Martius *et al.* 2015; Bastos Lima *et al.* 2017a; McMurray *et al.* 2017) and to enhance the effectiveness of NDCs in reducing emissions.

The chapter aims to answer the following questions: First, how have countries included forests in their (I)NDCs? Second, how can countries enhance the role of forests in this context, particularly in light of the many other global and national 'greening' initiatives? By addressing these questions, this chapter aims to inform policy-makers and practitioners about the opportunities and barriers to realising the potential contributions of forests to climate change mitigation, suggesting ways to increase the comprehensiveness of (I)NDCs with clear forest sector commitments.

6.2 How have countries included forests in their NDCs?

In existing NDCs, forests often appear as the linchpin linking economic and environmental outcomes. However, REDD+ was included in only 56 out of 162 NDCs submitted by 2016 (Pauw *et al.* 2016) and in 55 of 197 NDCs submitted by April 2018 (Authors' own analysis 2018). These 55 countries account for 98% of countries in Africa and 81% of countries in Asia, regions where most global deforestation occurs (Figure 6.1). However, countries with large areas of forest are not necessarily taking the opportunity that REDD+ presents to conserve it; for example, only 60% of countries in Latin America are actively developing REDD+ strategies.

Box 6.1 Global and national green development strategies

Several new strategies have arisen in recent years, with the goal of ensuring environmental protection while promoting economic development:

Green economy: While there is no internationally agreed definition, UNEP (2011) is often cited, defining a green economy as "one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities". UNEP also asserts that the green economy discourse has three main characteristics: low-carbon emissions, efficiency in natural resource use, and social inclusion.

Green growth: There is currently no consensus on the definition of green growth (Huberty *et al.* 2011). At least 13 different definitions have been used in recent publications, with fundamental differences within focus areas (Blaxekjaer 2012). Two major defining groups are: (i) those who align green growth with sustainable development, emphasising poverty reduction and global equity; and (ii) those emphasising transformations in industry and energy and the use of public-private partnerships (Scott *et al.* 2013; OECD 2011; Kasztelan 2017).

Low-emission development strategies (LEDS): LEDS emerged in the context of the United Nations Framework Convention on Climate Change (UNFCCC) climate talks in 2008. Despite this, no internationally agreed definition of LEDS has emerged. The elaboration and implementation of a LEDS can allow policy-makers to respond more effectively to climate change through the design of comprehensive policies that integrate low-emission and development planning, and encourage action across multiple sectors and levels (Clapp *et al.* 2010).

While they clearly overlap, the three concepts have different foci (Jacob *et al.* 2013). Green growth emphasises incentives and the search for new sources of growth through innovation, productivity, new markets, trust and stability. Green economy gives relatively higher priority to the government's role, the regulatory and legal framework, and the promotion of private and public investment and its effects on certain sectors that will drive the greening of the economy (Permanent Secretariat of SELA 2012). LEDS, with its origin in the UNFCCC, remains less specific on actual policies and their implementation, but has a focus on the final outcome: low emissions.

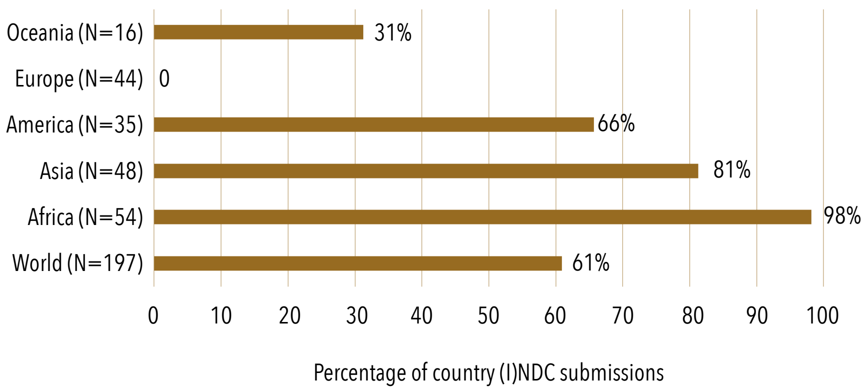


Figure 6.1 Share of (I)NDCs that mention REDD+ as a percentage of the total submitted (I)NDCs per region (N= 197)

Source: Authors' own analysis

Several studies and reviews aimed to understand achievements made by countries that have included forests in their NDCs (Forsell *et al.* 2016; Hein *et al.* 2018), as well as challenges that need to be addressed. Table 6.1 provides a snapshot of progress made, and challenges encountered by, countries that have taken measures to enhance the role of forests in their (I)NDCs, through a review of four key areas: (i) global and national recognition of the role of forests in (I)NDCs; (ii) policies and measures; (iii) funding sources; and (iv) land-use accounting and measurement, reporting and verification (MRV). Countries have made significant progress in enhancing global and national recognition of the role of forests, developing more detailed policies and measures to reduce emissions, mapping out available funding resources for NDCs, and improving the monitoring and evaluation framework. However, governments can further enhance the effectiveness of their (I)NDCs by acknowledging and implementing policies and measures that directly tackle drivers of deforestation and degradation.

Two major drivers of deforestation and forest degradation are frequently cited in literature: (i) forest conversion to agriculture production and (ii) weak forest governance, such as insecure tenure and the absence of safeguarding policies (e.g., full and effective participation of relevant stakeholders, actions to address the risks of reversals; Chapters 1 and 5). But these are not widely recognised in current NDCs. Henders *et al.* (2018) review 271 documents (INDCs and National Biodiversity Strategies and Action Plans) and found that only 14 explicitly make the link between forest loss and large-scale commodity production and consumption. In practice, REDD+ is also implemented in parallel with economic development programmes that cause deforestation and forest degradation (Bastos Lima 2017a; Brockhaus *et al.* 2017; Pham *et al.* 2017b). Besides these conflicting policy goals, we also found that countries gave highest attention to aspects of REDD+ finance and the improvement of forest monitoring systems, while forest governance and safeguards systems received much less attention (Figure 6.2). Such imbalances limit the potential effectiveness of policy responses aimed at addressing the drivers of deforestation and degradation.

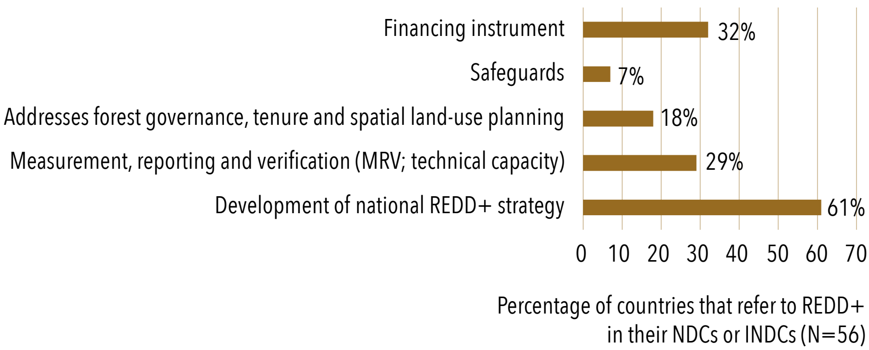


Figure 6.2 REDD+ strategies mentioned in countries' NDCs or INDCs

Source: Hein *et al.* (2018)

Table 6.1 Inclusion of forests in current (I)NDCs

	Progress	Gaps and challenges
Global and national recognition of the role of forests	• Most (I)NDCs recognise the vital importance of the forest sector. • Countries that do not include forests in (I)NDCs do indicate their intention to mitigate emissions in forest sector. • LULUCF sectors are included in approximately 75% of (I)NDCs. • Links between mitigation and adaptation are widely recognised. • Out of 48 (I)NDCs submitted by Least Developed Countries, at least 42 cover AFOLU and 37 cover LULUCF.	• To realise the full global mitigation potential, many countries need to clarify and strengthen their intended forest sector contribution. • LULUCF is identified as a 'Focus Area' by relatively few countries in different regions, as well as globally.
Policies and measures	• Quantifiable targets are more common in the forestry sector than in agriculture. • Afforestation, reforestation and sustainable forest management are the most popular mitigation options in NDCs. • Many countries refer to and include REDD+ in their mitigation options.	• Strategies vary and are not always aimed at reducing emissions. • Many (I)NDCs lack sufficient information on measures needed to achieve the mitigation goal. • There is limited discussion on the extent to which REDD+ is integrated into (I)NDCs.
Funding sources	• Most countries indicate the required international support (finance, technology and capacity building).	• Many countries, particularly in Asia, do not provide cost estimates of AFOLU mitigation measures or identify financing sources. • Few (I)NDCs mention the roles of private sector sustainability commitments and the financial sector in reducing emissions.
Land-use accounting MRV	• Many countries are in the process of developing reference levels as part of national REDD+ strategy implementation.	• (I)NDCs lack clarity and consistency re: the accounting of emissions and removals. • Many (I)NDCs either do not specify methods or assumptions used in reporting or accounting, or omit them, citing a lack of information. • Discrepancies between REDD+ and NDCs exist in relation to scope of fluxes and purpose.

Note: LULUCF = Land use, land use change and forestry

Sources: Petersen and Varela 2015; FAO 2016; Forsell *et al.* 2016; Zeleke *et al.* 2016; ESCAP 2017; Schletz *et al.* 2017; Vladu 2017; Hein *et al.* 2018

6.3 How can countries enhance the role of forests in climate policies?

There is no one-size-fits-all formula for countries designing and implementing their climate policies, as they are at different stages of NDC implementation and have different governance regimes, human and financial capacity, and national priorities. Table 6.2 provides key considerations and discusses how countries can address the challenges identified in section 6.2 to improve their NDCs in order to harness forests' mitigation potential.

6.3.1 Global and national recognition of the role of forests in NDCs

While most NDCs recognise the role of forests, it is more often framed as general discourse rather than through practical considerations. Mitigation goals are defined in terms of economic interest, available financial resources and technological capacities, and details are lacking on how to avoid further deforestation. Brockhaus *et al.* (2014) and Korhonen-Kurki *et al.* (2018) point out similar patterns in the design of REDD+ strategies that fail to challenge business-as-usual drivers of deforestation, both within forest-rich tropical countries and globally (through existing trade and investment patterns that finance deforestation in the tropics). Therefore, important first steps for countries are to: (i) target policies and practices that encourage deforestation; (ii) secure political commitment for anti-deforestation policies; and (iii) foster strong national ownership of the REDD+ policy process.

Countries might use opportunities to enhance the role of forests in climate change policies by bridging REDD+ with other initiatives such as green growth and green economy, as this can help to reinforce co-benefits and streamline reporting processes. However, in most countries linkages among these multiple forest governance initiatives are hampered by a lack of communication among REDD+ actors and other actors/institutions, a lack of understanding of climate change funding landscapes and potential competition for funds, different greenhouse gas (GHG) accounting methods, and a lack of coordination and policy coherence, leading to conflicts between the various strategies (McMurray *et al.* 2017). Therefore, it is essential to build capacity among both state and non-state actors to strengthen their knowledge of REDD+, and to facilitate knowledge exchange at all levels of governance to enhance their competencies in the technical and operational aspects of REDD+. Otherwise, merging these initiatives without first clearly defining them will help neither NDCs nor REDD+ become more effective, and might dilute already well-defined objectives of policy instruments like REDD+ (Pham *et al.* 2017b).

6.3.2 Policies and measures

Without clear strategies to address the drivers of deforestation and degradation, effective implementation of REDD+ and NDCs is unlikely (Hein *et al.* 2018). To move REDD+ and NDCs forward, countries first need to acknowledge such drivers, and recognise that the responsibility for addressing them reaches beyond the forestry sector. A review of specific drivers of deforestation and forest degradation, along with mapping of the roles (both positive and negative) of various actors and economic interests in these processes would help countries prioritise sectors and actors. These reviews would also help policy-makers develop appropriate policies and measures to address drivers – including removing contradictory policies such as subsidies for large-scale commercial agriculture – and carry out the modifications needed for cross-sectoral policy alignment. Although many countries do acknowledge the drivers of deforestation and forest degradation specific to their context, securing political commitment (which is highly influenced by economic policy) to take bold actions to address these drivers represents a major challenge (Korhonen-Kurki *et al.* 2018).

Effective policies and measures that discourage deforestation also require an inclusive decision-making process, in which decisions are made by a variety of actors (i.e., input legitimacy) and their diverse views are represented in REDD+ policy documents (i.e., output legitimacy) (Špirić *et al.* 2016). Coordinated and coherent sectoral policies would also help avoid duplication of efforts and the inefficient use of resources (Weiss 1993; Alter and Meunier 2009; Oberthür and Stokke 2011). A master land-use plan built with active engagement of all sectors, as well as effective monitoring of approved planning, would help to strengthen cross-sectoral coordination.

Clarification of rights and responsibilities among sectors and actors would also help to improve implementation of current NDCs. Consistent integration of REDD+ in NDCs would not only remove contradictions between policies; it would also require cross-sectoral coordination, along forest- and land-based commodity value chains (Visseren-Hamakers *et al.* 2012; Den Besten *et al.* 2014; Weatherley-Singh and Gupta 2015), and in some cases, through an overarching institution that is responsible for coordinating all sectors and existing programmes (Oberthür and Gehring 2011). International and national policies should also actively promote actions that encourage sustainable development and measures that increase consumer demand for sustainable commodities (McMurray *et al.* 2017), while fostering deforestation-free production on the ground.

6.3.3 Funding sources

Uncertain and unstable funding sources can hamper NDC implementation. Adequate funding not only requires commitment from developed countries, but also an understanding of how forests contribute to the local and national economy (Chapter 3). Mapping existing and potential funding for REDD+ and climate change policies can help countries consolidate their fundraising efforts, identify funding gaps and complementary financial resources for specific policies and measures, and prevent unhealthy competition among actors. Sectoral policies need to prioritise government investment in areas that stimulate deforestation-free economic pathways and minimise government spending in areas that deplete forest resources (UNECA 2012). Developing and conducting a regular review of public environmental expenditure and green accounting can also provide an opportunity to mainstream forests in national financial planning.

Mobilising private sector finance in REDD+ and NDCs has been identified by most developing countries as important, yet efforts have fallen far short of expectations (Streck 2012). However, private investments continue at large scale for the production of deforestation-driving commodities such as soy, palm oil, beef, and pulp and paper. Making the business case for REDD+ is a challenge for developing countries (Streck and Parker 2012), and efforts to identify alternative economic development pathways based on standing forests are being hampered by decreasing investment (and research) in sustainable management of, and production from, standing forests. More research and dialogue are needed on the sustainable use of standing forests, especially on how to align forest conservation goals with economic interests and political will.

Another important lesson learned from country REDD+ implementation is the need to recognise equity concerns in the distribution of benefits and costs – both direct opportunity costs and transaction (including implementation) costs (Loft *et al.* 2017a; Luttrell *et al.* 2018b). Understanding in net terms who loses, who shares the costs of REDD+ implementation, and who will gain from it will help governments develop a comprehensive estimate of funding resources required to implement NDCs.

6.3.4 Land-use accounting and monitoring reporting and verification

Many countries have not provided details on forest sector targets (which targets and how to measure them) or on the underlying policies and measures needed to achieve them (Schletz *et al.* 2017). There is also a discrepancy (in practice) in GHG accounting between REDD+ and NDCs, resulting from their differences in scope and purpose. As the scope of fluxes in REDD+ is limited to significant anthropogenic forest-related emissions/removals, countries often choose only the most significant emissions (e.g., from deforestation, excluding degradation or regrowth) and currently not all are national in coverage. In addition to limitations related to national capacities and lack of scientific data for full reporting of GHG inventories, many NDCs are unclear as to the comprehensiveness of accounting methods that will be used for the land sector (Schletz *et al.* 2017). Unrealistic targets set by countries – such as to restore millions of hectares of land despite the lack of a strong precedent of success in restoration efforts and without acknowledging existing adaptation constraints (Chapter 15) – and unrealistic estimates of their forest carbon stocks might also lead to ineffective NDC implementation.

Table 6.2 Examples on how to enhance the role of forests in climate change policies

	Recognise needs (problems and opportunities)	Policy planning, design and implementation
Global and national recognition of the role of forests in NDCs	• Develop political and financial commitment to overcome business as usual. • Identify opportunities to bridge REDD+ with e.g., green growth, green economy and LEDS. • Recognise the potential risk of merging multiple initiatives.	• Provide information and capacity to transform data into knowledge that can lead to a shift in attitudes among state and non-state agents. • Leverage synergies between adaptation and mitigation. • Clarify definitions of existing initiatives such as green growth, green economy and LEDS; identify and exploit potential synergies among these to achieve the common goal of sustainable development.
Policies and measures	• Recognise drivers of deforestation and forest degradation, and that addressing drivers cannot be done by the forestry sector alone.	• Review drivers of deforestation and forest degradation and livelihood benefits, to identify actors and sectors to be targeted. • Develop policies and measures for drivers, including removing contradictory policies. • Review modifications needed for policy alignment and strong cross-sectoral coordination. • Develop a clear monitoring and evaluation framework for private sector commitments.
	• Recognise that conflicts of interests can lead to resistance or even failure of policy implementation. • Attend to conflicts that can emerge with only limited participation of powerful (business-as-usual) actors who contribute directly or indirectly to deforestation and forest degradation.	• Map existing and potential actors. • Assess risks to implementation. • Clarify rights and responsibilities among sectors and actors. • Set up a transparent, inclusive decision-making process. • Establish overarching agencies and key governmental decision-makers. • Build capacity in government agencies to use their own social resources and local knowledge.

	Recognise needs (problems and opportunities)	Policy planning, design and implementation
Funding sources	Understand the contribution of forests to the national economy.	• Map existing and potential funding sources to identify priorities and prevent competition. • Prioritise government investment in areas that stimulate the greening of economic sectors. • Limit government spending in areas that deplete natural capital. • Secure adequate finance to address drivers of deforestation and degradation. • Conduct regular public environmental expenditure reviews. • Develop and monitor green accounting and alternative development measures. • Mobilise private sector finance.
	Recognise both opportunity and transaction (implementation) costs, as well as equity concerns.	• Identify who loses, who bears the costs and who will gain in net terms. • Develop plans for benefit and cost sharing, addressing compensation and equity concerns. • Involve stakeholders to gain political acceptance on benefit- and cost-sharing arrangements.
Land-use accounting MRV	• Recognise the politics of numbers ('what counts is counted'). • Acknowledge that actors have different capacities in accessing, processing and providing information. • Understand policies and power imbalances.	• Develop safeguards information systems to ensure transparency. • Empower civil society organisations and monitoring frameworks. • Enhance the MRV capacity of government agencies. • Build independent assessments systems. • Develop clearly defined and measurable targets, and source more information on the underlying policies and measures to achieve them. • Enable consistent land-use accounting.

Sources: Martius *et al.* 2015; Petersen and Varela 2015; FAO 2016; Forsell *et al.* 2016; Zeleke *et al.* 2016; Brockhaus *et al.* 2017; ESCAP 2017; Schletz *et al.* 2017; Vladu 2017; Hein *et al.* 2018; Luttrell *et al.* 2018b

Evidence also shows that the politics of numbers influence how an accounting system is set up (Chapters 4 and 5; Brockhaus *et al.* 2017). Transparency is critical and can be achieved through safeguards information systems, independent assessments, mitigation targets that clearly distinguish between unconditional and conditional commitment towards reducing emissions, and consistent land-use accounting. More information about financial, capacity building and technology needs is also necessary to facilitate the appropriate and effective transfer of resources from donors to receiving countries.

Transparency in value chains and divestment strategies is needed to hold the state and private sector accountable to their zero deforestation commitments (Chapter 13). As countries develop and refine their REDD+ plans and NDCs, internal coordination is essential to ensure methodological consistency between related initiatives. REDD+ can provide incentives for reducing emissions, thereby creating motivation for behavioural change in forest management. And the incipient REDD+ MRV and safeguards systems can be expanded with relatively little effort beyond the forestry sector (Martius *et al.* 2015). Therefore the entities involved in developing and revising NDCs should consider and – where appropriate – accommodate REDD+ advancements in methodology, data and institutional arrangements to meet NDC accounting requirements (McMurray *et al.* 2017). Actors have different capacities in accessing, processing and providing information; therefore, empowering civil society organisations and enhancing the capacity of government agencies in MRV should be important components of NDCs.

6.4 Conclusions

Many developing countries' NDCs have recognised the important role of forests, put forward mitigation measures in the forestry sector, and developed multiple green initiatives to achieve their mitigation goals. However, these measures do not directly aim to reduce emissions, nor do they provide sufficient information on the mitigation policies and measures needed or planned to achieve their goals. NDCs will be ineffective unless they have clear policies and measures to tackle the drivers of deforestation and forest degradation, and encourage institutional reform with cross-sectoral coordination, political commitment and national ownership of REDD+. They should also include adequate funding and capacity building, and support inclusive and transparent access to decision-making. However, while international funding is available for large-scale land conversion, funding for avoiding deforestation is limited (Chapter 3). The success of REDD+ and NDCs requires not only an understanding of countries' forest mitigation potential, but also the recognition and understanding of the political economy of drivers of deforestation and forest degradation, and the roles of actors and their interests and how they can hinder or enable change. Integrating forest targets with other land sector targets, and identifying potential synergies between REDD+ and development goals, green growth, green economy and LEDS, can also help to reinforce co-benefits and streamline reporting processes.

Multi-level governance

Some coordination problems cannot be solved through coordination

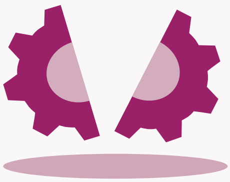
Anne M Larson, Juan Pablo Sarmiento Barletti, Ashwin Ravikumar and Kaisa Korhonen-Kurki

Key messages

- It is important to distinguish between coordination failures in REDD+ policy and implementation that can be addressed through improved coordination, and those that arise from fundamental differences in goals and interests.
- To improve the chance of finding more equitable solutions, collaborative multi-actor processes and forums should be designed with specific attention to local context, addressing power differences not only through procedural justice, but also through attention to underlying sources of inequity.
- Not all solutions can be negotiated, such as when highly unequal power relations combine with entrenched differences of interest. Other important options include regulations and law enforcement, and support for collective action by grassroots actors and coalitions for change.

The challenge of coordination in a nutshell

Everyone agrees that coordination is a great thing, so why is it so hard? Because there are so many interests – often conflicting – attached to land and natural resources.

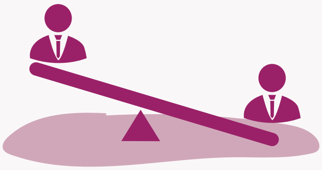


It is important to understand the root causes of coordination failures in REDD+ policy and implementation.

Some can be addressed through improved coordination, but others stem from fundamental differences in goals and interests.

Collaborative, multi-actor processes and forums, with specific attention to local context, can improve the chance of success.

They should address power differences among participants for more equitable outcomes.



Not all solutions can be negotiated, such as when highly unequal power relations combine with entrenched differences of interest.

Other options for improving coordination include regulations, law enforcement and support for collective action by grassroots actors and coalitions for change.

7.1 Introduction

Few people would object to the idea that coordination is a good thing, so why is it so difficult to achieve? The problem lies in the variety of interests – often conflicting – attached to land and natural resources. The use of a particular plot of land reflects the influence and different levels of power, policies and decisions made across multiple sectors and scales. And it is commonly understood that the most significant drivers of deforestation come from outside the traditional forestry sector. Consequently, if REDD+ or other efforts to reduce deforestation and degradation are to succeed, policy-makers and implementers need to engage with many different government offices: not only forest and conservation institutions, but also development offices such as agriculture, infrastructure, economics and finance, and those providing social services for families, promoting well-being, representing indigenous peoples, and so on (Corbera and Schroeder 2011; Nepstad *et al*. 2013a; Bastos Lima *et al*. 2017b). They will need to coordinate with the state at the national level, where national and international commitments are made. They also need to coordinate with subnational states, regions, provinces and municipalities that all have varying degrees of influence on policy and, often, a larger role in implementation (Figure 7.1; see also Nepstad *et al*. 2013a). Business and industry, NGOs, consumers, and the local and indigenous peoples living in and near forests all influence land use, as do donors who shape the activities of implementing partners.

In other words, reaching agreement on sustainable land-use goals requires tremendous coordination across sectors and scales (see Box 7.1). Further, the challenge of reaching agreement is in trying not only to achieve economically and environmentally optimal land-use outcomes, but also to address important justice and equity implications. The forest context in tropical countries is often fraught by histories of deep inequalities, conflict, competition for land and resources, and political struggles for recognition and rights (Martin *et al.* 2016).

In this chapter, we provide a synthesis of primarily CIFOR research concerning multilevel and multisectoral coordination around land use to explore why coordination failures are so persistent, and how their underlying causes can best be addressed.

7.2 The problems with coordination

One fundamental problem regarding land use, or attempts to establish more sustainable land and resource use, is that actors have different and conflicting goals and interests. The failure to align interests is a driver of deforestation and forest degradation, and multiple mechanisms have been used to support greater alignment, such as land-use planning and/or multistakeholder initiatives. If goals and material interests are relatively straightforward to align, as in 'pure' coordination problems (Box 7.1), they can be addressed through improved communication and information sharing, clearer distribution of responsibilities, and effective policies, implementation and accountability mechanisms.

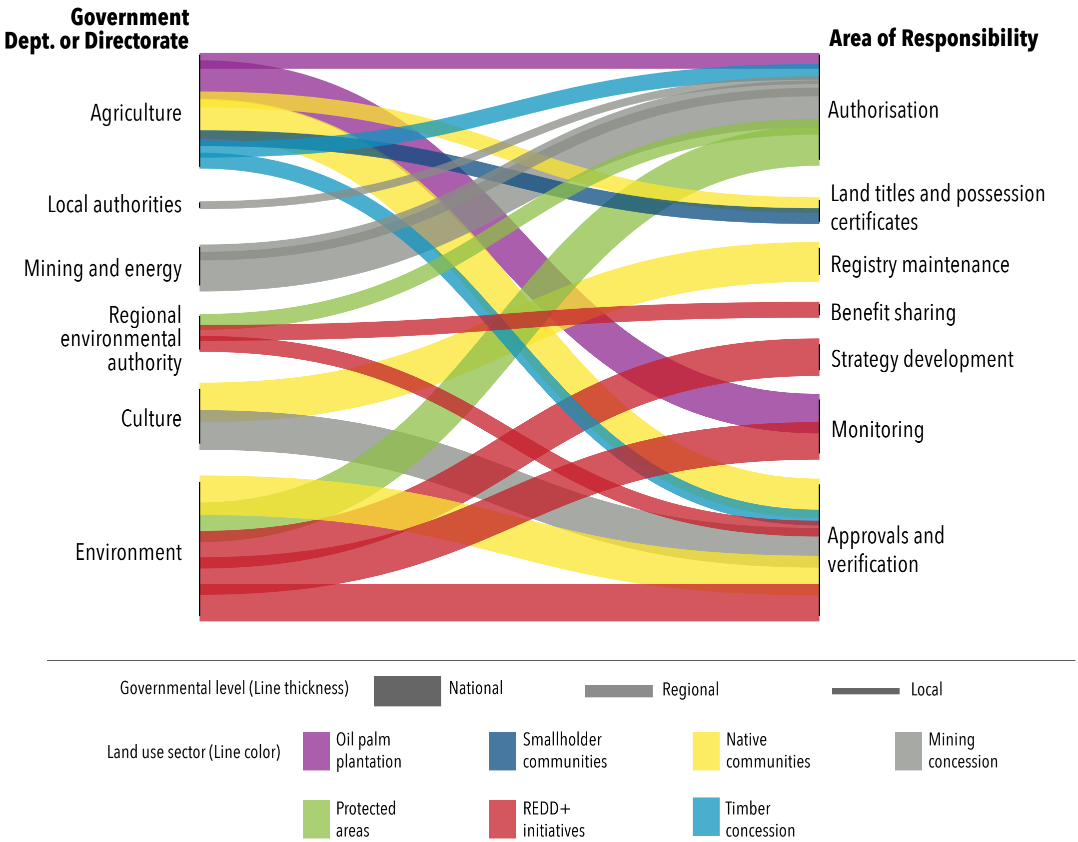


Figure 7.1 Complexity of government responsibilities across levels and sectors: an example from Madre de Dios, Peru

Note: This diagram shows which government department (left) has jurisdiction over which area of responsibility (right) at what government level (line width) for which land-use sector (colour).

Source: Based on Wieland Fernandini and Sousa (2015).

But most problems are more challenging to address. First, goals and interests – particularly towards sustainability objectives that challenge business as usual – cannot always be aligned through negotiation; there are deep-rooted conflicts of interest. Second, actors are not (usually) equals; benefits and costs are distributed differentially, and the interests of more powerful actors are likely to dominate solutions. These problems have, in the language of game theory, strong elements of the bargaining problem, where the outcome reflects the actors' bargaining power (Box 7.1).

A considerable body of research suggests that the failure to align goals and interests across actors, sectors and levels has compromised the effectiveness, efficiency and equity of low-emission initiatives such as REDD+. Coordination was

Box 7.1 Bargaining vs. cooperation vs. coordination problems

Arild Angelsen

'Coordination problems' in relation to the REDD+ debate cover a variety of situations that differ fundamentally in their structure and, therefore, in their solutions. Using basic game theory (the study of strategic interaction among actors), one can distinguish between three different problems relevant to coordination.

The bargaining problem: There is a fixed pie to be split among the actors (a zero-sum game). A related version of the bargaining problem is when policy priorities differ. There is no straight solution to a bargaining problem: more to A means less to B, and there is no agreement about what constitutes a fair split. Obviously, the realised outcome depends on the (bargaining) power of the actors involved. *Example:* The sharing of international results-based payments between national, regional and local governments.

The cooperation problem: Unlike in the bargaining problem, the pie gets bigger through cooperation. The classic example is the prisoner's dilemma game: if everyone cooperates, the sum of benefits is larger. But, the best (dominant) strategy for everyone is not to cooperate, and an agreement about cooperation therefore needs to sanction free riding to be sustained. *Example:* Sharing of transparent, REDD+-relevant information may benefit all in the long run, but each agency may have an interest to selectively withhold information to pursue its own interests (Chapter 5).

The (pure) coordination problem: In game theory, the term 'coordination' is reserved for a particular type of problem; it resembles the cooperation problem in that everyone will gain from working together, and no one is willing to take the first step alone. However, once an agreement is reached, no one wants to break the deal (a stable equilibrium). *Example:* The net benefit of fire control on one's own farm depends on other farmers also controlling fire, since one's own effort might be wasted by runaway fires. Thus two different equilibria exist: one high fire and one low fire (Cammelli and Angelsen, 2017).

In practice, these three classes of problems are intertwined. Cooperation and coordination problems typically involve bargaining for the benefits created, and the bargaining outcome affects the size of the pie. Most of the problems discussed in this chapter have strong elements of the bargaining problem, based on the fundamental difficulties of aligning various interests.

identified as one of the major challenges by almost half of national-level REDD+ actors interviewed in a seven-country study; REDD+ effectiveness was severely limited by inadequate horizontal integration, referring to alignment with existing sectoral and national development policies (Korhonen-Kurki *et al.* 2015; see also Corbera and Schroeder 2011; Nepstad *et al.* 2013a; Bastos Lima *et al.* 2017b). Similarly, vertical integration, referring to coordination among different levels of governance, is also a problem; subnational actors, from governments to local NGOs and communities, have often felt marginalised from REDD+ decision-making (Sanders *et al.* 2017; Myers *et al.* 2018; See also Box 7.2). Problems include information flows, as well as concerns over accountability, equity and justice (Ravikumar *et al.* 2015; see Gupta *et al.* 2012 on carbon accountability).

Box 7.2 Multilevel coordination challenges in Mexico

Paulina Deschamps-Ramírez, Tim Trench and Antoine Libert Amico

Centralised decision-making has historically shaped Mexico's natural resource policy, and the country's REDD+ process is no exception. The National Forestry Commission (CONAFOR) is the federal agency in charge of REDD+, yet the mechanism has been piloted at subnational level, in five states, each with its own government and environment ministry. Therefore, Mexico's broad interpretation of REDD+ and innovative national strategy heavily depends on enhanced coordination and effective channels for subnational actors to define objectives and consolidate local and regional governance. But there are significant obstacles to multilevel coordination; the concentration of budgets at the federal level, top-down decision-making, sectoral inertia, and political clientelism have all dictated the allocation of subsidies, land-use priorities and agendas at subnational level.

The experience of piloting REDD+ in Mexico has shed light on the limited processes of decentralisation and often incompatible government policies related to land use. Subnational jurisdictions have promoted REDD+ policy and put innovations into practice, ranging from effective monitoring initiatives to new participatory governance arrangements. However, the federal level must maintain control over budgets, as required by the UNFCCC, which can reinforce a culture of top-down decision-making. International commitments, such as Mexico's participation in the Carbon Fund of the Forest Carbon Partnership Facility (FCPF) and the involvement of state governments in the Governors' Climate and Forests (GCF) Task Force, have been valued by subnational stakeholders as an opportunity to enhance transparency in decision-making and strengthen bottom-up participation.

As in all REDD+ countries, the development and piloting of REDD+ in Mexico has occurred within particular political cultures, decision-making arenas and regional realities. Faith in the political system in Mexico is at an historical low, a factor implicit in the widely recognised challenges for vertical and horizontal coordination. The new government elect will be judged on its ability to redress power imbalances within the federal system, improve intersectoral coordination, and attend to the most marginalised regions of the country (characterised by collective landholdings, indigenous populations and important forest cover). Part of this challenge will be to build the social, economic and political conditions that can help achieve the country's ambitious zero deforestation rate by 2030.

Based on: Trench *et al.* (2018) and Deschamps and Larson (2017)

The failure to align land-use decisions is often due to underlying political dynamics, in particular the differences in interests and levels of power driving business-as-usual practices in the land-use sector. For example, because they represent key economic actors, the agricultural, infrastructure and finance offices that oversee land and development schemes – which often generate incentives for deforestation – tend to have far more power and resources than environment offices. These challenges have dimensions of both effectiveness (e.g., the ability to meet sustainability goals) and equity (e.g., trade-offs in relation to local livelihoods and rights).

Coordination problems across levels and sectors include barriers to information sharing (Kowler *et al.* 2016), which can be seen as a typical cooperation problem (Box 7.1): everyone would be better off if they all shared information, but each actor wants to hide information for their own benefit. Relatedly, there is a lack of clear responsibilities and sound channels of communication (Deschamps and Larson 2017). Gupta *et al.* (2012) demonstrate how the framing of the climate problem disempowers local actors (see also Sanders *et al.* 2017). Korhonen-Kurki *et al.* (2015) found that coordination failures in national-level REDD+ initiatives in seven countries emerged in part due to the inability to recognise key multilevel problems in the relations among actors, characterised as lack of accountability, lack of agreement, lack of alignment, and failure of acknowledgement. These problems pre-date REDD+, and awareness of them does not seem to lead to solutions. Rather, REDD+ policy-making reflects a complex struggle where the most economically powerful actors – those behind powerful deforestation drivers and development policies – tend to win (Ravikumar *et al.* 2018; Sanders *et al.* 2017). Alternatively, Bastos Lima *et al.* (2017b) suggest that REDD+ and business-as-usual tendencies simply operate in parallel, with REDD+ interventions in their own niche and failing to engage with those whose interests are driving deforestation. Turnhout *et al.* (2017) argue that even parallel conceptions of REDD+ will continue to co-exist because the inherent contradictions are not resolvable.

Importantly, the horizontal cross-sectoral challenges that were identified as a central challenge to REDD+ at national level (Brockhaus *et al.* 2014) also persist at subnational level (Ravikumar *et al.* 2015). In Madre de Dios, Peru, REDD+ created a new space for multi-actor interaction and communication, and for new alliances to emerge, but REDD+ and its advocates were unable to shape land-use dynamics or landscape governance, at least in the short term (see also Satyal *et al.* 2018). In the absence of strong and effective regional regulation, and due to the high value of gold on the international market, illegal gold mining proved to be a more profitable land-use option than sustainable land-use alternatives (Rodriguez-Ward *et al.* 2018).

Understanding coordination failures also means examining who is coordinating their efforts, to what end, and who is excluded. In a comparative study based on over 500 multilevel interviews from Indonesia, Peru and Mexico, Ravikumar *et al.* (2018, 3) find: "coalitions of actors who stand to gain from deforestation wield political power to systematically exclude coalitions for conservation and community land rights". That is, coordination among actors such as agricultural and mining offices, private firms, and elites with special interests is often instrumental in driving deforestation. Different actors have divergent – and at times irreconcilable – objectives, and political coalitions may actively undermine coalitions for sustainability and local peoples' rights.

7.3 Potential solutions

Brazil's Inter-Ministerial Working Group, created in 2003, was an historic attempt at multisectoral coordination. It brought together the ministries responsible for land reform, agribusiness, justice, infrastructure and others to create an action plan on the prevention and control of deforestation in the Amazon. For the first time, responsibility for deforestation and illegal logging was placed with the federal government as a whole, rather than solely with the Ministry of Environment. But the working group's failure at sustaining engagement with civil society, state-level governments and private sector actors – along with the lack of public access to information on action plan monitoring – were considered obstacles to its effectiveness (May *et al.* 2016). Indonesia's REDD+ Agency demonstrates another attempt at multisectoral coordination (see Box 7.3).

REDD+ has tried to shift the balance of power but has only been partially successful. In response to the failure to align land-use goals – and to the potential demonstrated by occasional successes – donors, NGOs and many others have

Box 7.3 Multisectoral coordination challenges in Indonesia: The rise and fall of the REDD+ Agency

Kaisa Korhonen-Kurki

The experience of the Indonesian REDD+ Agency demonstrates the ups and downs of attempts to institutionalise cross-sectoral coordination – in particular, the need to sustain support in light of powerful resistance and vulnerability to electoral processes. On 26 May 2010, Norway and Indonesia signed a letter of intent, which included a USD 1 billion pledge based on performance in a phased approach. As part of this, the REDD+ Task Force was established as a preliminary institution with overall responsibility for REDD+. It comprised a chair, a secretary and nine members representing different ministries. The Task Force reported directly to the President, and the head of it used this strategic position to push a number of important reforms.

The ability to move forward was, however, hampered by the powerful Ministry of Forestry. In 2014, the REDD+ Agency replaced the REDD+ Task Force, and was established as a ministerial-level institution, independent of the traditional government structure. It was run by a director, four deputies and a staff of around 60 professionals. The new agency pushed for reforms to break the task silos of ministries. But, that same year, the change in political leadership turned the institutional landscape around. After the 2014 election, the new president (Joko Widodo) rearranged several ministries and created a merged Ministry of Environment and Forestry (MOEF). This was followed by the dismissal of independent institutions that had been established as part of the climate change regime in Indonesia. By integrating the REDD+ mandate into the new MoEF, REDD+ was 'returned' to the purview of a bureaucratic institution. It also lost any authoritative decision-making power, having been reduced to a subdirectorate. Consequently, cross-sectoral coordination faltered.

Based on: Korhonen-Kurki *et al.* (2017)

called for landscape approaches, jurisdictional approaches and multistakeholder initiatives to foster and support greater coordination and collaborative planning (Sayer *et al.* 2013; Minang *et al.* 2015; Arts *et al.* 2017; Turnhout *et al.* 2017; Boyd *et al.* 2018).

A review of the global scholarly literature on such approaches – specifically on multistakeholder forums set up around land use and land-use change at the subnational level (Sarmiento Barletti *et al.*, unpublished) – reveals that these collaborative platforms are more likely to reach their proposed outcome if they are designed to be adaptive to the context of the problem (see also Olsson *et al.* 2004). One example is whether such a platform builds upon (or at least addresses) existing informal institutions, including traditional leadership roles, local resource management practices, and the organisation of social capital. Creating new institutions and ignoring existing systems and relationships can increase vulnerability, even if marginalised groups are participating.

Additionally, such forums are more likely to transform development/conservation practices in an equitable manner if they address power differences between participating stakeholders through procedural justice, and if they are based on an understanding of equity as a combination of material benefits, access to rights and equal social relations. That is, there is an important link between procedural and distributive justice (Blaikie 2006; Polack 2008); following Fraser (2009), they would address recognition (cultural justice), distribution (economic justice) and representation (political justice)[1] (see also Myers *et al.* 2018). Thus, awareness of context when designing multistakeholder coordination or collaborative processes is key to addressing the structural issues behind the problem they aim to solve, ultimately leading to more equitable and sustainable outcomes.

Crucially, one of the problems with the idea of coordination or collaboration as a solution is that it takes participation for granted. But not all collaboration is equal; who convenes the process and the type of participation offered matters, as well as who does and does not take part. Awareness of these issues will help to avoid reifying or exacerbating existing power differences among actors in relation to land use, as well as community-level conflict. It is also important that such processes be real negotiations, rather than a mechanism for rubber-stamping decisions that have already been made, or to 'check the box' on local participation (see Hickey and Mohan 2004 for a classic discussion of participation in development).

Multistakeholder forums or landscape approaches are not necessarily a solution when entrenched interests dominate (often behind the scenes). A scoping study of eight multistakeholder forums in two regions of the Peruvian Amazon suggests

1 Fraser (2009, 16) analyses justice as "parity of participation", which requires "dismantling the institutional obstacles that prevent some people from participating on a par with others". 'Recognition' grants people the cultural value that gives them requisite standing; 'distribution' addresses economic injustice; and 'representation' refers to membership in the political community of those entitled to make claims of justice.

a link between the ineffectiveness of collaborative processes and inequity in the context where the forum sits. In general, no agreement was reached in forums that challenged the development priorities proposed or supported by the most powerful actors in each region. Forums that were considered 'successful' did not challenge development priorities, were limited to specific locations where powerful actors did not hold economic interests, and had outcomes that were not binding on those actors (Sarmiento Barletti and Larson, in press).

In cases where it is more difficult to challenge powerful actors, other strategies are needed. Ravikumar *et al.* (2018) found that environmentally sustainable and socially just land-use outcomes emerged over time, driven by political organising by activists, local people, government environmental agencies, NGOs and international donors. For example, over the past 50 years, sustained campaigns by environmentalists, indigenous activists and their NGO allies led to the establishment of protected areas in Mexico and Peru; these expanded the geographical remit of environmental offices and gave them leeway to work with local communities on projects that connect livelihoods and human well-being to conservation and sustainable production. In other cases, electoral politics were key. For example, the mayor of the Indonesian district of Ketapang was elected by a coalition of voters who were interested in sustainable production but were suspicious of unchecked corporate oil palm expansion. Once elected, he was unusually aggressive in supporting local forest management, as well as in attracting socially and ecologically conscientious oil palm firms with bold commitments to conservation.

7.4 The way forward

This analysis suggests that, while cross-sectoral and multilevel coordination is clearly not simple, a deeper understanding of the underlying dynamics among actors in a given context is needed to find solutions that challenge business-as-usual trajectories and address both effectiveness and equity goals.

This means recognising the political and power dimensions of land-use governance, including differential power and authority over territory, as well as underlying interests, and incentives for land-use change (Rodriguez-Ward *et al.* 2018).

Greater coordination can support solutions, especially where interests are already fairly well aligned. In these cases it is most important to ensure the availability and flow of information across levels and sectors – a role fostered by independent information brokers and neutral and accountable intermediaries. Government, NGOs and donors should improve the organisation and distribution of responsibilities. In government, there needs to be a clear mandate for cross-sectoral coordination. REDD+ funders also need to improve collaboration; for example, the World Bank and UN-REDD have different rules regarding free, prior and informed consent (FPIC) for REDD+, and funds overlap for the same activities. Such alignment will also improve efficiency.

Nevertheless, aligning interests will often require a political negotiation, which is more than just including a wider range of actors (e.g., different levels and sectors of government, local stakeholders) in collaborative processes. Multistakeholder processes need to address the power imbalances between the different stakeholders through procedural justice (for example, empowering representatives of communities or women with skills and capacity) and include the participation of local actors throughout, rather than just in the implementation of an initiative. Clarifying rights, including through physical georeferenced maps, as well as assuring robust safeguards and redress mechanisms, can facilitate negotiations.

Finally, not all solutions leading to more sustainable and equitable land-use practices can be negotiated. Multisectoral solutions require bold action and leadership. They require government actors willing to challenge business-as-usual interests, including through rights recognition or bold regulations. In conditions of high inequality, other kinds of coordination or collaboration might be called for, such as support for social movements, networks and coalitions for change, and for the safety of environmental and human rights activists (see Chapter 8). Such efforts can shift power relations over time.

Chapter 8

Land and carbon tenure

Some – but insufficient – progress

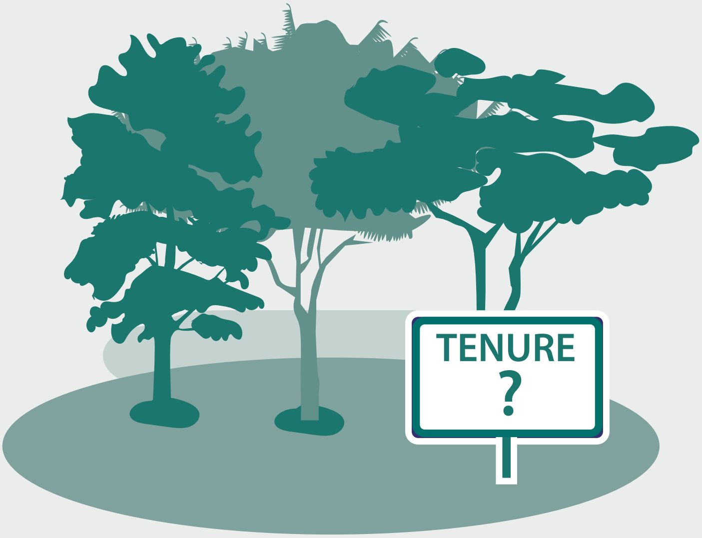
William D Sunderlin, Anne M Larson and Juan Pablo Sarmiento Barletti

Key messages

- REDD+ implementation at national, subnational and local levels has resulted in some progress on tenure, but this is far from enough to ensure the proper functioning of REDD+.
- In some countries (e.g., Peru, Tanzania and Indonesia), REDD+ implementation has raised the profile of tenure reform in national politics and policy; but it has largely failed to deliver notable gains on the ground.
- Major obstacles have been business-as-usual interests favouring forest conversion, the long legacy of exclusion of forest dwellers (notably indigenous peoples) from land-use decision-making, and the fact that concrete efforts to ameliorate tenure have occurred at local project level without sufficient national policy support.

Land and carbon tenure in a nutshell

Tropical countries have a history of forest dweller rights violations – notably when forest products or land are exploited commercially, and landless people migrate into areas claimed as traditional territories by indigenous peoples.

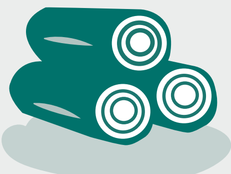


REDD+ implementation at national, subnational and local levels has resulted in some progress on tenure, but this is insufficient to ensure the proper functioning of REDD+.

Indigenous peoples were awarded tenure rights to a large segment of Indonesia's forest estate, and the One Map Policy was introduced.

In Peru, indigenous organisations and donors leveraged the formalisation of tenure rights to five million hectares of forest for Amazonian Indigenous Peoples.

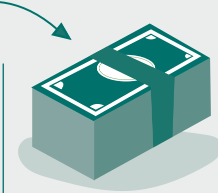
Civil society engagement in Tanzania led to recognition in its National REDD+ Strategy of the importance of secure land tenure and participatory forest management for successful climate change mitigation.



Business-as-usual interests favour forest conversion.

Forest dwellers (notably indigenous peoples) are excluded from land use and decision making.

Concrete efforts to improve tenure have occurred at local level without sufficient national policy support.



With REDD+ losing momentum through lack of funding, many interventions have been on hold, including tenure.

8.1 Introduction

Violation of the rights of forest dwellers is historically common in tropical countries, particularly where forest products or land are exploited commercially through mining, logging or the expansion of commercial agriculture (Peluso 1992; Schwartzman *et al.* 2013; Kelly and Peluso 2015; Human Rights Council 2018) and when landless people migrate into areas claimed as traditional territories by indigenous peoples (Roy 2000; Alexiades 2009). In this chapter, we assess the extent to which the implementation of REDD+ at national, subnational and local levels has strengthened or weakened tenure rights, and propose a course of action. Our analysis focuses on both land and carbon tenure rights, excluding other rights such as free, prior and informed consent (FPIC) and gender, which are discussed in Chapter 11.

Box 8.1 Carbon rights: A legal quandary

Lasse Loft

Carbon rights define which parties have the right to sell, trade and purchase a carbon credit (i.e., a fixed quantity of carbon) in the world's voluntary and compulsory markets, or through bilateral agreements (Chapman and Wilder 2013; Wieland 2013; Karsenty *et al.* 2014). Carbon rights can be tied to the ownership or control over land and trees. Alternatively, they can be defined as self-contained, intangible assets with a monetary value – similar to an intellectual property right, a company's brand, or a title to a mortgage (Greenleaf 2010; Peskett and Brodnig 2011; Loft *et al.* 2015).

Many tropical countries are involved in some form of carbon trade, either at project level or at a subnational or national scale (RRI 2018a). But efforts to clarify carbon rights are progressing slowly (Loft *et al.* 2015). A study by the Rights and Resources Initiative (RRI 2018a) analysed national-level laws and legally binding regulations in 24 countries that collectively hold more than 50% of global tropical and subtropical forests. To date, only five countries (Brazil, Costa Rica, Ethiopia, Guatemala and Peru) have explicitly defined carbon rights in their national laws. Landowners or legally recognised concession holders "may lawfully claim the rights to the carbon contained within their parcel. In Brazil however, carbon rights are vested in the legally recognised owner of the trees holding said carbon, per the country's legal interpretation of forest rights" (RRI 2018a, 5). At the time of the study, 17 countries were considering laws and/or regulations to clarify carbon rights.

The unclear legal situation of land and carbon rights poses a major source of risk for the implementation of results-based REDD+ (Loft *et al.* 2017b), and its elusiveness may lead to competing claims among stakeholders. The settlement of these claims relies on legal interpretations of existing resource laws and regulations from other sectors, under the national legal circumstances. This is a time-consuming and costly process for all stakeholders (Chapman and Wilder 2013; Wieland 2013). It poses a particular risk to the efforts of less powerful actors, such as attempts by indigenous peoples and local communities to secure land and resource rights that are not yet formally recognised (Larson 2011; Sarmiento Barletti and Larson 2017). Although inherent power imbalances cannot be eliminated entirely, processes of legal clarification such as lawmaking and court decisions – which are highly formalised and tend to be more transparent – can help to reduce them.

National policy attention to tenure in REDD+ is motivated by institutional factors, such as the commitment of Norway and other donors to conform to rights-related norms, regulations and protections. These include the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), FPIC, various UN declarations on the rights of women and on land and forest tenure rights (e.g., the United Nations' Voluntary Guidelines on the Responsible Governance of Tenure and the UNFCCC Cancún Agreements on REDD+), third-party certification mechanisms, and social safeguards. Subnational REDD+ implementers have set out to clarify and strengthen tenure rights to forests and, to a lesser extent, forest carbon rights (Box 8.1). Their motivations are both instrumental (clarifying and strengthening tenure are essential to meet REDD+'s carbon effectiveness goal) and ethical (many REDD+ projects are guided by concerns of equity and justice for their local partners).

However, success in creating an appropriate tenure foundation for REDD+ is not guaranteed. Early on, scholars and grassroots representatives highlighted the potential threat that REDD+ poses to tenure rights, as it often aims to restrict access to, and conversion of forests by, local people (Sunderlin *et al.* 2009). Resource competition introduced by the sale of forest carbon credits can also put REDD+ participants at a disadvantage. These complications have led to strong grassroots scepticism towards REDD+ (e.g., the 'No rights, no REDD' movement). Still, in principle REDD+ may benefit local people by placing tenure rights on global or national agendas, by clarifying and strengthening local forest tenure to prevent the conversion of forests by outside competitors, by enabling a beneficial reward system for forest protection, and by producing equitably distributed rewards through the sale of forest carbon credits or other community benefits.

8.2 The key issues

Providing increased tenure security for local forest custodians *vis-à-vis* external claimants on forests is key to the success of REDD+ objectives. Organisations implementing REDD+ are motivated to create an appropriate tenure foundation, but there are tall obstacles to doing so.

In addition to addressing ethical concerns, there are six instrumental goals that REDD+ implementers can achieve by clarifying tenure: (i) identifying the right-holders to REDD+ rewards; (ii) lessening potential harm from restricted forest access and competition for REDD+ benefits; (iii) introducing or bolstering community forestry; (iv) introducing or assuring enforcement of rights of exclusion; (v) resolving intersectoral and interministerial tenure contestation (Sunderlin 2014a; Sunderlin *et al.* 2018); and (vi) collaborating, consulting and negotiating with local REDD+ stakeholders on matters of mutual interest, such as design, implementation and monitoring.

However, there are various obstacles to achieving significant progress on tenure clarification and security. Implementing organisations must often compensate for restriction of forest access through alternative income sources, performance-based rewards, and increased rights in non-tenure spheres. Notably, REDD+ projects are often sited in areas of high tenure contestation or conflict (Sarmiento Barletti and Larson 2017; Gauthier 2018), where more powerful actors have historically had stronger tenure rights than smallholders. Even if REDD+ programmes or projects seek to recognise indigenous and/or collective land rights, there is often deep-rooted opposition to doing so. Larson and Springer (2016, 12) note that such opposition may come "from those who see national development and 'progress' as driven by large-scale private investments, and from those who fear that communities will act as drivers of resource degradation" (see also Monterroso *et al*. 2017; Monterroso and Larson 2018a). In many developing countries, this has escalated into violence against those who seek to defend their lands against claims by powerful actors (Box 8.2).

Box 8.2 The human costs of defending territory and resources

In recent years, local and indigenous peoples in areas rich in natural resources have been subject to a growing number of murders, death threats, acts of sexual violence, and legal and illegal intimidation. In her most recent report, Victoria Tauli-Corpuz, the UN Special Rapporteur on the rights of indigenous peoples, notes: "A crucial underlying cause of the current intensified attacks is the lack of respect for indigenous peoples' collective land rights and the failure to provide indigenous communities with secure land tenure" (Human Rights Council 2018). This trend reinforces the importance of clear land and resource tenure legislation, and of indigenous peoples' access to the rights set in such legislation and in relevant international agreements, e.g., the United Nations Declaration on the Rights of Indigenous Peoples and the International Labor Organization's Convention No. 169.

In 2016, at least 201 forest defenders were murdered worldwide, followed by 197 defenders in 2017, in different conflicts over land and resources; 40% of the victims were indigenous (Global Witness 2017). One example is the murder of Ashaninka leader Edwin Chota and three other community leaders in 2014, as they travelled from the Ashaninka indigenous settlement of Saweto in the Peruvian region of Ucayali to Apiwtxa, an Ashaninka community across the border in Brazil, to meet with other leaders. Chota had recently returned from Lima, where he had denounced threats by people working for timber companies. His murder is not an isolated incident in Peru. In 2017, six local farmers were murdered in Ucayali by a criminal gang that intended to sell their land to palm oil businesses (*The Guardian* 2017). Female land and human rights defenders are less likely to be murdered, but are more often subject to sexual violence – and they are less likely to denounce these abuses (UN OHCHR. n.d.).

In 2017, a letter from rights defenders in 29 countries demanded that the United Nations press governments for better legal protection from violence. The letter states: "We need global action to counter the threats we face. This is not just a struggle for resources, it's a struggle for justice and social equality" (Human Rights Defenders 2017). This context of violence and lack of access to rights underscores the need for REDD+ and similar initiatives implemented in the territories of local and indigenous peoples to actively promote the defence of human rights in order to avoid worsening the current situation (Sarmiento Barletti and Larson 2017).

Land shortages, migration and population growth have also led to tenure conflicts among smallholders (Gauthier 2018). These obstacles are exacerbated by the fact that, in some REDD+ countries, indigenous peoples are not recognised as groups with distinct rights; in other countries, neighbouring non-indigenous local communities may not have the same tenure rights as indigenous peoples.

8.3 The REDD+ experience

8.3.1 Achievements

There have been successes at the level of the global REDD+ framework and national policies. Attention to clarifying and strengthening local tenure rights is enshrined in the tenure requirements of the UNFCCC's Cancún Agreements, in the REDD+ safeguards of the UNFCCC Warsaw Framework, and in the policies and activities of major donor, multilateral and international organisations that have laid the groundwork for REDD+, e.g., the Norwegian International Climate and Forest Initiative, the World Bank and FAO. Partly due to their interactions with international donors, some REDD+ country governments have given more attention to forest tenure, including major recognition of indigenous land rights. In 2013, Indonesia established the basis for the recognition of indigenous tenure rights to a large segment of the country's forest estate through its Constitutional Court Decision 35 (Kahurani *et al.* 2013; Butt 2014), and introduced the One Map Policy to resolve interministerial contestation over forest tenure (Samadhi 2013). Engagement with civil society and indigenous organisations led to recognition of rights protection (including tenure) in Indonesia's National REDD+ Strategy and safeguards (Jodoin 2017). Similarly, civil society engagement in Tanzania prompted its National REDD Framework to recognise the centrality of securing land tenure and participatory forest management for climate change mitigation (Jodoin 2017). In Peru, leverage from Amazonian indigenous organisations such as the Interethnic Association for the Development of the Peruvian Rainforest (AIDESEP) and from donors (e.g., Norway, the Forest Investment Program, and the Inter-American Development Bank) led to a series of initiatives targeting the formalisation of tenure rights to about five million hectares of land for Amazonian Indigenous Peoples (Espinosa and Feather 2018; Monterroso and Larson 2018b).

At the subnational level, jurisdictional programmes and local REDD+ projects have made progress in establishing commitments to address tenure issues, and have achieved modest concrete gains. Recognising tenure as a priority challenge, most implementers at the sample of sites in CIFOR's Global Comparative Study on REDD+ (GCS REDD+) have devoted significant resources to addressing rights issues (Sunderlin *et al.* 2014b). In this sample, which encompasses 22 subnational initiatives in 6 countries and half the area under REDD+, households report a net favourable outlook on the well-being outcome of tenure interventions in their villages (Sunderlin *et al.* 2018). In Cameroon, REDD+ had a measurable positive influence on tenure security at two sites (Sunderlin *et al.* 2018).

8.3.2 Shortfalls

At the national level, governments face challenges in turning policy recognition of the importance of tenure into concrete improvements for REDD+. These include resistance by policy-makers to incorporating changes of the kind and scope needed. In Indonesia, there has been reluctance to acknowledge the legitimacy of indigenous peoples' claims to forest lands (Jodoin 2017) and a lack of follow-through on Constitutional Court Decision 35 at provincial and district levels (Nababan and Arizona 2016). And the transfer of day-to-day management of REDD+ from Indonesia's National REDD+ Agency to the Ministry of Environment and Forestry may also lead to setbacks for rights recognition (Jodoin 2017). In Tanzania, there has been a failure to recognise indigenous rights and to incorporate international norms into the National REDD+ Strategy (Jodoin 2017). In Peru, current titling processes do not reveal a shift towards a wider recognition of indigenous rights by the central government, nor is there evidence of any change to the government's preference for a conservation model that overlaps exclusive protected areas with indigenous territories (Espinosa and Feather 2018). Further, the ongoing titling process is slow and risks being undermined by bureaucratic obstacles (Monterroso and Larson 2018a). In Ecuador, as in many other countries, there is a lack of political will to assure that rights over land and resources translate into effective access to resources in the context of REDD+ (Loaiza *et al*. 2016, 2017.)

At subnational and local levels, REDD+ has had little success in establishing an appropriate tenure foundation (Sunderlin *et al*. 2018). Across the GCS REDD+ sample of sites (Sills *et al*. 2014), tenure insecurity decreases only negligibly across the whole sample of villages in the aftermath of tenure interventions (Sunderlin *et al*. 2018). Being located in a REDD+ site significantly reduced tenure insecurity at village level at only two sites (in Cameroon), and actually increased the insecurity of smallholder agricultural land tenure in Brazil at household level (Sunderlin *et al*. 2018). Among the reasons cited was inadequate government support for implementing organisations. A recent systematic review of the literature on REDD+ projects throughout the world found that, although REDD+ discourse places great emphasis on recognition of tenure clarity and security, this is not reflected in practice (Saeed *et al*. 2017). Likewise, there have been allegations of tenure rights violations in areas where REDD+ has been, and will be, implemented, as documented by Sarmiento Barletti and Larson (2017). Although it is not clear whether REDD+ is responsible for these violations, it highlights the importance of clear safeguards to avoid exacerbating existing inequalities.

8.3.3 Outcome on balance

Despite some measurable achievements, little has been done to clarify and strengthen local-level tenure conditions in REDD+ activities, or to lay a tenure foundation for REDD+ that matches the high expectations of the programme.

There are several major reasons for this shortfall:

- Business-as-usual interests – such as soy and livestock in the Amazon and oil palm in Indonesia – continue to have the upper hand in land-use decision-making in the tropics and are the main threat to tropical forests, the viability of REDD+, and the tenure rights of forest dwellers (Cotula and Meyers 2009; Edwards *et al*. 2012; Brockhaus *et al*. 2014; Enrici and Hubacek 2016).
- REDD+ project implementers, often unassisted by government, are trying to resolve tenure problems at the local level whose origin and scope are at the national level (Sunderlin *et al*. 2014a).
- As REDD+ loses momentum because of lack of funding, many interventions have been put on hold, including tenure.
- Generally speaking, securing tenure rights faces challenges at all governance levels, ranging from resistance and opposition by business-as-usual interests to deficits in human, technical and financial resources. This also includes broader governance problems such as corruption, weak rule of law, or burdensome rules and regulations for formalisation that carry high time and financial costs (Tacconi *et al*. 2009; Notess *et al*. 2018). Efforts to secure tenure rights need to be attentive to these challenges, which affect whether new statutory rights will translate to rights in practice (Larson *et al*. 2010).
- New resources such as carbon, which is associated with novel emissions reduction schemes such as REDD+, have not yet been addressed appropriately by national laws (Loft *et al*. 2015). This means that people from outside a community may have legal rights to resources within that community, and that carbon may fall under the often onerous regulations governing community access to valuable resources. In many cases, forest regulations make it difficult for communities to benefit from valuable resources without substantial external support (Cronkleton *et al*. 2012; Larson and Pulhin 2012).

The failure of REDD+ to advance is a reflection of worldwide ambivalence and hesitation towards addressing climate change (de Sassi *et al*. 2014; see also Chapter 2). In the same way, the failure to make more progress on tenure in REDD+ is largely a reflection of worldwide ambivalence and hesitation towards addressing inequality and righting historical wrongs.

8.4 Lessons and ways forward

Land tenure reform (in particular, the recognition of customary rights) and a serious commitment to REDD+ must both challenge the deep-rooted economic and political interests of business-as-usual exploitation of forests (Larson *et al*. 2013; Sunderlin *et al*. 2018). This is also true of rights over forest carbon.

National-level forest tenure reforms are needed to support REDD+; proponents often try to resolve local-level problems that are actually national in origin and scope (Sunderlin *et al.* 2014a). There must also be cross-scale integration between the efforts of proponents and national actions, and an authentically participatory approach to REDD+ (a key factor in the Cameroon success stories) (Rothe and Munro-Faure 2013; Awono *et al.* 2014; Sunderlin *et al.* 2018).

Achieving this goal must be based on recognition of indigenous peoples' rights to self-determination and to their full inclusion in decisions that affect them. In

Box 8.3 Direct benefits of tenure security for achieving forest-based climate change mitigation

There is an emerging body of research – and a related advocacy movement – linking the tenure rights of indigenous peoples and local communities (IPs/LCs) with forest-based climate change mitigation. The following are the core elements of this outlook/philosophy:

- Indigenous peoples occupy about a quarter of world's land surface (Garnett *et al.* 2018).
- Most of the world's remaining tropical forests are in areas that are managed under customary tenure and/or legally owned by IPs/LCs (RRI 2018a), and they manage "at least 24 percent (54,546 MtC) of the total carbon stored above ground in the world's tropical forests" (RRI *et al.* 2016, 1).
- Forests under the management of IPs/LCs that have legal and secure tenure rights tend to be relatively well protected (Stevens *et al.* 2014; Ding *et al.* 2016; RRI 2018b).
- Matching analysis suggests this success in forest protection is not explained by the remoteness of remaining tropical forests (Stevens *et al.* 2014; Vergara-Asenjo and Potvin 2014).
- Most IPs/LCs that live in forests lack secure tenure rights, in spite of modest gains made in recent decades (RRI 2016, 2018b; RRI *et al.* 2016).
- Formal recognition of customary forest tenure rights will significantly boost the performance of Indigenous peoples in protecting remaining tropical forests against conversion to non-forest uses (Stevens *et al.* 2014).
- There are strong economic (cost–benefit) arguments for improving the tenure rights of IPs/LCs as a climate change mitigation strategy (Hatcher 2009; RRI 2014; Ding *et al.* 2016).
- Although this outlook/philosophy is beginning to get traction in national and international policy circles (RRI 2014), the 2015 Paris Agreement failed to give significant attention to the tenure rights of IPs/LCs (RRI 2016).

Among the concrete actions being proposed to remedy deficiencies and accomplish the goals of this advocacy agenda are to:

- provide IPs/LCs with legal recognition of rights to their forests (RRI 2014, 2018b; Stevens *et al.* 2014; Ding *et al.* 2016) and protect their existing legal rights (Stevens *et al.* 2014; RRI 2018b);
- provide technical assistance and training to IPs/LCs (Stevens *et al.* 2014), for example help in mapping, registering and titling lands (RRI 2014);
- compensate communities for climate and non-climate benefits provided by protected forests (Stevens *et al.* 2014);
- encourage donor organisations to have dedicated funding streams for forest tenure reform (RRI 2016; RRI *et al.* 2016); and
- improve the tenure component of Nationally Determined Contributions (NDCs) in fulfilment of the Paris Agreement (Ding *et al.* 2016; RRI 2016; RRI *et al.* 2016), including through monitoring the climate performance of forests managed by IPs/LCs (RRI 2016).

the context of REDD+, this means engaging indigenous peoples and local communities as right-holders and bearers of climate solutions, not as project beneficiaries (Sarmiento Barletti and Larson 2017). It also requires placing UNDRIP rights at the core of REDD+ and recognising the management of territories in accordance with indigenous approaches.

Finally, it needs to be acknowledged that, in some parts of the forest estate, recognition and strengthening of tenure rights in and of itself – without recourse to additional reward systems such as compensation for opportunity costs or conditional payments – can be a viable approach to forest-based climate change mitigation (Box 8.3).

Part 3

Assessing impacts

Chapter 9

National and subnational forest conservation policies

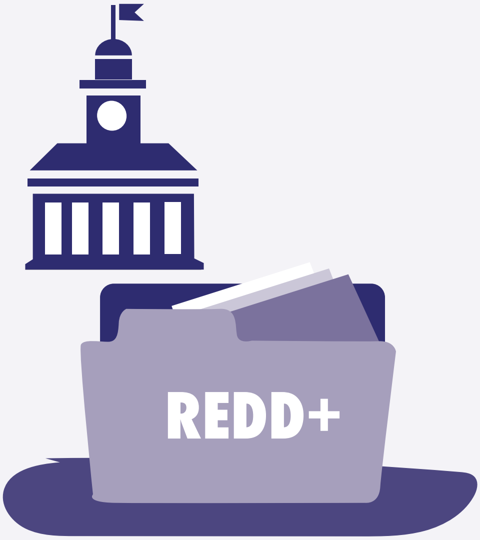
What works, what doesn't

Jan Börner and Thales AP West, with Allen Blackman, Daniela A Miteva, Katharine RE Sims and Sven Wunder

Key messages

- National and subnational policies contribute to forest conservation, but their effectiveness is low on average, especially in the tropics.
- No particular policy instrument stands out as a 'silver bullet'. Achieving the multiple objectives of REDD+ will require policy mixes that are sensitive to local contexts.
- More rigorous evidence on the effectiveness of forest conservation policies is needed, especially from Africa.

National and subnational forest conservation policies in a nutshell

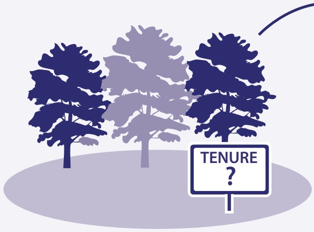


Originally planned as a national tool, REDD+ implementation has been dominated by subnational actors and civil society. Now, as countries finalise their REDD+ programmes, national policies are likely to dominate future implementation strategies.

National policymakers can achieve conservation goals through diverse strategies.

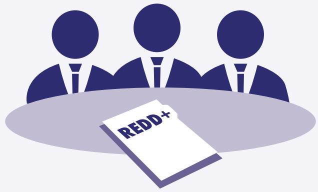
The most common strategy is to discourage deforestation through disincentive-based policies, the creation of protected areas or land-use restrictions enforced via fines, asset confiscation or jail.

Incentive-based policies such as payment for environmental services can encourage forest conservation and improve local livelihoods.



Enabling policies, e.g., land tenure regularisation, can create the necessary conditions for effective and efficient public administration and law enforcement.

Generally, national policies seem to work, but they are much less effective than anticipated. Where policies are effective, cost assessments suggest that investments did pay off.



To ensure national forest conservation policies continue to be effective, efficient and equitable, REDD+ will have to provide significant and stable long-term incentives to recipient country governments.

9.1 Introduction

REDD+ was initially conceived to be implemented through government-led policies at national and subnational scale (Pedroni *et al.* 2009; Angelsen 2017). However, when countries were preparing for REDD+, decentralised project-based pilot initiatives gained momentum (Minang *et al.* 2014; Sills *et al.* 2017; West 2016). Now, as countries begin to launch their REDD+ programmes, national policies are once more in focus.[1] These policies are key vehicles to implement REDD+ as a multi-objective tool for conservation and development, and are often aligned with pre-existing strategies and objectives (Brockhaus *et al.* 2014). Indonesia, for instance, has framed REDD+ as a green, sustainable, low-carbon development pathway (Di Gregorio *et al.* 2017), whereas Brazil's REDD+ programme, expected to be launched by 2020, represents a central component of the ongoing national plan to reduce deforestation (Box 9.1).

Such desired synergies between REDD+ and other conservation and development programmes could secure lasting REDD+ benefits, while reducing the overall cost of curbing deforestation and forest degradation effectively, efficiently and equitably (Angelsen 2008; Vatn and Vedeld 2013; Chapter 6). Focusing on these outcomes, we explore recent scientific literature on the impacts of policy instruments relevant to REDD+ that are implemented chiefly by governments at national and subnational levels.

Box 9.1 Forest governance reform in Brazil

Brazil is a conspicuous example of how national policies can achieve REDD+ objectives. Conservation policies reportedly contributed to reducing deforestation rates in the Brazilian Amazon by approximately 70% (Nepstad *et al.* 2014). Notably, impacts materialised after the federal government launched the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm) in 2004 (Government of Brazil 2004). The plan helped to enact mostly existing legal frameworks in three thematic areas: (i) territorial planning and land-use policies, responsible for the creation of over 50 million ha of protected areas and homologation of another 10 million ha of indigenous lands between 2004 and 2011, and regularisation of thousands of rural private lots in the region; (ii) monitoring and law enforcement strategies assisted by satellite-based 'real-time' detection of deforestation (i.e., the Real Time System for Detection of Deforestation [DETER] programme) and; (iii) promotion of sustainable land-use activities (Government of Brazil 2013). While the PPCDAm is acknowledged as a central component of the forthcoming national REDD+ programme (Government of Brazil 2016), its implementation was followed by a political backlash in 2012 that weakened the legal basis for national forest law enforcement (Sparovek *et al.* 2012).

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1 The United Nations REDD+ programme (UN-REDD), which was established to support the implementation of national REDD+ initiatives, reported the number of partner countries grew from 9 in 2009 to 64 by 2017 (UN-REDD 2017). At least 6 countries have passed or amended a total of 15 new laws, regulations or decrees related to REDD+, and 15 countries have established 23 national or subnational platforms for multistakeholder engagement in REDD+ decisions (UN-REDD 2015). Similarly, the REDD+ Readiness Fund of the World Bank's Forest Carbon Partnership Facility increased its total disbursements from USD 3.5 million in 2009 to USD 42.9 million in 2017 (FCPF 2017).

National policy-makers can achieve REDD+ goals through distinct strategies (Boxes 9.1–9.3) that can be categorised as enabling, incentive or disincentive-based instruments (Börner and Vosti 2013). *Enabling policies*, such as land tenure regularisation, including the devolution of forest use rights, can create the necessary conditions for effective and efficient public administration and law enforcement. In some contexts, enabling policies strengthen the sense of land ownership, awareness and responsibility, thereby eliminating motives to clear forests in order to establish land-use rights. An increasingly popular strategy is to encourage forest conservation through *incentive-based policies*, such as payment for environmental services (PES) that potentially come with the co-benefit of enhancing local livelihoods. Finally, the most common strategy is to discourage deforestation and forest degradation through *disincentive-based policy* instruments, such as the creation of protected areas or land-use restrictions enforced via fines, asset confiscation, or jail.

The emerging evidence on the effectiveness of various policy instruments in achieving forest conservation and social co-benefits echoes earlier criticism of a 'silver bullet' approach to environmental policy design. Howlett contends that policy instruments should be wielded "…like the scalpel of a careful surgeon working on the body politic … [rather than]… the butchers cleaver, with little respect for the tissue of the patient falling under the knife" (Howlett 2004, 1). In fact, the effectiveness of the policy instruments reviewed in this chapter varies considerably both within and across instrument categories, as well as over time and across local contexts. Beyond the choice of policy instruments, other factors

Box 9.2 The Indonesian moratorium

In May 2011, the federal Indonesian government announced a moratorium prohibiting district-level agencies from granting concession licenses for selective logging or for the conversion of dryland forests and peatlands to palm oil or fast-growing tree plantations. It was enacted as part of Indonesia's National REDD+ Strategy, and supported by a USD 1 billion bilateral cooperation agreement with Norway (Angelsen 2017). Looking at the previous decade (2000–2010), Busch *et al.* (2015) estimated that Indonesian deforestation would have been 1.0–3.5% lower, had the moratorium already been in place. Contrary to government sources, Sloan *et al.* (2012) argued that the 53.5 Mha of dryland forests protected by the moratorium were inherently subject to low deforestation pressures when compared to similar unprotected areas and, hence, benefited only marginally from the conservation effort. Yet the 15.4 Mha of carbon-rich peatlands that were also protected by the moratorium benefited considerably from the intervention, since they experienced similar deforestation threats to other unprotected peatlands. Still, two years after the moratorium was enacted, ongoing political pressures and lobbying limited the land under protection from suppression or logging licensing to only 17–32% of the intended conservation areas (Sloan 2014). Recent work based on remotely-sensed forest fire data reported only negligible impacts associated with the moratorium (Groom *et al.* 2018). Notwithstanding recent extensions in the size and scope of the moratorium, results from impact studies have until now not been very encouraging – perhaps mostly due to the spatial targeting of the policy.

Box 9.3 Sustainable forest management in the Republic of the Congo

Declines in the Republic of the Congo's wildlife population during the 1990s led to implementation of its 2000 Forestry Code. Among other objectives, the Code aimed to mitigate forest degradation due to logging through the adoption of sustainable forest management (SFM) guidelines. The law assigned 54% of forests in the country as timber concessions and required concessionaires to develop and follow a government-approved forest management plan. Concessionaires were also encouraged to pursue Forest Stewardship Council certification, which imposes additional biological and social obligations regarding the management of forests, but grants access to restricted and international timber markets (Brandt *et al.* 2014). However, results from Brandt *et al.* (2014) suggest that the presence of SFM was immediately associated with higher deforestation in Congolese forests, apparently driven by higher legal timber production, foreign capital and international timber demand. In defence of the conservation policy, Karsenty *et al.* (2017) noted a problematic selection of comparison units in the former study, which likely led to a biased assessment of the SFM. As a result, the impacts of the Congolese policy on deforestation remain unclear (Karsenty *et al.* 2017).

such as design, implementation context and timing are equally important to the composition of policy mixes that aim to conserve forests in socially acceptable ways (Robinson *et al.* 2018).

9.2 What works, at what cost, and why?

9.2.1 Enabling policies

Public, and often private, forests in many developing countries are *de facto* open access resources, where illegal deforestation and forest degradation activities (e.g., logging) are commonplace. Enabling policies that clarify or secure the property rights of local forest stakeholders can create the necessary capacity and incentives to fend off invaders and facilitate law enforcement, but they can also increase agricultural investments and deforestation (Liscow 2013). Such policies often come as a combination of decentralisation or devolution of natural resource management rights, forest concessions and land tenure reforms. Relatively few studies have evaluated enabling policy instruments, and results are mixed.

Decentralisation is often expected to yield positive conservation outcomes (Pagdee *et al.* 2006; Bowler *et al.* 2012). Theory suggests decentralisation reforms can improve governance efficiency, equity and responsiveness to local demands, because local authorities, who are better informed about local contexts and communities, can develop better policy solutions (Wright *et al.* 2016). Greater local efficiency and equity are also theorised to result in more effective local investments, management and, ultimately, sustainable development pathways (Ribot *et al.* 2006). However, in the presence of poverty or strong economic incentives for natural resource extraction, decentralisation could also promote deforestation (Miteva *et al.* 2012).

The few quasi-experimental evaluations of decentralisation impacts tend to report that rates of forest loss have reduced (Samii *et al.* 2014), such as in the case of India (Somanathan *et al.* 2009; Baland *et al.* 2010) and in Nepal (Edmonds 2002), but not so in Uganda (Jagger *et al.* 2018), whereas results seem mixed in Bolivia (Andersson and Gibson 2007; Wright *et al.* 2016).

Logging concessions can mitigate forest loss and degradation when concessionaires are obliged to maintain permanent natural forest cover and harvest selectively and sustainably (Clark *et al.* 2009; Vidal *et al.* 2016). Quasi-experimental studies reported logging concessions to have reduced deforestation in Indonesia (Gaveau *et al.* 2013) and Guatemala (Blackman 2015; Fortmann *et al.* 2017), whereas impacts were indiscernible in Mexico (Blackman and Villalobos 2018) and in the Republic of the Congo (Brandt *et al.* 2014; Karsenty *et al.* 2017).

Finally, direct property right transfers to individual land users and communities may enable both more sustainable land management and effective environmental monitoring, but success depends on a host of factors (Platteau 2000; Robinson *et al.* 2018). For example, titling communities, rather than individual households, could result in the unsustainable use of local common-pool resources and increase deforestation and forest degradation (Ostrom 2009). Likewise, titling can grant credit access and promote agricultural intensification to the detriment of forests (Liscow 2013). Consequently, evidence remains limited and mixed. Land titling initiatives have reportedly reduced deforestation in Peru (Blackman *et al.* 2017), increased forest loss in Nicaragua (Liscow 2013), and not affected forest cover in Brazil and Ecuador (Buntaine *et al.* 2015; BenYishay *et al.* 2017). Potential economic benefits notwithstanding, land titling seems to require complementary policy measures to effectively mitigate forest loss and inequality (Coleman and Liebertz 2014; Buntaine *et al.* 2015; BenYishay *et al.* 2017).

9.2.2 Incentive-based policies

Incentive-based policies like PES programmes that compensate landowners in exchange for maintaining or enhancing carbon stocks (and other ecosystem services) continue to be an important part of the REDD+ on-the-ground implementation portfolio (Alix-Garcia and Wolff 2014). Empirical evidence from these cases demonstrates that PES are politically feasible, popular among recipients, and can generate meaningful avoided deforestation while supporting household and community livelihoods (Ezzine-De-Blas *et al.* 2016; Börner *et al.* 2017; Salzman *et al.* 2018; Wunder *et al.* 2018). However, emerging evidence also suggests the need to temper expectations that incentive-based REDD+ policies will deliver carbon emissions reduction and sequestration more cost-effectively than direct investments in clean energy and energy-efficiency, or that they can achieve substantial poverty reduction (Kerr 2013; Lubowski and Rose 2013; Alix-Garcia *et al.* 2015; Börner *et al.* 2016, 2017; Sims and Alix-Garcia 2017).

PES schemes will reduce emissions only if they are designed to attract participation from landowners who would otherwise have caused substantial deforestation and forest degradation (Alix-Garcia *et al.* 2008; Ferraro 2008; Jack *et al.* 2008). Programmes in Costa Rica, Mexico, Ecuador, and Brazil have achieved substantial relative reductions in deforestation among participants (near 50% in some cases), but absolute avoided deforestation impacts have been small to modest when the initial rates of forest loss were low (e.g., 1–2% per year) (Robalino and Pfaff 2013; Alix-Garcia *et al.* 2015; Jones and Lewis 2015; Robalino *et al.* 2015; Sims and Alix-Garcia 2017; Simonet *et al.* 2018b).

As expected, PES have generated greater impacts in locations with high risk of deforestation and/or better capacity for implementation (Arriagada *et al.* 2012; Alix-Garcia *et al.* 2015; Costedoat *et al.* 2015); the largest absolute changes in deforestation are for a pilot PES programme in Uganda in an area with historically very high rates of forest loss (Jayachandran *et al.* 2017). While few studies have assessed *ex-post* net benefits or cost-effectiveness, Jayachandran *et al.* (2017) demonstrated positive net benefits of carbon sequestration in the Ugandan pilot. A comparison of PES and protected areas in Mexico found similar opportunity cost profiles between incentive-based and traditional mechanisms (Sims and Alix-Garcia 2017).

PES are generally expected to deliver economic benefits for programme participants because enrolment is voluntary (Wunder 2015). Evidence suggests that PES have supported livelihoods (Liu *et al.* 2018), with slightly positive or no impacts on well-being in Costa Rica (Arriagada *et al.* 2015), Mexico (Alix-Garcia *et al.* 2015; Sims and Alix-Garcia 2017), China (Liu and Lan 2018), Uganda (Jayachandran *et al.* 2017) and Ecuador (Jones *et al.* 2016). Both theory and evidence suggest that the potential for win-win environment and poverty alleviation outcomes from PES depends on whether areas at high risk of environmental loss are owned by poor households and whether payment amounts are sufficiently large to compensate for opportunity and participation costs (Pagiola *et al.* 2005; Alix-Garcia *et al.* 2008, 2015; Jack *et al.* 2008; Jindal *et al.* 2013; Börner *et al.* 2016).

To some extent, many existing PES programmes have sought to target enrolment of land at high risk of loss, of high environmental service density, or of relatively low opportunity cost. This can be achieved by, for example, locally adjusting payment levels according to deforestation risk and conservation opportunity costs, establishing areas of programme eligibility that overlap with high-risk areas, prioritising applicants with a high predicted risk of forest loss, or using auction mechanisms to solicit low-cost bids. Evidence from evaluations of national PES programmes highlights the importance of these strategies (Ferraro 2008; Arriagada *et al.* 2012; Sims *et al.* 2014; Alix-Garcia *et al.* 2015). However, comparison of PES design and implementation across the world reveals that these more sophisticated strategies are still being under-employed; in particular, the enforcement of conditionality (i.e., compliance monitoring and sanctions) is lagging severely behind (Wunder *et al.* 2018). Careful design of PES programmes will also be important for their cost-effectiveness relative to other forms of emissions reduction.

9.2.3 Disincentive-based policies

Disincentive-based approaches, like the establishment of protected areas and other land-use restrictions, remain the dominant conservation strategy in developing countries (Ferraro *et al.* 2011). The impacts of protected areas on forest cover may have both beneficial and detrimental effects on local livelihoods (Oldekop *et al.* 2016). Examples of the former are the regulation and provision of hydrological or pollination services, and the creation of jobs (mostly related to tourism), which is expected to reduce poverty. In contrast, the creation of protected areas could decrease production/extraction activities, increase human-wildlife conflicts, and limit infrastructure development (e.g., access to electricity), thereby increasing poverty (Ferraro and Hanauer 2014). While multiple studies have examined the effectiveness of these interventions in reducing deforestation and forest degradation, most relied on case studies, qualitative data or correlations, and lacked the adoption of rigorous impact evaluation techniques (Geldmann *et al.* 2013; Puri *et al.* 2016).

Most rigorous assessments have suggested that protected areas are effective at reducing deforestation and potentially alleviating, or at least not exacerbating, poverty in some areas (Canavire-Bacarreza and Hanauer 2013; Ferraro *et al.* 2013, 2015; Miteva *et al.* 2015; Busch and Ferretti-Gallon 2017; Sims and Alix-Garcia 2017); some have also demonstrated positive spillovers in neighbouring areas (Andam *et al.* 2010; Honey-Rosés *et al.* 2011), whereas others report deforestation leakage (Pfaff and Robalino 2017). The effects of protected areas also depend on their type. One global comparative assessment found multi-use protected areas and indigenous lands to be even more effective at reducing fire than strictly protected areas (i.e., without human residents) in Latin America and Asia (Nelson and Chomitz 2011). Mixed-use protected areas also stemmed more deforestation in Guatemala than strict ones, mostly due to the presence of forest concessions (Blackman 2015). Some studies, for example in Bolivia, Brazil, Costa Rica, Indonesia and Thailand, found strict protection to result in more avoided deforestation than sustainable-use areas, but in many cases the differences were not large and arose from site selection rather than management regime (Ferraro *et al.* 2013; Nolte *et al.* 2013).

Other disincentive-based policies, such as enhanced environmental monitoring, field-based law enforcement and credit access restrictions, are also often reportedly associated with declines in deforestation, particularly in the Brazilian Amazon (Hargrave and Kis-Katos 2013; Börner *et al.* 2015; Cisneros *et al.* 2015; Fearnside 2017). Still, both the environmental and economic impacts of these policies seem to be actor-specific and vary over space and time (Cisneros *et al.* 2015; Pfaff *et al.* 2015).

9.3 Summary and outlook

Our non-systematic review of the recent literature paints a heterogeneous picture in terms of how national policies can work towards effective, efficient and equitable REDD+ (Table 9.1). The low number of studies reporting no significant effects may reflect a publication bias towards significant findings, even if no such bias was found in the literature on drivers of deforestation (Busch and Ferretti-Gallon 2017). Clearly, most of the recently published rigorous evaluations of national and subnational forest conservation policies focus on deforestation (rather than forest degradation) and on countries in Latin America and Asia. As noted by others, Africa remains as an understudied region (Busch and Ferretti-Gallon 2017). Based on the available evidence, however, none of the policy instruments consistently outperforms any other across varying design and implementation contexts (Figure 9.1). On average, national policies help to reduce forest loss, but they are much less effective than their underlying theories of change would predict (Chapter 2). That said, the few available assessments of programme implementation costs suggested that the investments did pay off.

Table 9.1 Impact of national policies on deforestation (selected studies)

Study	Policy	Location	Methods	Findings
Miteva *et al.* (2015)	Protected areas (PAs)	Indonesia	Matching and difference-in-differences regression analysis	PAs reduced deforestation by 6% during 2000–2010
Ferraro *et al.* (2013)	PAs	Bolivia, Thailand, Indonesia and Costa Rica	Matching and regression analysis	Forest loss was reduced by 2.3–16.7% in strict PAs, and by 0.3–3.6% in less-strict PAs
Sims and Alix-Garcia (2017)	PAs and payment for environmental services (PES)	Mexico	Matching and regression analysis	PES and PAs reduced deforestation by 25.2% and 23.6%, respectively during 2000–2010. PES reduced poverty (11.2%) while PAs had neutral impacts on livelihoods during 2000–2012
Robalino *et al.* (2015)	PAs and PES	Costa Rica	Matching and regression analysis	0.9–1.2% and 1.2–1.6% forest loss reductions in PAs with no PES and in PES-enrolled areas away from PAs, respectively. No significant reductions in PAs enrolled in PES. 1.5% and 2.8% forest loss reductions in PA buffers and in PES-enrolled areas in PA buffers during 2000–2005
Blackman *et al.* (2017)	Land tenure	Peru	Autoregressive fixed-effects regression analysis	Land titling reduced short-term deforestation by >75% and forest disturbance by roughly 60%

Continued to next page

Table 9.1 Continued

Study	Policy	Location	Methods	Findings
Liscow (2013)	Land tenure	Nicaragua	Regression analysis based on instrumental variables	Titling decreased forest cover by 13.7%
BenYishay *et al.* (2017)	Land tenure	Brazil	Matching and difference-in-differences regression analysis	No mitigatory effect on deforestation during 1995–2010 due to low expected rates of deforestation on indigenous lands
Gaveau *et al.* (2013)	Timber concessions	Indonesia	Matching and regression analysis	During 2000–2010, deforestation was on average 17.6% lower in natural forest timber concessions than in oil palm; timber concessions and PAs presented a similar effect on forest conservation
Jayachandran *et al.* (2017)	PES	Uganda	Matching and regression analysis from a randomised controlled trial	5.1% reduction in deforestation after two years of PES (2011–2013)
Bauch *et al.* (2014)	Community-based enterprises	Brazil	Matching and difference-in-differences regression analysis	Almost no discernible impacts on household income, assets, livelihood portfolios, or forest conservation during 1997–2006
Arriagada *et al.* (2012)	PES	Costa Rica	Matching and difference-in-differences regression analysis	PES increased forest cover by 11–17% in enrolled lots during 1992–2005
Costedoat *et al.* (2015)	PES	Mexico	Matching and difference-in-differences regression analysis	12–14.7% more forest cover in lots enrolled in the PES programme during 2007–2013

More evidence based on counterfactuals – in particular from randomised controlled trials or quasi-experimental designs, may eventually enable meta-analyses to identify cost-effective national policy instruments for variable contexts and outcome measures (Macura *et al*. 2015; Baylis *et al*. 2016; Puri *et al*. 2016). Equally, an increasing number of studies demonstrate that technical and institutionally feasible adjustments to the design and implementation strategies of existing national forest conservation policies (e.g., spatial targeting, improved monitoring and enforcement) could massively boost cost-effectiveness (Börner *et al*. 2016; Ezzine-De-Blas *et al*. 2016; Wunder *et al*. 2018).

However, knowledge about what works best, where and when, may not be enough. What prevents policy-makers from adopting these science-based recommendations? We know too little about what determines policy-makers' choice and design of

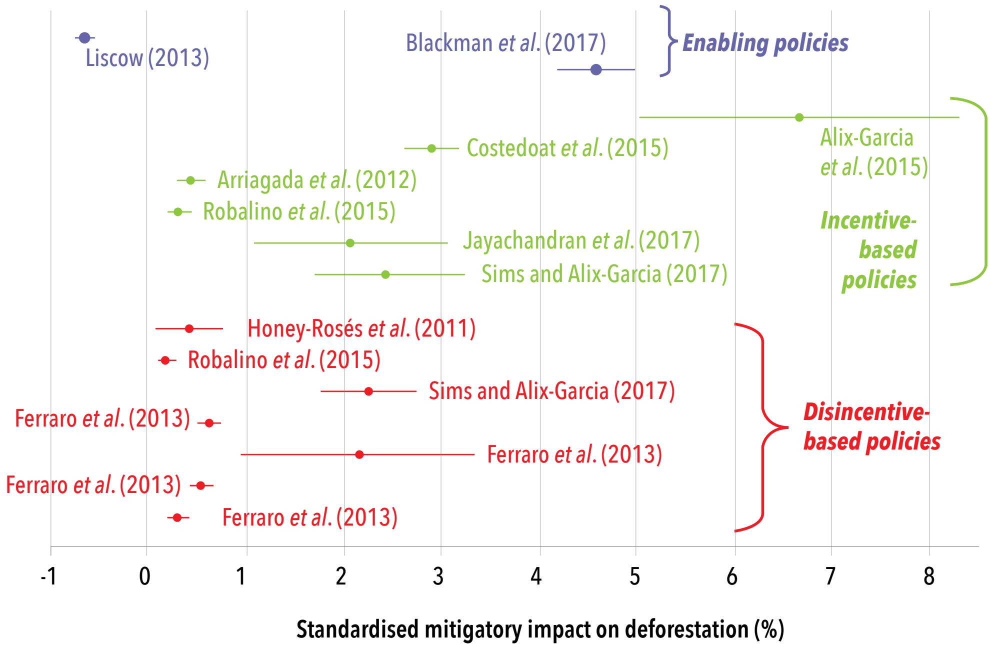


Figure 9.1 Effect sizes of national policies

Note: Standardised impacts calculated based on the method described in Samii *et al.* (2014). Dots represent average annualised impacts. Lines represent standard errors.

national forest conservation policy instruments. Administrative and institutional constraints, as well as limited bargaining power and multiple side objectives of environmental ministries in developing and emerging economies, can lead to suboptimal policy choices and design outcomes, even if decision-makers are well-informed (Rosa da Conceição *et al.* 2015; Nolte *et al.* 2017). Likewise, policy design, implementation (including enforcement) and context conditions change over time (Lambin *et al.* 2014). As a result, success stories are not guaranteed to last (see Box 9.1) as temporary shifts in public policy priorities can produce easily revertible improvements in forest governance structures. REDD+ will thus have to provide sizeable, stable and long-term incentives to recipient country governments if it is to achieve lasting conservation outcomes.

Chapter 10

Forests and carbon

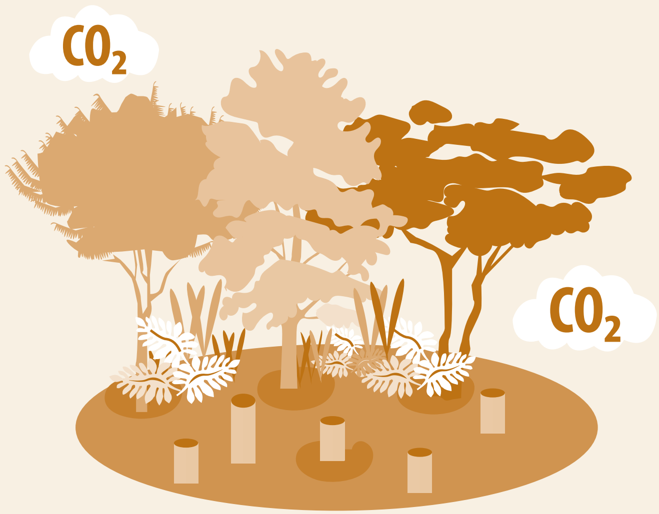
The impacts of local REDD+ initiatives

Gabriela Simonet, Astrid B Bos, Amy E Duchelle, Ida Aju Pradnja Resosudarmo, Julie Subervie and Sven Wunder

Key messages

- Only a few studies assess the impacts of local REDD+ initiatives on forests, due to the financial, methodological, data and political challenges of implementing rigorous impact evaluations.
- Local REDD+ projects and programmes frequently include a mix of interventions, i.e., incentives, disincentives and enabling measures. Disincentives are used to reduce deforestation, and incentives – either conditional on results or not – are used to help minimise the trade-offs between carbon and well-being outcomes.
- The scarce evidence that is available on local REDD+ outcomes shows modestly encouraging results for forest conservation and carbon stock enhancement. Three projects using conditional incentives showed positive results for forests, through reducing the negative impacts of smallholder agriculture and firewood collection.

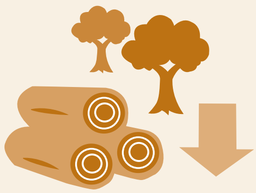
REDD+ impact on forests and carbon in a nutshell



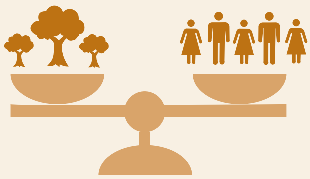
Hundreds of local REDD+ initiatives have emerged across the tropics, but few studies have assessed their impact on forests.

Few studies assess the impact of local REDD+ initiatives on forests. This is due to the financial, methodological, political and data challenges of implementing rigorous impact evaluations.

Local REDD+ projects and programmes frequently include a mix of interventions, i.e., incentives, disincentives and enabling measures.



Disincentives are particularly important for reducing deforestation; whereas incentives are used to help minimise the trade-offs between carbon and well-being outcomes.



Conditional and non-conditional livelihood enhancements can help minimise trade-offs between carbon and well-being outcomes.

Existing studies show modestly encouraging results for forest conservation and carbon stocks.

Positive results come from locally adapted solutions that make smallholder agriculture more sustainable and reduce firewood collection. REDD+ projects and programmes with conditional incentives succeeded in reducing deforestation at several sites.

10.1 Introduction

Tropical deforestation and forest degradation play a major role in anthropogenic emissions of CO_2. REDD+ was created to counteract this, and the potential of REDD+ to help mitigate climate change was recognised in the Paris Climate Agreement. REDD+ stands apart from previous conservation instruments because of its results-based approach; financial incentives are tied to demonstrated reductions in deforestation and forest degradation – and, thus, emissions (Chapter 4). Although the UNFCCC initially agreed upon national-level REDD+ implementation, hundreds of local REDD+ projects have emerged across the tropics, of which about a third have already sold carbon credits on the voluntary market (Box 10.1). This is at least a tentative sign that these local initiatives have made some progress. However, although forest monitoring methods have evolved (De Sy *et al*. 2016), there are still surprisingly few rigorous studies on the carbon/land-use performance of REDD+ (Duchelle *et al*. 2018b).

Beyond its slow implementation, this probably reflects a mix of financial, technical and political challenges. First, it is expensive to undertake robust impact evaluations; acquiring the necessary data is costly. Second, results are often highly sensitive to the methods adopted to calculate a counterfactual baseline. Third, although robust evaluations can take time, funders are impatient: independent evaluations can be risky, as disappointing short-term evaluated impacts in a learning phase could jeopardise the future financing of REDD+ projects and programmes.

Box 10.1 REDD+ and its global potential to mitigate climate change

As of May 2018, around 350 REDD+ projects were underway in 53 countries, covering an area over 43 million ha – nearly the size of Morocco (Simonet *et al.* 2018a). Ten key countries currently host more than 10 REDD+ projects each: Brazil (48), Colombia (33), Peru (25), Indonesia (21), Kenya (21), Uganda (18), the Democratic Republic of Congo (17), China (13), India (12) and Mexico (12). However, when we look at the 'density' of REDD+ initiatives, i.e., the amount of forest area under REDD+ in relation to countries' total forest area (Figure 10.1), the leading countries change completely, with Kenya, Guatemala, Cambodia, Madagascar and Peru in the top five.

While their interventions and strategies differ vastly, REDD+ projects share a common objective: to mitigate climate change through reductions in deforestation, forest degradation and/or the enhancement of forest carbon stocks. Together, based on their project design documents, they are expected to avoid the emission of 84 million tCO_2 per year (with a mean lifespan of 33 years) (Simonet *et al.* 2018a) corresponding to around 1% of annual emissions from deforestation, forest degradation, harvesting and peat fires in the tropics (7.4 ± 4 $GtCO_2$ per year, Grace *et al.* 2014).

How much of this potential has been realised so far? Probably less than forecast, as less than 5% of total expected emissions reductions have actually been sold as carbon credits on the voluntary market (Simonet *et al.* 2018a). Slack demand on carbon markets is impeding the sale of sizeable quantities of already-verified emissions, with only a third of REDD+ project implementers having already sold some credits; another third have so far chosen not to generate carbon credits, instead relying on other financing sources.

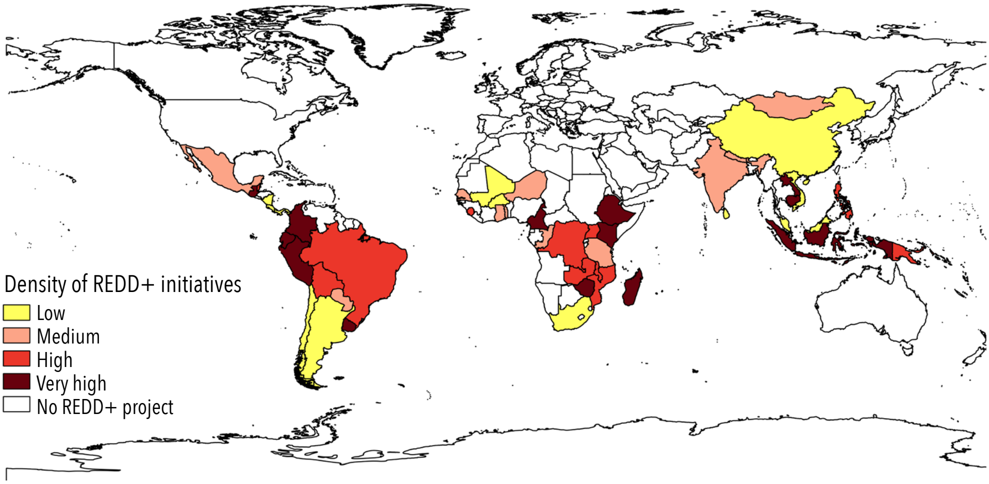


Figure 10.1 Density of REDD+ projects, defined as the area covered by REDD+ projects divided by country's (2015) forest area.

Note: Low density means that between 0.002% and 0.30% of country's forest area is covered by REDD+ projects; Medium ranges between 0.30% and 0.97%; High between 0.97% and 3.31%; and Very high between 3.31% and 66.36%.

Source: Based on Simonet *et al.* (2018a) and FAO data.

This chapter sets out to address two main questions: What methods and data are available to quantify the carbon/land-use outcomes of local REDD+ initiatives and other forest carbon-focused pilot experiments? What do the few early impact evaluation studies conclude?

10.2 Measuring impact on forests

10.2.1 Methods

Since the emergence of REDD+, monitoring of forest-cover change and land-use compliance has seen remarkable advances, even at project level (De Sy *et al.* 2016). However, genuine impact assessment is more complex, as this aims to attribute forest changes to specific interventions. This raises the hypothetical question, how would forests have fared without the intervention? This requires the construction of an explicit counterfactual scenario.

The challenge of constructing appropriate counterfactual scenarios could, in principle, be solved by randomly selecting a treatment group (that will be offered the REDD+ intervention) versus a control group (that will not) before the intervention begins. Although considered the gold standard for impact evaluation, randomised controlled trials (RCTs) like these are challenging to implement for logistical, financial, political and ethical reasons[1] (Athey and Imbens 2017). Randomisation is therefore rarely used for REDD+ and other conservation initiatives, apart from a few recent exceptions (e.g., Jayachandran *et al.* 2017; Jack and Jayachandran 2018; Pynegar *et al.* 2018).

Instead, REDD+ programme evaluation largely relies on observational studies; that is, studies where interventions have not been randomly assigned (Athey and Imbens 2017). These frequently use a before-after/control-intervention (BACI) design, where the sample includes both participating and non-participating individuals, with both groups surveyed at least twice (before and after the programme). 'Matching' control groups with comparable characteristics are chosen, so that any post-treatment difference in performance can be observed. In such cases, causal inference about the impact of a programme is often challenging, because those who are offered the programme may differ from those who are not, even before the programme starts. It is therefore hard to determine whether any difference between the two groups observed at the end of the programme results from the programme itself, or from this initial difference. This selection issue can be resolved using quasi-experimental methods, which include the matching approach and the difference-in-difference (DID) approach, as well as combinations of both (Box 10.2). Researchers have only recently begun to apply such quasi-experimental methods to the REDD+ context (e.g., Börner *et al.* 2013; Bos *et al.* 2017; Duchelle *et al.* 2017; Simonet *et al.* 2018b).

In the absence of comparison group data, some studies look at changes in the outcomes of participants over time, something referred to as the 'before-after' (BA) method or a 'naïve comparison', assuming nothing else changes (Poffenberger 2015; Pandey *et al.* 2016). These methods suffer from some biases when important events or strong trends prevail – i.e., when a 'time trend bias' (e.g., output prices, infrastructure development) drives results more than the intervention in question. Causal assessment is therefore difficult under BA. Combining BA and BACI to assess tree cover change at 23 REDD+ sites, Bos *et al.* (2017) found that the BACI approach indicated marginally better REDD+ performance than BA, especially at the most localised level (village rather than site). As such, BACI and BA tend to lead to different results.

10.2.2 Data

Getting the right data at the right scale is another impediment to assessing REDD+ impacts on forests and carbon stocks. Primary data sources are remote sensing images and carbon stock inventories carried out in the field, which can complement self-reported interview data.

1 Ethical problems arise when creating a group of individuals who will be denied a programme that is clearly beneficial, and who otherwise would have benefitted. This issue has been particularly discussed in medical research. An objection is that, in a situation of limited funding, randomisation can be seen as a fair solution. A potential solution to relieve ethical concern is to apply 'conditional randomisation': first select eligible participants who need the treatment, then randomly assign it within budget (Ravallion 2018).

Box 10.2 Commonly used quasi-experimental estimators

Various econometric methods using observational data have been developed to tackle the issue of selection (i.e., initial differences between treatment and control groups, due to non-random assignment of treatment). See Todd (2007) for an exhaustive and rigorous presentation of observational methods, and Athey and Imbens (2017) for recent developments of this literature. Three of these commonly used econometric methods are presented below:

- **The matching approach**: If we believe that factors creating selection bias are all observable, meaning that we can measure all of these factors using available data, we can use matching estimators to estimate the additional effect of a programme. Matching consists of comparing 'treated' farmers (those who were offered the programme) to observationally similar ones from the control group, i.e., comparing farmers who are as similar as possible.
- **The difference-in-difference (DID) approach**: If we believe that factors creating selection bias are constant over time, we can use the DID approach, which compares the changes in outcomes over time between the treated and the control group. The causal impact is measured by subtracting the pre-programme difference (A - B) from the post-programme difference (C - D) between these two groups (Figure 10.2).
- **The DID-matching approach**: This approach first uses matching to construct a control group that is observationally similar to the treatment group, and then uses DID to estimate a treatment effect. DID-matching combines the advantages of the matching approach and of the DID approach, as it controls for both observable and time-invariant, linear, unobservable, confounding factors. Matching and DID can be combined in at least two ways: (i) matching to pre-process the sample and then performing DID (see Ferraro and Miranda 2017) or (ii) integrating DID into the matching procedure (see Todd 2007).

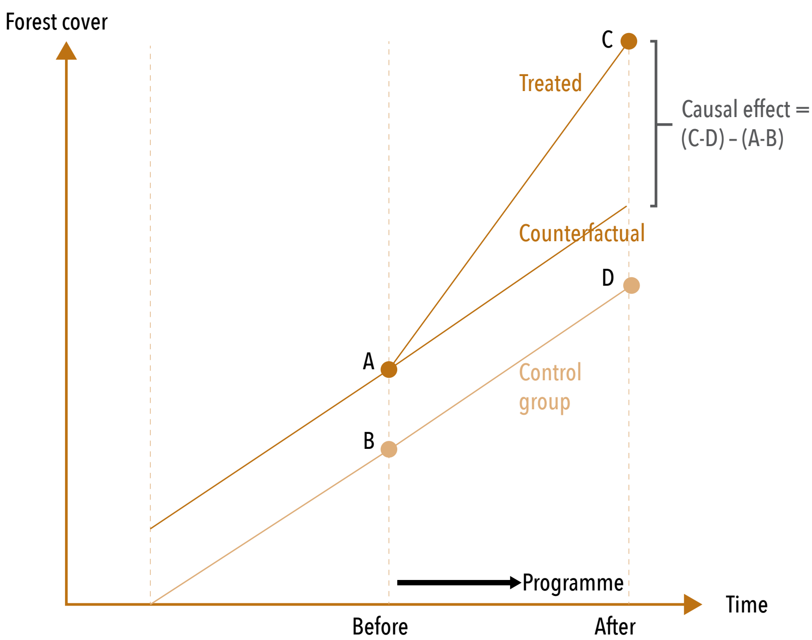


Figure 10.2 Illustration of the difference-in-difference (DID) approach

The plethora of tools and datasets available for forest monitoring through remote sensing can cause confusion among end users about which is correct or best for what purpose (Petersen *et al.* 2018). Beyond quantifying forest area changes, challenges persist in fully assessing the carbon stock contained in different carbon pools within a forest, including soil. When specific information is missing, IPCC emission factors are frequently used. However, these may not be representative of the forest type where interventions take place and come with significant uncertainties, resulting in even larger uncertainties in final carbon emission estimates (Romijn *et al.* 2015).

Self-reported interview data can help to 'ground-truth' remotely observed trends, and overcome some of the technical limitations of remote sensing, notably getting household-level information on land use, completing missing information in cloud-covered areas, tracking reforestation and forest degradation, or distinguishing between tree species. This data can also help to construct adequate theories of change about the causes behind observed land-use changes (Chapter 2). However, the costs associated with fieldwork data collection can be prohibitive, and the accuracy and bias (i.e., if local people fear losing benefits due to honest reporting of forest-clearing activities) of self-reported data can be hard to estimate.

10.3 The impact of local REDD+ initiatives on forests

Just like national REDD+ policies (Chapter 9), local REDD+ projects and programmes often include a mix of enabling measures, disincentives, and both conditional and non-conditional incentives (Table 10.1; Chapter 11).

Enabling measures aim to create the appropriate conditions for local REDD+ initiatives to operate. Such measures include local environmental education, capacity building, and activities aimed at clarifying ownership and access rights over forests, trees and carbon.

Disincentives restrict access to and/or conversion of forests. These can include enforcement of forest protection laws and regulation (e.g., Brazil's Forest Code), forest monitoring (e.g., by communities), or the imposition of fines.

Incentives (cash or non-cash) can be conditional or non-conditional, with the aim of inducing changes in landholders' behaviour, so as to reach REDD+ objectives, compensate them for any loss expected from these changes, direct them to more sustainable production, and/or improve their living conditions. They notably include technical assistance, the distribution of agricultural inputs (e.g., seeds and fertilisers), or the introduction of improved cooking stoves. When incentives are conditional on the protection of forests or the adoption of specific practices (e.g., reforestation or agroforestry), they can be classified as payments for environmental services (PES).

Impact evaluation studies developed so far eclectically combine the methods and data choices presented in Figure 10.3 and Table 10.1.

Table 10.1 Impact of REDD+ projects and programmes on forests

Study	Type of intervention (D=disincentives, I=incentives, E=enabling measures)	Location	Experimental design	Statistical method	Type of data (RS = remote sensing, CSM = carbon stock measurement, RLU = reported land use)	Findings
Börner *et al.* (2013)	D (improved protected area enforcement) and I (individual conditional payments)	Brazil	BACI	DID and DID-matching	RS	Decline of mean annual deforestation is 12% less in treated reserves (2000–2007 vs. 2008–2011).
Bos *et al.* (2017)	Variable mix of D, I and E among 23 initiatives studied	Peru, Brazil, Cameroon, Tanzania, Indonesia, Vietnam	BA and BACI	BA mean comparison and DID	RS	"Overall minimal impact of REDD+ in reducing deforestation on the ground thus far."
Duchelle *et al.* (2017)	Variable mix of D, I and E among 17 initiatives studied	Peru, Brazil, Cameroon, Tanzania, Indonesia, Vietnam	BACI	Mixed effects model	RLU	Higher forest impact for disincentives than for other intervention types.
Jayachandran *et al.* (2017)	D (patrol to reduce outsiders' access to forests) and I (individual conditional payments)	Uganda	RCT	Regression	RS and RLU	5.1% reduction in deforestation after two years of payments (2011–2013).
Pandey *et al.* (2016)	D (harvesting control), I (cooking stove distribution, income generating activity implementation) and E (awareness meetings)	Nepal	BA	BA mean comparison	CSM	Carbon stocks increased by 5.1 tC/ha per year (1.9–8.0) over a three-year period.

Study	Type of intervention (D=disincentives, I=incentives, E=enabling measures)	Location	Experimental design	Statistical method	Type of data (RS = remote sensing, CSM = carbon stock measurement, RLU = reported land use)	Findings
Poffenberger (2015)	D (forest fire control), I (subsidising fuel efficient stoves; promoting pig farming) and E (awareness meetings)	India	BA	BA mean comparison	CSM	Average forest fire area fell from 82.8 ha (2010–12) to 62.3 ha (2013–15); increase in biomass levels.
Resosudarmo *et al.* (unpublished data)	Variable mix of D, I and E among 17 initiatives studied	Peru, Brazil, Cameroon, Tanzania, Indonesia, Vietnam	BACI	Descriptive statistics	RLU	65% of treated households report land-use change; forest enhancement interventions generate the highest changes, followed by disincentives.
Simonet *et al.* (2018b)	D (enforcement of Brazilian Forest Code), I (individual conditional payments) and E (awareness meetings, environmental regularisation, administrative support)	Brazil	BACI	DID and DID-matching	RLU	~50% decrease in the average rate of deforestation in treated farms compared to the counterfactual deforestation rate (2010–2014).

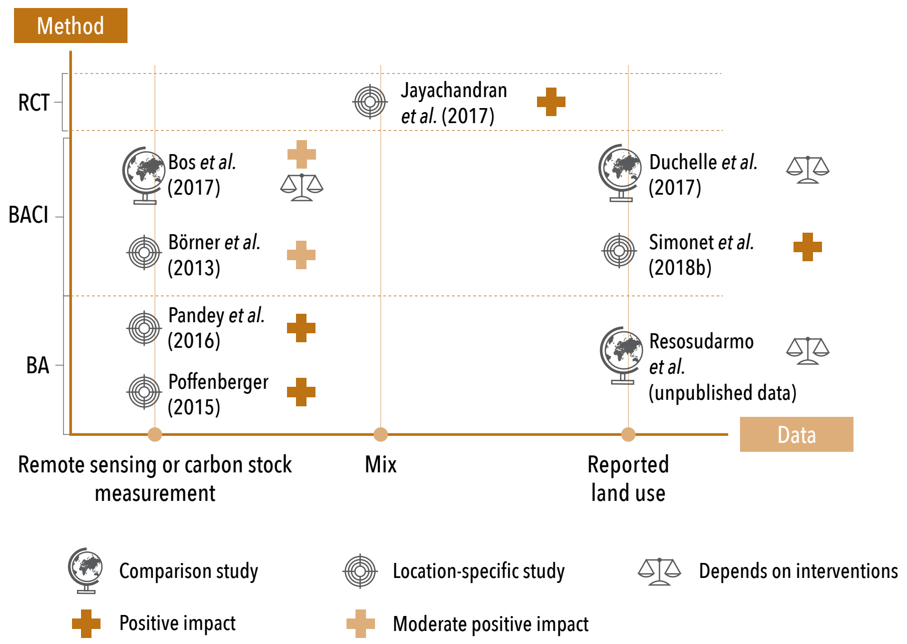


Figure 10.3 Methods and data used in the REDD+ and forest carbon impact literature

References to studies within this chapter mainly derive from Duchelle *et al.* (2018b), a systematic review of English-language peer-reviewed articles from 2015 to 2017 that include an *ex-post* assessment of REDD+ interventions, i.e., assessed after the programme has begun. More recent articles (2018) and those prior to 2015 were included based on the authors' knowledge of REDD+ impact evaluation literature. Here, we present the results of studies comparing interventions, e.g., weighing up the role of disincentives versus incentives in forest clearing. We then discuss the results found in location-specific studies, distinguishing non-conditional incentives from conditional ones. Given the hybrid nature of REDD+ projects and programmes, it is challenging to attribute outcomes to specific interventions.

10.3.1 Comparative studies: Deforestation reductions likely driven by disincentives

In 2010, CIFOR launched its Global Comparative Study on REDD+ (GCS REDD+) that collected BACI data from a pan-tropical sample of households in 23 REDD+ sites across Brazil, Cameroon, Indonesia, Peru, Tanzania and Vietnam. Using Global Forest Change (GFC) data (Hansen *et al.* 2013a) on these 23 sites, Bos *et al.* (2017) used both BA and BACI approaches to assess tree cover change at site and village scale, finding some reduction in tree cover loss at early stages of REDD+ interventions.

Duchelle *et al.* (2017) analysed the effect of different types of interventions on forest clearing, as reported by 4,000 households living over 17 sites. Authors found that households targeted by disincentives significantly reduced their forest clearing compared with those primarily receiving incentives or no intervention at all. Importantly, when applied on their own, disincentives negatively affected local perceptions of tenure security and well-being, however when applied with incentives, negative well-being effects were cushioned.

Drawing on the same global dataset as Duchelle *et al.* (2017), Resosudarmo *et al.* (unpublished data) analysed the perceived effects of different intervention types on land-use behaviour. They found that three-fourths of households at REDD+ sites were subject to at least one intervention designed to protect or restore forests. Among these households, 65% reported changes in agricultural and forestry practices, including reduction or cessation of forest clearing and burning for agriculture, and more sustainable management of timber and non-timber forest products. Disincentives, i.e., interventions restricting forest access and conversion, reportedly spurred these land-use changes in slightly more than half of the sample.

The few global REDD+ studies undertaken so far conclude that overall, moderate positive forest impact has been made, with disincentives seeming to play a major role in this. Bos *et al.* (2017) attribute this relatively low impact to the slow implementation of REDD+ initiatives, and the correspondingly low density of interventions. Likewise, the focus of REDD+ implementers on smallholders fails to address the larger-scale drivers of deforestation. Although disincentives may have better results, it seems crucial to compensate for any negative impacts they may have on smallholders' well-being by combining them with incentives. Studies presented hereafter provide insights into the performance of local REDD+ initiatives that use a diverse range of incentives (always in combination with disincentives and/or enabling measures).

10.3.2 Location-specific studies: Non-conditional incentives may slightly increase carbon stocks

Very little can be said about the capacity of non-conditional incentives to reduce deforestation, due to the absence of robust impact analysis dealing directly with this type of intervention. Using BA carbon pool inventories in a case study report on a REDD+ site in Nepal, Pandey *et al.* (2016) found an average increase of 5.1 tC/ha per year (1.9–8.0) in carbon stocks over a three-year period. The authors mainly attributed this result to the use of improved cooking stoves, which reduced pressure on forests for fuelwood. Using a similar approach, Poffenberger (2015) found that community conservation and reforestation activities in a REDD+ project in India led to an increased biomass, notably due to better fire control, enrichment planting and distribution of cooking stoves.

The two studies analysed projects that adopted a strategy focused on non-conditional incentives, combined with disincentives and enabling measures (Table 10.1). They showed that this type of intervention mix had a positive effect on carbon stocks. This result must be analysed in view of the limitations of the BA approach applied in both studies. In both cases, solutions aimed at reducing firewood consumption are highlighted as an element of success, but one which cannot be isolated from other elements, such as awareness meetings and forest controls, which were implemented simultaneously.

10.3.3 Location-specific studies: Conditional incentives demonstrate varying degrees of success

Some of the more robust studies examined the impact of incentives conditional on forest protection and/or enhancement. Using high-resolution satellite images and self-reported data, Jayachandran *et al.* (2017) estimated the effectiveness of a carbon-focused initiative offering individual payments to Ugandan smallholders in return for forest conservation and tree planting. After two years of implementation, satellite data demonstrated that tree cover had declined by 4.2% in the intervention villages, versus 9.1% in the control villages. Self-reported data were in line with this main result, with lower self-reported tree cutting in the intervention group. These encouraging results link not only to a reduction in participants' own deforestation, but also to increased patrolling so as to reduce others' open access to forests. Spillover effects seemingly played no role. However, if the programme was scaled up, the lower levels of timber extraction in treatment villages could increase prices, thus incentivising more tree cutting in neighbouring villages.

An early impact assessment of the Bolsa Floresta programme – among the first initiatives in Brazil to rely on individual conditional incentives to protect forests – used remote sensing data to uncover preliminary impacts on forests (Börner *et al.* 2013). The assessment found that while forest impacts remained small in terms of number of hectares, mean annual deforestation in Bolsa Floresta reserves was 12 percentage points lower than in other multiple-use protected areas. However, as Bolsa Floresta operates in a remote part of the Amazon where demand for converted land remains low and beneficiaries are relatively homogenous, this corresponds to a low absolute forest loss.

Using DID and DID-matching methods in a third assessment, Simonet *et al.* (2018b) found promising results regarding the possibility of stemming deforestation among smallholders in the Brazilian Amazon by offering PES-type incentives alongside enabling measures (e.g., awareness raising), in a context of strict governmental control (see Box 10.3).

These three studies focused on initiatives that included conditional incentives. All indicated significant reductions in deforestation, but to varying degrees of magnitude. In all cases, the REDD+ projects included a mix of interventions, so the

Box 10.3 Measuring impact: The 'Sustainable Settlements in the Amazon' initiative

Since the mid-2000s, deforestation has been significantly reduced in Brazil, yet less so among smallholders, who still rely much on land-extensive swidden agriculture (shifting cultivation) and cattle ranching for subsistence. Noncompliance with the Brazilian Forest Code, which requires conserving between 50% and 80% of their land as forest, has so far remained widespread. In this context, 350 smallholders living along the Transamazon Highway (Pará State) were offered an innovative REDD+ package including payments conditional on forest conservation, environmental education, and technical-administrative assistance (with forest restoration and adoption of fire-free agriculture systems added as later components).

Using DID and DID-matching, Simonet *et al.* (2018b) found that participants (whose initial mean forest cover spanned ~71 ha) saved an average of 4 more hectares of forest over the study period (2010–2014), compared to the counterfactual scenario with no REDD+ initiative. Although participants continued to clear forest, their deforestation rate was halved (Figure 10.4). The remote sensing-based plot-level data neatly mirrored the auto-declared deforestation data, providing a convincing reality check. Slowdown in the creation of new pastures is key. Just like Jayachandran *et al.* (2017), the authors found no evidence of spillover of deforestation from participating plots to neighbouring ones. Authors believe that the long-term presence of the project initiator, locally adapted solutions, and strong deforestation monitoring by the Brazilian government, may have all contributed to these encouraging results at a pilot stage of REDD+ implementation.

Using the most recent GFC data (version 1.5) (Hansen *et al.* 2013b) and applying the BACI method at village level (Bos *et al.* 2017), analysis showed that deforestation in the Transamazon intervention villages increased over time, but did so less than in control villages. These results do not necessarily contradict results obtained at household level, as less than 10% of households living in the villages marked as intervention villages actually participated in the project. This illustrates the complexity of combining different types of data and different scales of analysis.

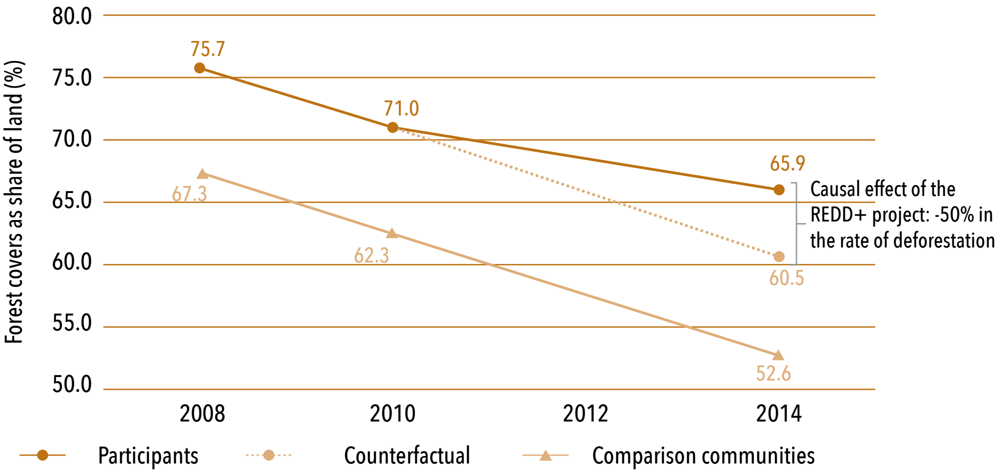


Figure 10.4 Impact of REDD+ on deforestation in Transamazon project

Source: Data from Simonet *et al.* (2018b) impact – if any – cannot be clearly attributed to any particular one. Across the three studies, the simultaneous presence of incentives and disincentives appears to be conducive to project success. The ability of landholders to exclude outsiders is also necessary, indicating that initiatives in areas with unclear and insecure tenure rights have less potential for success.

10.4 Lessons and ways forward

Local REDD+ projects and programmes are hybrids of enabling measures, disincentives and incentives. Due to the complexity of measuring heterogeneous treatments, over short timeframes, it is too early to establish a clear link between the type of REDD+ intervention and its success in reducing deforestation. However, we can see from local-level studies that restrictions on forest access and clearing have led to reductions in deforestation, and that conditional incentives showed positive results across several sites. Likewise, conditional and non-conditional incentives are clearly important in minimising the trade-offs between carbon and non-carbon benefits. The few studies that have investigated local spillovers found no such evidence (Jayachandran *et al.* 2017; Simonet *et al.* 2018b) but more systematic exploration is needed if programmes are to be scaled up.

Despite REDD+ debuting globally over a decade ago, robust studies on its carbon performance are still notably lacking. There is an urgent need to understand the effectiveness of early REDD+ projects and programmes when it comes to conserving forests and enhancing carbon stocks, to guide the design of future interventions. A good sign of progress towards this objective is independent evaluation of the effectiveness of several REDD+ projects – financed by a major funder, the Amazon Fund – which mainly takes a qualitative approach. More work is needed to evaluate the effects of different types of interventions, especially at the jurisdictional (rather than project) scale, which is the focus of the REDD+ mechanism. Increasing the number of robust impact evaluations on REDD+ and its underlying instruments is challenging, but not impossible. REDD+ funds or carbon markets could, for example, introduce more stringent requirements for proponents to demonstrate the carbon and non-carbon performance of their projects (see Chapter 10), while facilitating collaborations with independent researchers. More assistance to countries and subnational jurisdictions would also be beneficial, so that they can build up robust evaluation units to assess REDD+ interventions once underway.

Chapter 11

People and communities

Well-being impacts of REDD+ on the ground

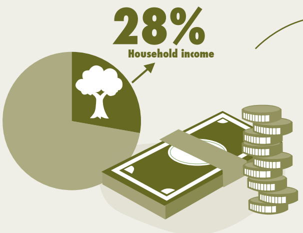
Amy E Duchelle, Claudio de Sassi, Erin O Sills and Sven Wunder

Key messages

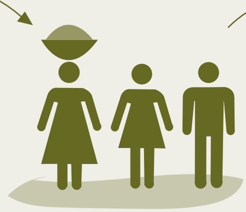
- Several studies on well-being outcomes of REDD+ interventions found small or mixed effects on livelihoods or welfare, which were more likely to be positive when incentives were offered.
- The slow pace of REDD+ implementation, and lack of robust studies quantifying both its forest/land-use and well-being outcomes, make it difficult to draw conclusions about trade-offs. But separate evidence on similar local-level PES initiatives points to challenges for designing REDD+ initiatives that are both effective at reducing forest carbon emissions and strongly pro-poor.
- Results that are more equitable and long-lasting are more likely when local people are genuinely involved in REDD+ programme design and implementation.

Well-being impacts of REDD+ in a nutshell

Tropical forests play a key role in meeting global climate and development objectives.



Natural forests and wildlands provide an average of 28% of total household income for communities in and around tropical forests – in the form of food, woodfuel and fibre for consumption and sale.



Given the importance of forests to local well-being, REDD+ must minimise risks to local people and produce livelihood benefits, to be effective and equitable.

Studies on well-being outcomes of REDD+ interventions found small or mixed effects on livelihoods or welfare, which were more likely to be positive when incentives were offered.

The lack of robust studies quantifying both forest/land-use and well-being outcomes makes it difficult to draw conclusions about trade-offs.

Separate evidence on PES points to challenges in designing REDD+ initiatives that both reduce emissions and are strongly pro-poor.

Meaningful participation in the design and rollout of interventions – as a way to achieve more equitable and lasting results – is still a frontier for REDD+.

11.1 Introduction

Halting deforestation, along with other 'natural climate solutions' such as restoring degraded lands, could provide at least 37% of the cost-effective emissions mitigation needed by 2030 to meet the Paris Agreement goal of keeping global warming below 2°C (Griscom *et al.* 2017). And natural forests and wildlands provide an average of 28% of total household income for communities in and around tropical forests, in the form of food, woodfuel and fibre for consumption and sale – almost as much as agricultural crops (Angelsen *et al.* 2014). Given the importance of forests to local well-being, it is widely accepted that REDD+ must minimise risks to local people and produce livelihood benefits, to be both effective and equitable (Brown *et al.* 2008; Agrawal *et al.* 2011). At a minimum, REDD+ and other forest-based mitigation efforts should not harm local people, but they can also go further towards being pro-poor (Campbell 2009).

The UNFCCC REDD+ social and environmental safeguards – which include respect for the rights of indigenous peoples and local communities, effective participation in REDD+ design and implementation, and promotion of social co-benefits – demonstrate international policy consensus around the need to protect and strengthen local rights and livelihoods as part of climate action (UNFCCC 2011). Although REDD+ safeguards are designed for national-level REDD+ programmes, we can glean early lessons on the potential well-being benefits and risks of REDD+ interventions from on-the-ground experiences. Of the more than 350 REDD+ projects and programmes being implemented across the tropics as of May 2018, nearly half had attained third-party certification (e.g., Climate, Community & Biodiversity Alliance, Plan Vivo) (Simonet *et al.* 2018a), which requires – but does not necessarily guarantee – adherence to social and environmental safeguards.

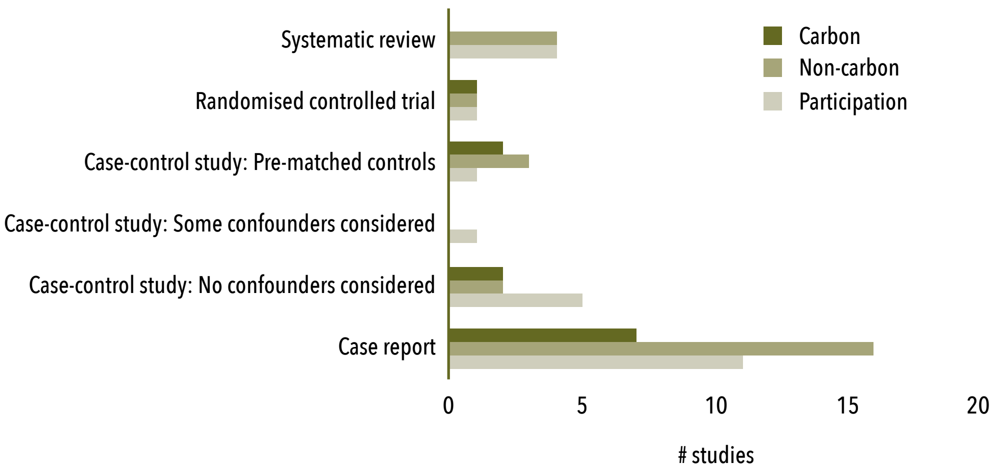


Figure 11.1 Studies (*ex post*) of REDD+ impacts on participation and non-carbon (mostly well-being) outcomes

Source: Adapted from Duchelle *et al.* (2018b)

Given global attention to the potential social risks of REDD+, most of the recent REDD+ impact studies – although still scarce – focus on well-being outcomes, rather than on forest/land-use outcomes (Duchelle *et al.* 2018b; Figure 11.1). This chapter summarises what is known about how REDD+ interventions and related payments for environmental services (PES) can affect local well-being.

11.2 Expected impacts from REDD+ interventions

Although there are many possible frameworks for conceptualising and measuring well-being, the common impacts assessed in recent REDD+ literature are income or livelihoods, project costs, perceived well-being, distributive equity and social capital (Duchelle *et al.* 2018b; Figure 11.2). Beyond these, REDD+ can also affect land tenure security (Chapter 8), local capacities, institutions and networks. Given the variety of possible social impacts, it is important to understand what REDD+ implementers set out to achieve, and through which types of interventions.

Typically, a bundle of interventions is applied at REDD+ sites, including enabling measures, disincentives, and conditional and non-conditional livelihood enhancements (Sunderlin *et al.* 2015; Figure 11.2). Enabling measures include ensuring free, prior, informed consent (FPIC), engaging local people in REDD+ design, and clarifying land tenure, which can help set the stage for forest protection.

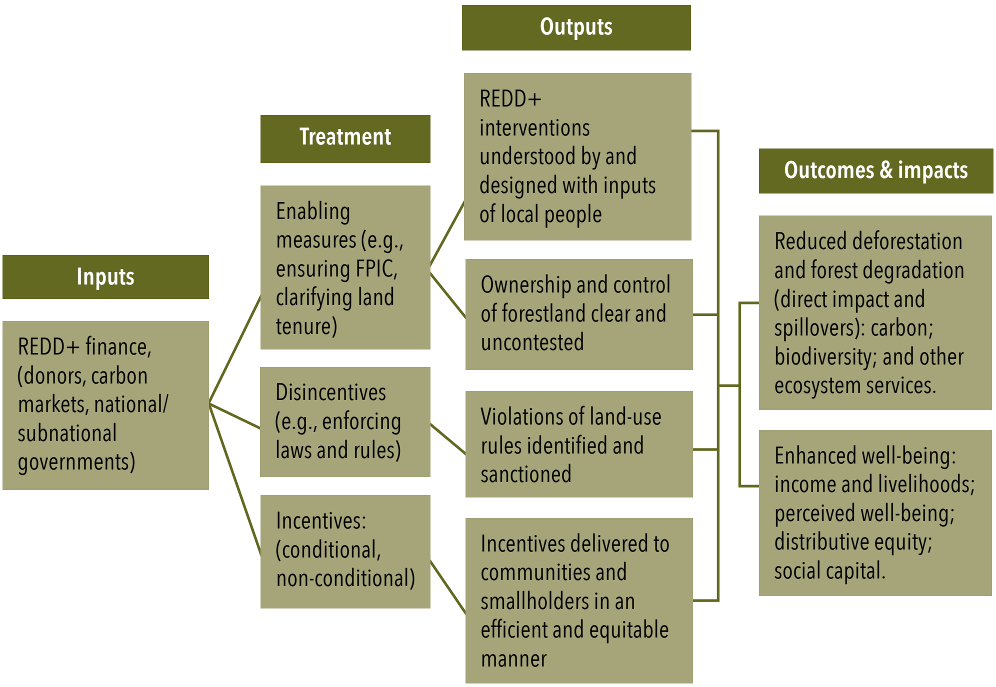


Figure 11.2 Theory of change for positive outputs and outcomes in local REDD+ initiatives

Disincentives include regulation and enforcement of restrictions in access to, or conversion of, forests. In theory, violations of forest and land-use rules should be identified and sanctioned through effective monitoring and enforcement by village associations and governmental agencies, and thus protect forests. Conditional incentives like PES require participants to protect or improve local forests in exchange for benefits. Non-conditional livelihood support does not, in direct exchange, require local stakeholders to alter their forest-use behaviour, but aims to promote forest conservation by investing in productive alternatives (e.g., more sustainable agricultural practices). To deliver maximum well-being benefits, conditional and/or non-conditional livelihood enhancements should be distributed equitably. Specifically, a substantial proportion of households – and not just the village elites – should receive these interventions, and local perceptions of equity (i.e., perceived fairness of benefits) should be taken into account (Loft *et al.* 2017a).

Box 11.1 Pan-tropical analysis of REDD+ income impacts

In addition to potential adverse effects on local welfare, the risks of REDD+ exacerbating existing inequality within communities – with elites absorbing a disproportionate share of the benefits – are well-recognised (Ghazoul *et al.* 2010; Andersson *et al.* 2018). To understand the effects of REDD+ interventions on income and inequality, detailed income data (all cash and subsistence sources, following Angelsen *et al.* 2014) were collected for over 4,000 households in 150 villages at 16 REDD+ sites in 6 countries in 2010/2011 and 2013/2014, using a before-after-control-intervention (BACI) study design. Treated and control villages were reasonably well balanced at baseline (Sills *et al.* 2017), but we used matching combined with difference-in-difference analysis to maximise accuracy in the comparison of intervention against control groups.

Overall, we observed an increase in income over time at sites in Indonesia and Brazil, a decrease at sites in Cameroon and Peru, and no change at sites in Vietnam and Tanzania. REDD+ had no effect on these trends in the pooled global sample or at the country level except for Cameroon, where REDD+ led to decreased income, primarily due to its effect on households in one site (Figure 11.3). Indeed, site-level results were extremely heterogeneous. For instance, income change (both decreases and increases) at some sites exceeded 25–30%, highlighting the dynamism of local livelihoods in places where REDD+ is operating. At the site in Cameroon where REDD+ resulted in lower household income, the decrease was concentrated in the two highest quintiles, while the poorest quintiles became marginally better off over time. So, on one hand REDD+ reduced average household income at this site, but it protected the poor and arguably reduced inequality. At one site in Tanzania, while there was no overall income effect from REDD+, we found similar effects among quintiles as in the case above: the rich were negatively affected by REDD+, the middle quintiles were unaffected, and the poorest quintiles were marginally better off.

While these cases reduced inequality, it came at the cost of wealthiest households, which lost substantial income. At one site in Peru, while the income decrease and existing inequality were not caused by REDD+, it failed to buffer negative trends or protect the poor. Similarly, at several sites in Brazil and Indonesia, with generally increasing income in both treatment and control areas, REDD+ did not affect underlying trends; thus in many cases it failed to tackle increasing inequality, but did not exacerbate it. These results demonstrate the importance of understanding heterogeneity both across and within sites, in order to judge whether and how social safeguards are being met.

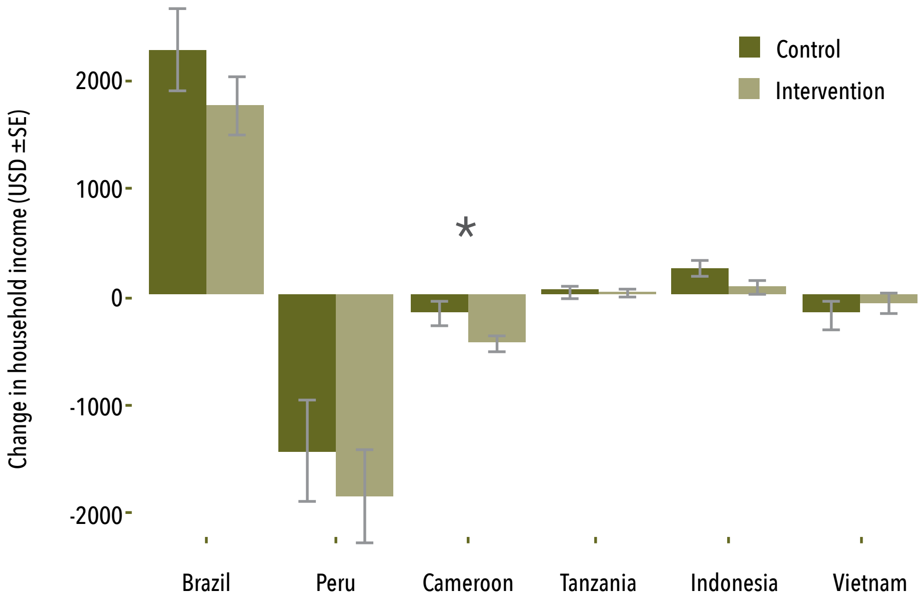


Figure 11.3 Change in household income after REDD+ initiatives were introduced (intervention) and in non-REDD+ (control) areas

Note: * denotes a significant difference ($p<0.05$)

Since an important focus of REDD+ is to restrict or replace forest-damaging activities, local people are likely to incur opportunity costs (Rakatama *et al.* 2017). Yet they may also benefit from forest protection interventions, especially when the damaging activities are caused by outsiders (Clements *et al.* 2014). In addition, REDD+ implementers may err on the side of caution by intentionally overcompensating for local opportunity costs, which are difficult to quantify, so that participating communities experience some net welfare gains. These benefits may take time to materialise, however, as new activities start to pay off. One challenge is that the costs of forest conservation may be felt most strongly by certain groups; for instance, sometimes the poorest are the most dependent on clearing forest and are thus most heavily affected by conservation restrictions (Poudyal *et al.* 2018). There is also increasing evidence of elite capture in benefit distribution from REDD+ schemes (Poudyal *et al.* 2016). At the same time, wealthier households often glean more absolute benefits from forests, meaning they would need higher compensation for foregone forest uses than poorer households (Ickowitz *et al.* 2017). In general, voluntarily participating smallholders and communities could still see net declines in their incomes if they underestimate the opportunity costs of conservation or expect to derive non-income gains from REDD+ participation (e.g., attracting development donors).

11.3 Evidence reveals nascent forest and well-being impacts

Recent *ex-post* studies of REDD+ interventions on the ground highlight small or mixed well-being results, which are more likely to be positive when incentives are part of the offered intervention mix (Duchelle *et al.* 2018b). One collection of studies from 23 REDD+ sites in 6 countries, which are part of CIFOR's Global Comparative Study on REDD+ and based on a before-after-control-intervention (BACI) approach, analysed early impacts of REDD+ interventions in 150 communities and nearly 4,000 households (Sills *et al.* 2014). Results showed that REDD+ had minimal impact on household and village-level perceptions of well-being, as well as on income sufficiency (Sunderlin *et al.* 2017). An analysis of REDD+ impacts on household incomes found that welfare improvements also remain elusive (Box 11.1). It is clear, however, that women's well-being may be affected more adversely by REDD+ than men's if gender aspects are ignored in intervention design (Box 11.2).

In terms of potential trade-offs between conservation and well-being, impacts on forests at these sites have also been minimal: there was a reduction in tree cover loss at the village level in about half of the REDD+ sites studied, and no effect in a third of sites when compared to control areas (Bos *et al.* 2017; Chapter 10). Looking more closely at the types of REDD+ interventions applied at these sites, restrictions were most effective at curbing reported forest clearing. However, they negatively affected local perceptions of well-being; adding livelihood enhancements cushioned these negative effects, helping alleviate the burden of land-use restrictions, which highlights the importance of incentives in the offered intervention mix (Duchelle *et al.* 2017; Figure 11.2).

Other studies have focused on negative well-being effects of REDD+. Jagger and Rana (2017) demonstrate the use of secondary, publicly available data to evaluate the impacts of REDD+. They found some evidence of potential negative impacts on human welfare at 18 REDD+ project sites in Indonesia, but point out the challenges with interpreting such evidence. For example, they found that REDD+ increased the number of government issued certificates verifying that households are poor. This could indicate increased poverty, or increased awareness of rights and possibilities of accessing services for the poor, in REDD+ villages. Case study results from Nigeria and Vietnam reported that forest-clearing restrictions compromised agricultural livelihoods (Asiyanbi 2016; McElwee *et al.* 2017). A case study from Indonesia argued that alternative livelihood strategies proposed by the project implementer did not make sense for the local context (Lounela 2015). At a REDD+ site in Tanzania, new strategies introduced by project implementers were not considered financially viable for local people (Svarstad and Benjaminsen 2017), nor did they create long-term livelihood opportunities (Lund *et al.* 2017). In-depth studies of a REDD+ pilot project in Madagascar showed substantial uncompensated costs, which were felt especially strongly by the poorest (Poudyal *et al.* 2016, 2018). At another site in Kenya, while REDD+ positively impacted local assets, focus groups revealed that these benefits did not match local expectations or compensate for the opportunity costs of restricting forest use (Atela *et al.* 2015a). Indeed the failure of many REDD+ projects to deliver local benefits – including prospects of substantial cash transfers that never materialised due to the lack of predictable finance – led to local frustrations with and scepticism about REDD+ (Angelsen and Vatn 2016; Milne *et al.* 2018).

While REDD+ was initially conceived as a multi-level PES scheme (Angelsen 2014), only a few initiatives have actually offered conditional payments to local households (Sunderlin *et al.* 2015). Therefore, we have turned to other types of PES for lessons on how conditional REDD+ incentives could affect local well-being. A recent systematic literature review found that contracted environmental service providers (those who receive the payments) typically do obtain higher incomes as a result of participating in PES, but there is little available evidence on non-monetary impacts (Blundo-Canto *et al.* 2018). Jayachandran *et al.* (2017) demonstrated the potential of PES under ideal conditions (i.e., careful implementation in the context of high deforestation and low opportunity costs), showing that it can reduce deforestation without imposing a welfare cost on local forest users. Yet there is also evidence that PES is less accessible to credit-constrained households at the

Box 11.2 Gendered impacts of REDD+ on perceived well-being

Anne M Larson

We used the BACI method discussed in Box 11.1 to analyse changes in perceived well-being over time in REDD+ and non-REDD+ villages. The results were compared between focus groups with mixed participants (68% male on average) and with women only, and the focus groups elaborated their own definitions of well-being. For the analysis, each village was classified as having overall positive, negative or no movement in well-being between the two phases of research; for example, even if focus groups reported improved well-being for some members of the group in Phase 2 (2013–2014), the change was noted as 'negative' if this was true for a smaller portion than in Phase 1 (2010–2011). Overall, the results showed a net drop in perceived well-being for both women and the village as a whole in REDD+ sites, and no change (for women) or positive change (for the village as a whole) in the control group. A regression model found declines in well-being for women to be significantly associated with being in a REDD+ village.

These results are somewhat puzzling: when women rated specific REDD+ related interventions in their villages, 46% of the interventions were seen to have a positive effect and only 7% a negative one. Unrealised expectations may explain some of the results, as well as the many specific and varied factors that affect overall well-being (such as illness). Women's responses suggest that well-being is more likely to improve if interventions specifically support women's employment, economic conditions and empowerment. The overall analysis points to better results for women's well-being if women are fully engaged in design, implementation and decision-making, and when explicit strategies are included to address their priorities (Larson *et al.* 2018).

same site (Jayachandran 2013). In another recent review of the literature, Alix-Garcia and Wolff (2014) concluded that PES has led to long-term investments (e.g., in schooling and off-farm labour) but not to any short-term increase in assets, based on quasi-experimental evaluations in China and Mexico. Another study showed that PES had reduced poverty in Mexico, but most significantly where the risk of deforestation was low, suggesting a trade-off between targeting for forest conservation versus poverty alleviation (Alix-Garcia *et al.* 2015). In sum, the literature on PES finds that there is often little effect – but certainly no negative effect – on the well-being of participants. This suggests that direct conditional payments by REDD+, at least under a voluntary system, are likely to be consistent with the objective of 'do no harm'. At the same time, the evidence on PES points to key challenges in designing REDD+ initiatives that are both effective at reducing forest carbon emissions and strongly pro-poor, contradicting the theoretical win-win outcomes presented in Figure 11.2.

The lack of robust studies on forest/land-use outcomes in the REDD+ literature (Chapter 10) also makes it difficult to draw general conclusions about carbon versus well-being trade-offs. At sites where there are at least some positive forest outcomes, albeit small or insignificant well-being effects (e.g., those analysed in CIFOR's Global Comparative Study on REDD+), the results could be interpreted as successful 'do no harm' REDD+. At others, there are clear trade-offs between effectively reducing forest clearing and improving well-being, if livelihood enhancements are not included in the mix (e.g., at Brazilian sites in Duchelle *et al.* 2017). Finally, in the absence of reduced deforestation and degradation, REDD+ interventions may still lead to local welfare gains – possibly because livelihood objectives have a stronger weight in the initiative's design (Börner *et al.* 2013).

11.4 Despite efforts, local participation remains limited and uneven

To maximise both positive forest and well-being outcomes, there are strong arguments for involving farmers, smallholders and communities – in a meaningful way – in the design of REDD+ interventions, particularly those that affect their livelihoods (Duchelle *et al.* 2017; Myers *et al.* 2018). Although the primary purpose of REDD+ (climate change mitigation) is globally defined and thus transcends local interests, local people often know best how to effectively realise forest-based mitigation options while minimising costs. Inclusive participation in the setting and modification of rules for resource management is one of Ostrom's core design principles for successful governance of the commons (Ostrom 1990). Further, from the perspective of social justice, participation matters as an end in-and-of itself (Fraser 2009). While REDD+ safeguards should help ensure stakeholder consultation and free, prior, informed consent (FPIC), as well as promote effective participation in REDD+ design and implementation, most implementers do not yet seem to be fully capturing the alleged benefits of local decision-making and input.

FPIC is a minimum ethical requirement for REDD+. It begins with effective information sharing about REDD+ initiatives with local stakeholders, as a key enabling measure (Figure 11.2). While multiple countries have seen progress on developing policies and processes for FPIC in REDD+ (Jagger *et al*. 2014), in places where indigenous peoples' rights are politically sensitive, such as Vietnam, FPIC may be more challenging to implement (Pham *et al*. 2015). Moreover, implementers of local REDD+ initiatives have faced difficulties in securing the resources (financial and time) needed to carry out comprehensive FPIC processes on the ground, and to ensure local people have a clear understanding of REDD+ – a concept that is still evolving (Jagger *et al*. 2014). Given such challenges, a plethora of recent studies has highlighted limited awareness of local REDD+ projects among affected communities (e.g., Bayrak and Marafa 2016; Saeed *et al*. 2017; Milne *et al*. 2018). Case reports from Guyana (Airey and Krause 2017), Indonesia (Harada *et al*. 2015), Tanzania (Scheba and Rakotonarivo 2016; Khatun *et al*. 2017), and in REDD+ sites across five countries (Larson *et al*. 2015) found that despite a focus on information sharing, awareness was uneven among locals, with women and poorer villagers being least informed about project activities. In addition, different approaches to FPIC, the quality of facilitators, and consultation venues all influence its effectiveness. FPIC is often carried out in a very rushed manner due to time constraints and pressure from donors, but comprehensive consultation takes time (Pham *et al*. 2015).

Beyond FPIC, there are opportunities to involve local communities directly in the design and implementation of REDD+ initiatives. Although many REDD+ implementers find it challenging and costly to do more than passive consultation, there are clear examples of more meaningful participation. In a REDD+ project in Kenya, villagers were more involved in decision-making than in integrated conservation and development projects (ICDPs) in the same area, likely due to REDD+ implementers' attention to safeguards (Atela *et al*. 2015b). At the same site in Kenya, and at another in Nepal, the studied REDD+ initiatives also enhanced the participation of women in village-decision making (Kariuki and Birner 2016; Sharma *et al*. 2017). And case studies from REDD+ sites in Indonesia and Brazil highlighted how local engagement in REDD+ project activities increased social learning and trust among villagers (Mulyani and Jepson 2015; West 2016).

11.5 Lessons and ways forward

Lessons on the local well-being effects of early REDD+ initiatives can inform the design and implementation of future forest-based climate change mitigation policies and programmes at jurisdictional scales. Although the aim of REDD+ is to protect and enhance forests, there are legal, moral and practical reasons for making sure that this objective is achieved while at a minimum not harming, and ideally ensuring benefits for, local people.

This chapter highlights the challenges of promoting social benefits in complex local contexts, given the varying impacts of REDD+ interventions on heterogeneous local populations, including across income groups and between men and women in the same community. Findings also show that, in many places, impacts on both forests and well-being have remained incipient. The lack of results reflects both the slow implementation of REDD+ and low financial flows, which have limited the intensity of action on the ground. Conditional payments can be effective in reducing deforestation, and this is likely to be consistent with the 'do no harm' objective of REDD+. But the anticipated win-win outcomes of forest protection and enhanced well-being through PES may still be elusive.

Finally, interventions designed with local people, and based on their perceptions of equity, will likely be better adapted to local realities and have greater legitimacy (Wong *et al.* 2017). It appears that REDD+ implementers are, typically, attentive to some degree of local participation, and that the principles of social safeguards are being integrated in the early design of REDD+ projects – arguably more so than in many traditional conservation projects (Jagger *et al.* 2014). However, meaningful participation in the design and rollout of interventions still represents a challenge for REDD+. It is clear that local participation in REDD+ could be enhanced, both through better FPIC, and through engagement with local communities as right-holders and not just as project beneficiaries (Chapter 8). Such engagement, despite the costs, could help capture the potential complementarities between forest conservation and local well-being, leading to better climate and development outcomes over the long term.

Part 4

Evolving initiatives

Chapter 12

Subnational jurisdictional approaches

Policy innovation and partnerships for change

Claudia Stickler, Amy E Duchelle, Daniel Nepstad and Juan Pablo Ardila

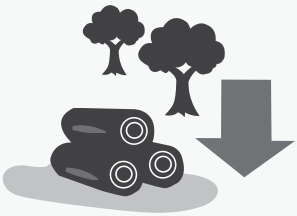
Key messages

- In a study of subnational jurisdictions across 12 countries, which together contain 28% of the world's tropical forests, all 39 jurisdictions had made formal commitments to reducing deforestation. Most (38 of 39) had also taken concrete actions to implement these pledges.
- The majority of these sampled jurisdictions have developed and implemented integrated jurisdictional strategies, robust jurisdiction-wide multistakeholder processes, and quantifiable, time-bound targets that define their vision of sustainability – despite a scarcity of international climate finance to support these and other interventions.
- Annual deforestation decreased between 2012 and 2017 in just under half of jurisdictions (17 of 39), although any links between actions taken by subnational governments and observed trends in deforestation are yet to be analysed.

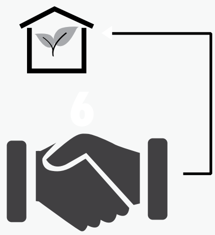
Subnational jurisdictional approaches in a nutshell

Jurisdictional approaches (JAs) to sustainable development seek to protect forests, reduce emissions, and improve livelihoods and other social, environmental and economic dimensions across entire governmental territories: states, provinces, districts, counties and other political administrative units.

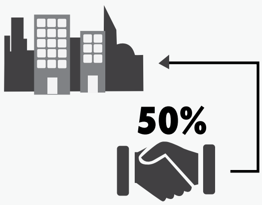
Thirty-nine subnational jurisdictions, containing 28% of the world's tropical forests, made formal commitments to reduce deforestation. Most have taken concrete actions to implement these pledges.



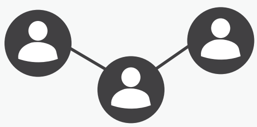
Annual deforestation decreased from 2012 to 2017 in almost half (17 of 39) of these jurisdictions, despite scarce international climate finance.



35 of the 39 jurisdictions have endorsed a set of guiding principles committing them to respecting the rights of forest peoples to their land and resources.



Nearly half of the 39 jurisdictions are partnering with companies seeking sustainably grown supplies of agricultural commodities through consortia or multi-sector processes.



Despite progress in developing sustainability policies and interventions, only a few jurisdictions have advanced policy and legal reforms, plans and actions.

A global framework is needed to drive progress towards jurisdictional sustainability. This should not assume significant new flows of finance are imminent.

12.1 What is a jurisdictional approach?

Jurisdictional approaches – in which a landscape is defined by policy-relevant boundaries, and a high level of governmental involvement is at the core – seek to protect forests, reduce emissions and improve livelihoods across entire governmental territories: nation-states, states, provinces, districts, counties and other political administrative units (Nepstad *et al.* 2013a, 2013b; McCall 2016; Boyd *et al.* 2018). This territorial focus facilitates a strategic alignment with public policies and programmes, and means that governments are usually leaders or active participants in strategy development and implementation. Placing environmental and social sustainability at the centre of efforts to develop and implement an integrated, cross-sectoral and jurisdiction-wide policy agenda is what sets jurisdictional sustainability apart from business-as-usual policy-making.

Subnational jurisdictional approaches grew out of the perceived limitations of both early implementations of REDD+, and agricultural commodity supply chain initiatives, in terms of their abilities to address tropical deforestation (Table 12.1). In the case of REDD+, national governments were slow to develop the policies and programmes necessary to address drivers of deforestation and to generate change on the ground. They were also, at least in the case of large countries, far removed from farmers and forest communities whose behaviours REDD+ was originally designed to influence. Numerous political and economic factors hindered progress, including the lack of incentives to counter business-as-usual deforestation (Seymour and Busch 2016; Angelsen *et al.* 2017; Brockhaus *et al.* 2017). REDD+ projects, meanwhile, proliferated rapidly, typically with little or no relationship to government agencies, public policies and programmes, and with a heavy focus on smallholders to the virtual exclusion of other agents of deforestation (Sills *et al.* 2014; Simonet *et al.* 2015; Table 12.1). These projects also tended to penalise traditional forest stewards (e.g., indigenous peoples) as 'low performers' in terms of earning the 'avoided deforestation/emissions' credits that are central to many REDD+ schemes.

A similar disconnect from public policies and programmes has slowed the effectiveness of supply chain initiatives (Lambin *et al.* 2018; Luttrell *et al.* 2018a; Nepstad and Shimada 2018; Shimada and Nepstad 2018; Table 12.1; Chapter 13). To achieve their corporate zero deforestation pledges, the Tropical Forest Alliance 2020 (TFA 2020), certification bodies (e.g., Roundtable on Sustainable Palm Oil) and individual consumer goods companies (e.g., Unilever, Marks & Spencer and Walmart) have recently started exploring jurisdictional sourcing; i.e., the sourcing of soybeans, palm oil, beef and other 'forest-risk commodities' from jurisdictions that have and are able to achieve jurisdictional performance targets related to deforestation, reforestation and other sustainable development goals (Stickler *et al.* 2018).

Table 12.1 Comparison of approaches to reduce tropical deforestation

Approach	Supply chains	Project-level REDD+	National-level REDD+	Subnational jurisdictional
Borders	Farms, plantations and processors of a particular commodity	Local project-level boundaries	National boundaries	Subnational political, administrative boundaries (e.g., state, province, county, district)
Scale	From individual producer to entire commodity sector	Usually small	Medium to large	Small to medium
Stakeholder/actor involvement	Farmers, processors and buyers NGOs in watchdog role	Often limited to a small number of local actors	Should include all actor groups across country Representation may be patchy in large countries	Should include actor groups across subnational jurisdiction Greater potential for representation of diverse actors in a subnational jurisdiction
Key actors	Private sector	Project proponents	Government	Government
Role of government	None to small	None to small	Large	Intermediate to large
Ability of approach to address deforestation, forest degradation and forest restoration	Can provide incentives for farmers and others to reduce deforestation, reinforced by market actors Cannot overcome broader policy/legal issues	Can provide incentives for specific actors to reduce deforestation Can serve as testing ground for new approaches	Can support national policy innovation Can establish national rules for benefit-sharing with diverse actor groups	Can address regional-scale drivers Can experiment with innovative policies and programmes for addressing drivers Can create context for broader benefit-sharing with diverse actor groups
Challenges/ barriers	The costs of traceability/ verification and the lack of incentives for farmers	High risk of leakage Carbon price signal and market demand still weak	Carbon price signal and market demand still weak Potentially distant from local and regional actors Bureaucratic, slow	Carbon price signal and market demand still weak Vulnerability to political turnover Subnational authority/autonomy very limited in some nations
Potential of approach to support broader transition to LED-R	Low to medium: new initiatives to link supply chain and jurisdictional strategies are promising	Low: generally isolated from broader policy processes and multistakeholder dialogues	High: can align market signals with regulatory and fiscal incentives to drive change	High: can align market signals with regulatory and fiscal incentives to drive change; can test innovations that are then adopted by national governments

Note: In practice, these approaches could overlap.

Box 12.1 Key concepts

- **Jurisdictional sustainability**: the successful transition to sustainable development – encompassing social, environmental and economic dimensions – across an entire political geography, such as a state, province, county, district or nation. Success is measured 'wall-to-wall' across the entire jurisdiction and therefore encompasses the full range of activities, production systems, ecosystems and actors.
- **Jurisdictional approach**: a type of integrated landscape management, with an important distinguishing feature: the landscape is defined by policy-relevant boundaries and the underlying strategy is designed to achieve a high level of governmental involvement.
- **Low-emission rural development (LED-R)**: a jurisdictional approach to sustainability, in which climate stability is an explicit goal, there is a focus on rural populations, and both environmental and development concerns are integrated at the scale of the entire jurisdiction.

Unlike these isolated efforts, jurisdictional approaches encourage alignment between REDD+ incentives, sustainable supply chain initiatives, domestic policies and finance, to address the interconnected issues of deforestation, rural livelihoods and food security (Nepstad *et al.* 2013a). In decentralised systems, subnational jurisdictions have at least some legal authority and political power (Larson and Ribot 2009; Boyd *et al.* 2018). Their governments are also often better positioned to communicate with the farmers and communities making land-use decisions (Larson and Ribot 2009; Stickler *et al.* 2014). Because they have authority over more sectors and actors than isolated REDD+ projects or supply chain efforts, and are able to look beyond solitary projects with a typically narrow focus in terms of the actors, issues and goals involved, subnational jurisdictions can be more creative in their solutions when addressing agents of deforestation and/or recognising forest stewards. They also typically deal with a more restricted range and volume of socioeconomic and environmental issues than national-level governments, owing to their smaller scale, and can help advance and support national-level goals.

12.2 Assessment of jurisdictional sustainability across the tropics

Jurisdictional sustainability is achieved when an entire political geography completes the transition to sustainable development; this encompasses social, environmental and economic dimensions. Throughout the tropics, a growing number of subnational jurisdictions have embraced the jurisdictional approach as a framework for building durable programmes for low-emission rural development (LED-R). In this chapter, we examine the efforts of 39 subnational jurisdictions, which together are home to nearly a third of the world's remaining tropical forests (see Box 12.2 for sample selection). Some of their efforts have been underway for more than a decade, whereas other locations have more recently committed to comprehensive jurisdictional sustainability. It is difficult – and in many cases too early – to determine whether these efforts have directly contributed to reducing deforestation or emissions from other sources. In most cases, deep systemic changes in forest and land-use governance are needed to achieve these goals. As such, an important indicator of progress for subnational jurisdictional approaches is whether key elements are in place, including: robust multistakeholder processes; policies and programmes aimed at reducing emissions; time-bound and quantifiable targets; and accurate, transparent, and accessible monitoring and reporting systems.

In this chapter, we ask what progress subnational jurisdictions are making, in developing and implementing interventions to support their transition toward LED-R. We review the formal commitments made by each jurisdiction and assess their progress in advancing elements of jurisdictional strategic frameworks that are likely to be integral to achieving sustainability (see Box 12.2 for methods). As well as identifying programmes and interventions that are specifically designed to advance jurisdictional sustainability, we examine the potential for other interventions (not specifically designed with a goal of jurisdictional sustainability) to contribute to an overall jurisdictional sustainability strategy. We also report on deforestation rates and trends in the jurisdictions. However, because of the likely time lag between interventions (policy, market and other) and measurable effects

Box 12.2 Methods for jurisdictional sustainability assessment

In 2017–2018, a comprehensive assessment of 9 elements of jurisdictional sustainability was conducted across 39, mostly first-order, administrative divisions (e.g., states and provinces) within 12 tropical countries (Stickler *et al.* 2018; Figure 12.1). Thirty-five of these subnational jurisdictions are voluntary members of the Governors' Climate and Forests Task Force (GCF TF) and formally decided to develop and apply a jurisdiction-wide approach to LED-R, as did Sabah, Malaysia (not a member of the GCF TF). The remaining jurisdictions (Oromia, Ethiopia; Zambezia, Mozambique; and Mai-Ndombe, DRC) were selected by their national governments to pilot a jurisdictional approach that could be replicated or scaled up.

Secondary data were compiled and interviews conducted with key stakeholders in 33 jurisdictions. Oaxaca and Tabasco, Mexico; Pastaza, Ecuador; Piura, Peru; Papua, Indonesia; and Roraima, Brazil, were not included for most ratings. The full dataset obtained was used to generate progress ratings on the core elements of jurisdictional sustainability described in Section 12.2 and seen in Figure 12.3. These elements were identified through a series of workshops of the Sustainable Tropics Alliance, based on direct experiences with LED-R in 11 jurisdictions across 6 countries (Nepstad *et al.* 2013a; Stickler *et al.* 2014; DiGiano *et al.* 2016; EII 2017). For each core element, a jurisdiction was rated as being 'early', 'intermediate' or 'advanced' in its progress, based on criteria detailed in Stickler *et al.* (2018). The ratings are best understood as indicating the types of support needed for jurisdictions to advance their LED-R strategies. These data were combined with an analysis of deforestation and emissions between 2000 and 2017 for all jurisdictions.

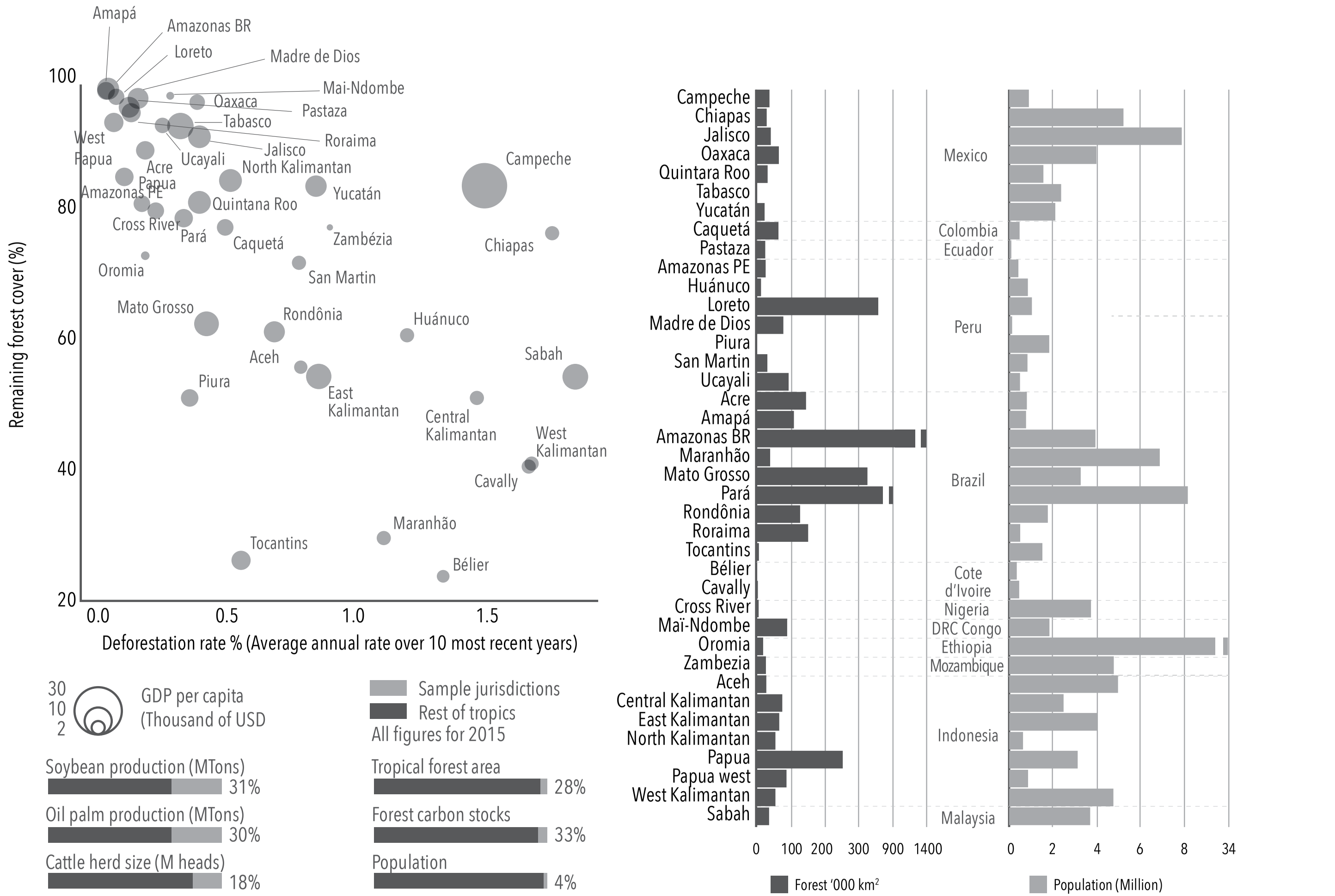


Figure 12.1 Key indicators related to forests and drivers of deforestation in the 39 studied jurisdictions

Source: Details at www.earthinnovation.org/state-of-jurisdictional-sustainability on forest clearing, and because of the complex relationships and feedbacks between them, we did not attempt to establish causal links between deforestation rates and the actions that jurisdictions have undertaken. Figure 12.1 shows indicators of population, per capita GDP, deforestation rates, and forest cover (% and km^2) across the 39 studied jurisdictions, alongside their collective share of selected commodity production, forest area and forest carbon in the jurisdictions, versus the tropics as a whole.

12.2.1 Formal commitments and early action

Across the sample of 39 global jurisdictions, the majority have made formal commitments to reducing deforestation, reducing emissions, restoring degraded lands, and promoting sustainable economic development and social inclusion. These commitments include:

- the Rio Branco Declaration (RBD), under which 35 of the studied jurisdictions committed to reducing deforestation by 80% by 2020, conditional on performance-based funding;
- the Under2 Memorandum of Understanding (U2MOU), under which 27 jurisdictions committed to reducing emissions by 80–95% below 1990 levels (or below 2 annual metric tons per capita) by 2050;
- the New York Declaration on Forests (NYDF), under which 18 jurisdictions committed to halving natural forest loss by 2020 and ending it by 2030; and
- the Bonn Challenge, under which 31 jurisdictions in 10 countries fall under commitments made at national level to restore 150 million ha of cleared and degraded land by 2020, and 350 million ha by 2030.

Such commitments represent formal, public expressions of intent, often serving as jurisdictions' first step towards developing comprehensive jurisdictional strategies for sustainability. Action on such commitments is likely to be critical to bridging the gap between current emissions reduction trajectories and Nationally Determined Contribution (NDC) objectives at the national level. Many of the studied jurisdictions had developed clear performance targets corresponding to these international pledges (Figure 12.2). Many also are financing and implementing policies and programmes, and prioritising indigenous peoples, local communities and smallholder farmers as key beneficiaries of these interventions (Stickler *et al.* 2018).

12.2.2 Progress on framework elements of jurisdictional sustainability

Nine framework elements are considered to be among the most important for the transition to jurisdictional sustainability: (i) an integrated LED-R strategy; (ii) a spatial plan; (iii) performance targets; (iv) measurement/monitoring, reporting and verification; (v) policies and incentives; (vi) multi-stakeholder governance; (vii) sustainable agriculture; (viii) indigenous peoples' and local communities' rights and engagement; and (ix) LED-R financing. Overall, the majority of jurisdictions

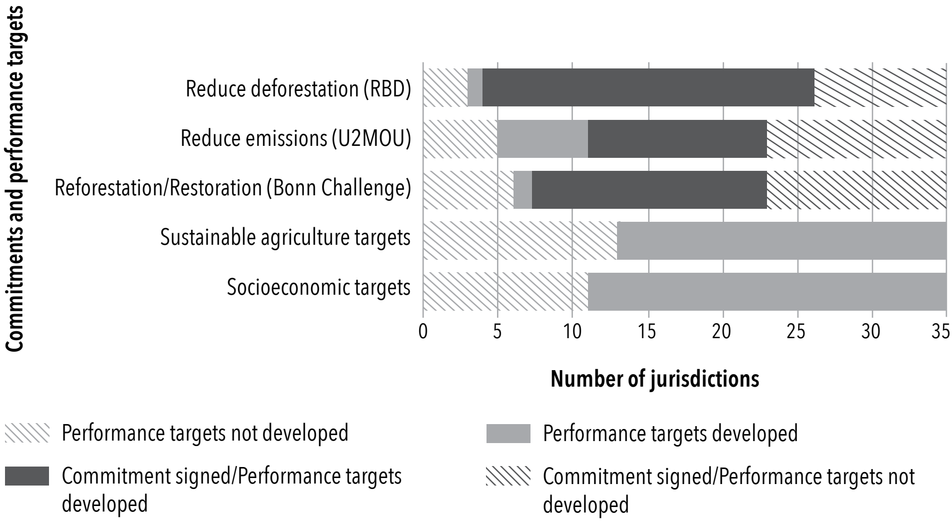


Figure 12.2 Number of jurisdictions with defined commitments and performance targets that correspond to their international-level commitments

Note: RBD = Rio Branco Declaration; U2MOU = Under2 Memorandum of Understanding. This analysis includes 35 jurisdictions (excluding Roraima, Piura, Pastaza, Papua).

Source: Based on Stickler *et al.* (2018)

received 'intermediate' and 'advanced' ratings for their progress in developing and implementing integrated jurisdictional strategies (21 of 33); relevant jurisdiction-wide multistakeholder processes (20 of 33); and quantifiable, time-bound targets that define jurisdictions' vision of sustainability in terms of impact indictors (21 of 33) (Figure 12.3). In comparison, jurisdictions were slower at putting in place robust, transparent and accessible MRV systems; establishing the necessary policy, technical and financial support for the transition to sustainable agriculture; and securing the needed finance to advance LED-R readiness and implementation. The state of Acre, Brazil had made the most progress overall (Stickler *et al.* 2018). A summary of jurisdictions' progress on each element is presented below.

Integrated low-emission rural development strategy: Nearly two thirds of the sampled jurisdictions (21 of 33) have jurisdiction-wide plans or strategies, but only three (Acre and Mato Grosso, Brazil; Sabah, Malaysia) broadly addressed causes of land-based emissions across sectors, and incorporated critical elements such as targets, MRV and incentives. In Brazil, Acre's Multi-Year Governance and Sustainability Plan (2016–2019) integrates environmental and development objectives (de los Rios *et al.* 2018), and Mato Grosso's Produce, Conserve, Include (PCI) initiative is linked to the state's REDD+ law and has coherent strategies for all major sectors (Nepstad *et al.* 2018). In Malaysia, Sabah's recent Long-Term Strategic Action Plan (LEAP 2016–2035) aligns all sectors and existing policies in a vision for a sustainable economy, and includes state-wide environmental, social and economic goals for 2035 that have been endorsed by most public agencies (Bahar 2018). However, most jurisdictions still face the challenge of integrating policies and programmes across sectors with environmental and social sustainability as the main prerogative, although efforts are underway.

Spatial plan: Approximately half (17 of 33) of the jurisdictions have legally adopted spatial plans. However, all but 3 (Acre and Pará; Jalisco, Mexico) fail to adequately address indigenous/local community rights or to mitigate the effects of planned infrastructure developments; some plans were developed with a low level or quality of stakeholder participation. In many jurisdictions, spatial plans could support jurisdictional sustainability goals more effectively if they incorporated a broader range of ecological and social parameters, and were better linked to relevant land-use laws.

Performance targets: More than half of jurisdictions have time-bound, quantitative targets related to commitments made for reducing deforestation, forest recovery, sustainable agriculture, and various socioeconomic factors (Figure 12.2). Acre, Mato Grosso and Sabah have a broad range of jurisdiction-wide goals and milestones linked to the integrated LED-R strategies mentioned above. For many others, jurisdiction-specific performance targets are being developed within national-level frameworks, such as subnational implementation of national legislation (e.g., Concerted Regional Development Plans in Peru) and targets established in the context of multilateral financing agreements with tropical countries (e.g., the Letter of Intent between the Central African Forest Initiative and the Government of the Democratic Republic of the Congo). These examples demonstrate how national-level frameworks can foster subnational action towards international goals.

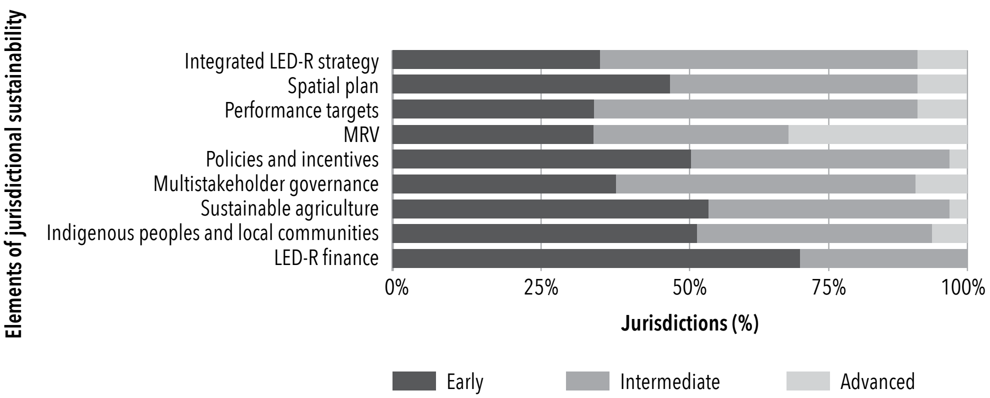


Figure 12.3 Progress on elements of jurisdictional sustainability (E = early; I = intermediate; A = advanced) indicated by percentage of 33 sample jurisdictions achieving each of the three rating levels (see Box 12.2)

Source: Stickler *et al.* (2018)

Measurement, reporting and verification: Although nearly all jurisdictions have measurement, reporting and verification (MRV) systems (primarily for tracking forest cover) under development or in place, most still fall short in one or more of the following areas: frequency, reliability, accuracy or transparency. Twelve jurisdictions were rated ‘intermediate’ because, despite having technically advanced systems (either jurisdiction-specific or as part of the national system), they failed to make their reports and data available to the public. While jurisdictions in Brazil, Colombia, Peru and Mexico were able to leverage the subnational data provided by national-level MRV systems, only one third of all jurisdictions in the sample had a preliminary or partial MRV system in place at the subnational level. Even fewer had systems (in place or under development) capable of monitoring progress towards a broader range of jurisdictional performance targets; notable exceptions include Mato Grosso and Acre, Brazil, along with San Martín and Ucayali, Peru. Limited institutional and political support and lack of capacity were major challenges hindering subnational-level MRV systems from being adapted or developed to align with jurisdictional performance targets. The majority of jurisdictions outside Brazil have struggled to make the data and methods used for monitoring forest clearing and other issues publicly accessible, whether for political or technical reasons.

Policies and incentives: Many jurisdictions have developed policies and programmes aimed at achieving LED-R. Interventions range from broad ‘green growth’ policies (e.g., East Kalimantan, Indonesia), to payment for ecosystem services programmes (e.g., Quintana Roo and Chiapas, Mexico), to initiatives that give value to sustainable agricultural and forestry products (e.g., cocoa in Huánuco, Peru; non-timber forest products in Amapá, Brazil). Although some jurisdictions have begun to coordinate their interventions through integrated LED-R strategies (e.g., Caquetá, Colombia; Jalisco, Mexico; Sabah, Malaysia; and Mato Grosso, Brazil), only Acre, Brazil, has coherent state policies that align with national policies for all relevant sectors affecting land use. In over half of the jurisdictions, interventions tend to be isolated and/or narrow in scope. Other important challenges to the development of durable LED-R interventions include political turnover, centralised national governance structures, powerful elites, and corruption at subnational and national levels.

Multistakeholder governance: Robust multistakeholder processes are considered a key element of successful jurisdictional approaches, and can help provide legitimacy and political durability to LED-R policies and programmes (Boyd *et al.* 2018). Recent or ongoing multistakeholder processes relevant to LED-R exist in 20 jurisdictions, but very few (Acre, Jalisco, Quintana Roo) have established broadly representative multistakeholder bodies with the specific goal of developing and implementing LED-R plans and activities. Most often, either indigenous peoples and local community representatives or private sector actors are left out of such processes. Governments do not typically have a model for carrying out consultations or engaging diverse stakeholders; likewise, broad participatory consultations are time-consuming and expensive, which may make them less likely to be carried out than simple 'box-ticking' exercises. Multistakeholder processes are also often organised around a particular theme, instead of operating at the jurisdictional scale to support broader LED-R strategies (see also Chapter 7).

Sustainable agriculture: Fourteen of the 39 jurisdictions have started activities to support the transition to more sustainable agriculture. Only Mato Grosso, however, exhibits a wide range of more advanced initiatives addressing both large and smallholder crop and livestock production, including negotiations with major soybean markets for large-scale jurisdictional sourcing agreements aligned with the state's Produce, Conserve, Include initiative (Nepstad *et al*. 2018; Box 12.3). Nearly half of the 39 jurisdictions have established partnerships with companies (six of them with formal contracts) targeting formal preferential sourcing, financial investment, or technical assistance to the jurisdiction. The majority of jurisdictions, however, are hampered by a lack of incentives and support for sustainable agriculture (including weak market access) – for larger landholders and businesses and smallholders alike – along with low private sector engagement in the jurisdiction's sustainability agenda.

Indigenous peoples' and local communities' rights and engagement: Recognition of the rights of indigenous peoples and local communities, and equitable benefit sharing are key components of successful jurisdictional approaches to LED-R (DiGiano *et al*. 2016). In 18 of the 33 jurisdictions, land tenure and access rights for these populations are weak or poorly enforced, and/or their participation in jurisdictional dialogues is low. An important step to addressing this shortcoming was taken in 2018, when 35 of the 38 Governors' Climate and Forests Task Force

Box 12.3 Mato Grosso: Sustainable commodity production through public-private partnerships and a jurisdictional strategy

In 2015, a multistakeholder process in Mato Grosso, Brazil, spearheaded by the state government, resulted in the establishment of jurisdictional targets for increasing soy production and beef productivity. This sharply slowed deforestation and increased technical assistance to the state's many smallholder farmers. The Produce, Conserve, Include (PCI) strategy was announced at the Paris climate summit, with the PCI targets representing GHG emissions reductions of 4 $GtCO_2$ by 2030 in forest carbon, plus additional reductions in methane. Since that announcement, Mato Grosso was awarded a 'pay-for-performance' contract of approximately USD 50 million from the German REDD Early Movers (REM) programme and the UK Department for Business, Energy and Industrial Strategy, in recognition of both the PCI and the state's creation of a comprehensive jurisdiction-wide REDD+ law. Farm sector participation in the PCI has been the most challenging dimension of the strategy, but it could be strengthened if the state-wide goals are translated into sourcing partnerships with the EU or China that deliver benefits to the state's farmers. One of the most promising mechanisms for this is to translate a portion of the accumulated verified emissions reduction – roughly 700 $MtCO_2$ as of 2017 – into farm-level benefits.

(GCF TF) member-governments endorsed a set of guiding principles committing them to respecting the rights of forest peoples to their land and resources (GCF TF 2018). Implementation of these is already underway in Acre and Mato Grosso, Brazil; Quintana Roo, Mexico; and in Central Kalimantan and West Papua, Indonesia. The potential of subnational governments to support indigenous peoples is perhaps best illustrated by the 20-year partnership between the Government of Acre and the indigenous peoples of that state (DiGiano *et al.* 2018).

Finance: As of 2016, 29 of the 39 jurisdictions studied had received or were scheduled to receive approximately USD 2.3 billion in international climate finance. Most of this finance (88%) reaches jurisdictions without results-based conditionality. Six states in the Brazilian Amazon have received a total of USD 220 million in funding through the Amazon Fund, however performance requirements are the responsibility of the national government. Germany's REDD Early Movers programme has made important contributions to the jurisdictional REDD+ strategy of Acre and has established a contract with Mato Grosso – the only jurisdictions studied that received (or were scheduled to receive) direct results-based finance. These jurisdictions are also the best positioned to meet the proposed California Tropical Forest Standard (Box 12.4). There is an urgent need for adequate and diverse sources of finance to support states and provinces that are at early and intermediate stages of progress.

Box 12.4. California's long-awaited tropical forest carbon market

There are signs that new mechanisms to compensate tropical forest jurisdiction progress in slowing deforestation are on the near-term horizon. The California Cap-and-Trade regulation, which was adopted pursuant to the California Global Warming Solutions Act of 2006 (also known as Assembly Bill 32, or AB32), includes a framework for the inclusion of international offsets from sector-based programmes. Under this framework, the future approval of a sector-based tropical forest programme could allow capped entities in California, such as power companies, to account for a small share of their GHG emissions by purchasing verified emissions reduction from qualifying jurisdictional programmes that reduce emissions from tropical deforestation. This regulatory framework was an important motivating factor for the creation of the Governors' Climate and Forests Task Force (GCF TF), the largest and oldest network of jurisdictions focused on slowing tropical deforestation to reduce carbon emissions. In September 2018, Governor Jerry Brown gave the go-ahead for opening the draft California Tropical Forest Standard to public consultation (CARB 2018). The standard establishes the requirements for MRV, reference levels, social and environmental safeguards, and carbon accounting of the eventual California market. If endorsed by the California Air Resources Board, the standard would establish the conditions under which tropical forest jurisdictions could link to the California carbon market through a future regulatory amendment process, thus establishing the world's first compliance market for emissions reduction achieved by slowing tropical deforestation.

12.2.3 Deforestation and emissions trends

Overall, 346,615 km^2 of forests – an area about the size of Germany – were cleared between 2000 and 2017 in the 39 jurisdictions combined. This area represents 6.6% of the primary forest cover remaining in the jurisdictions at the beginning of the period, and 32% of all forest lost in the tropics over the same time period. Annual deforestation increased between 2012 and 2017 in 18 of the 39 jurisdictions, remained stable in 9 jurisdictions and declined in another 12 jurisdictions. Aggregate deforestation over the five-year period in jurisdictions exhibiting an increase was 50,133 km^2, 1.7 times greater than in jurisdictions with decreasing and stable deforestation rates combined. In aggregate, the jurisdictions in the sample still retain 80% of their original forest cover (4.98 million km^2 remaining), with a total carbon stock of 69 GtC.

Overall, deforestation in half of the studied jurisdictions declined below projected subnational forest reference emission levels (FRELs). These were calculated using identical criteria to those defined by national or regional FRELs submitted to the UNFCCC as a measure of jurisdictional commitment and subsequent performance (Stickler *et al.* 2018; Chapter 4). From 2006 to 2017, deforestation in the Brazilian states declined by 115,000 km^2 (representing 6.2 $GtCO_2e$ in avoided emissions – equivalent to about one tenth of annual global emissions) relative to the 1996–2005 average (FREL), an achievement attributable in large part to national policies and programmes (Nepstad *et al.* 2014). The 70–80% decline in deforestation in Brazil dominated the overall deforestation pattern. Smaller reductions in deforestation rates relative to FRELs were found in Peru (Huánuco, Loreto, San Martín, Ucayali), Indonesia (Aceh, Central Kalimantan, East Kalimantan, Papua), Colombia, (Caquetá) and Ecuador (Pastaza) (Stickler *et al.* 2018).

12.3 Conclusions and recommendations

One third of the world's tropical forests is located in subnational political geographies that have committed to jurisdictional sustainability agendas, and are making qualitatively measurable progress in building the strategies, public policies and programmes necessary to achieve low-emission rural development. Nearly half of these jurisdictions have seen declining deforestation rates in the last half-decade, although the link between actions taken by subnational governments and observed trends in deforestation is yet to be analysed.

Despite substantial progress in developing policies and interventions to support sustainability, truly advanced policy and legal reforms – and other plans and actions – have taken place in just a few jurisdictions, including Acre, Mato Grosso, Jalisco and Sabah. Acre is most advanced, in large part because it has a 10–20-year lead over other studied jurisdictions in developing a political platform ('Florestania') that puts forest conservation and support for sustainable livelihoods at its centre

(Schmink *et al.* 2014). Mato Grosso, Sabah, Jalisco and some of the other more advanced jurisdictions (e.g., East Kalimantan, San Martín, Quintana Roo) have also developed key policies and programmes, which only more recently evolved into more formal political platforms or jurisdictional strategies that prioritise environmental outcomes across all sectors.

How and why do jurisdictions with integrated programmes that place social-environmental sustainability at their core advance further? This is undoubtedly driven by many factors, which need to be analysed in detail. Among these may be the degree of decentralisation, the political and economic power and/or autonomy of a jurisdiction, the length of time over which the jurisdictional approach has been under development or implementation, key policies, incentives and programmes that are in place or under development, and human and financial capital.

The actions already taken by the studied jurisdictions are notable, given the scarcity of positive incentives for LED-R. The existing incentives for tropical forest states and provinces to mobilise the financial resources, public policy innovations, law enforcement, and political capital that are necessary to slow deforestation at scale are still relatively weak. The research presented here highlights the need for purposeful investments in jurisdictions at all stages of progress, not just those that are most advanced. Given the significant expanse of forests located in these jurisdictions, it is essential that they can continue to advance both enabling elements and strategies.

This assessment suggests the need for a global framework to drive progress towards jurisdictional sustainability, without assuming that large new flows of finance are imminent. Some of the main opportunities for accelerating transitions to LED-R include: (i) developing broadly-shared definitions of success in addressing tropical deforestation; (ii) developing better mechanisms for recognising the efforts of aspiring jurisdictions (e.g., via funding or other means); (iii) providing support for partnerships between government and indigenous peoples/local communities; and (iv) fostering company-government partnerships that are aligned with the LED-R strategy, and made more commercially attractive by verifying already achieved emissions reductions.

Support for successful subnational jurisdictional programmes is also important because of the implications for a broader transition to LED-R. Well-designed, functional subnational jurisdictional approaches should help national programmes, supply chain initiatives and REDD+ projects achieve their goals. Having a diversity of approaches to forest and land-use governance and sustainable development should not be seen through the lens of a zero-sum game, but rather from the perspective of supporting a race to the top, in which subnational jurisdictions and other actors and initiatives are simultaneously encouraged to maximise their potential for success, by working in concert.

The private sector

Can zero deforestation commitments save tropical forests?

Pablo Pacheco, Haseebullah Bakhtary, Marisa Camargo, Stephen Donofrio, Isabel Drigo and Dagmar Mithöfer

Key messages

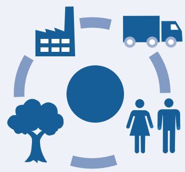
- There are three approaches to private sector commitments on zero deforestation: individual company or group-level adoption of voluntary standards; sector-wide supply chain-based interventions; and mixed supply chain and territorial initiatives at jurisdictional level.
- The main implementation challenges of these approaches are the limits of voluntary standards, traceability systems that are difficult to implement, selective actions that cannot deliver at scale, associated leakage effects, and persistence of segmented supply chains.
- Approaches have evolved to deal with such challenges, however progress requires committed companies to increase implementation efforts, other supply chain actors to adhere to commitments, and governments to harness the potential of jurisdictional approaches.

Private sector commitments in a nutshell

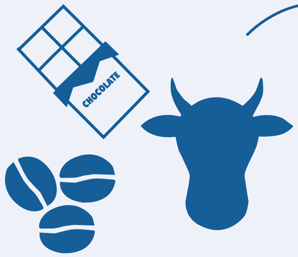
Deforestation due to commercial agriculture is a persistent problem in the tropics. It leads to biodiversity loss, contributes to climate change, and has other negative environmental and social effects.

Private sector sustainability commitments seek to produce and source commodities in ways that reduce the risk to forests.

Zero deforestation pledges are promising, but have limits. Their implementation needs to be accelerated, transparently, to show real results and progress.



Improved supply-chain management measures and complementary initiatives at the territorial/jurisdictional level would enhance the effectiveness of commitments.



Approaches to support zero deforestation, and their implementation strategies, are generally commodity-specific.

Implementation of private sector commitments varies across products; palm oil is most advanced, followed by cocoa and soy. Coffee and beef lag behind, despite the fact that beef causes the most deforestation.

Governments, companies and NGOs agree that better management systems, partnerships and market deals are needed for more effective commitments.

13.1 Private sector commitments and approaches

Deforestation driven by commercial agriculture is a persistent problem in the tropics (Curtis *et al.* 2018), in spite of growing private sector efforts such as codes of conduct, certification, and individual and collective commitments to sustainability (Lambin *et al.* 2018). Company commitments to zero deforestation (ZD) hold significant potential, but have limited scope and coverage and relatively slow implementation, making it challenging to halt persistent deforestation with its multiple causes and actors (Geist and Lambin 2001; Busch and Ferretti-Gallon 2017). When forest is converted to agricultural land, the large income streams generated benefit both influential elites and significant numbers of local people and immigrants, who make a living from small-scale agriculture. Poor government capacity tends to lead to weak enforcement of land-use and environmental regulations; there is often also a lack of political support in jurisdictions where ZD actions are in place (Stickler *et al.* 2018).

Some segments of the private sector, notably consumer goods manufacturers (CGMs) and retailers, are committing to advance sustainable supply, specifically to address deforestation driven by agricultural commodities (Climate Focus 2016). The number of commitments to zero deforestation has grown rapidly in recent years (Box 13.1), although this is now beginning to plateau (Haupt *et al.* 2018). These commitments embrace different levels of ambition and ways to link with suppliers (Jopke and Schoneveld 2018). However, to date only 98 (21%) of all ZD-committed companies are working with suppliers and have clear, actionable goals to implement traceability systems (Forest Trends 2018).

This chapter provides reflections on the progress and challenges associated with ZD commitment implementation, with a focus on forest-risk commodities (i.e., palm

Box 13.1 Zero deforestation targets in the most relevant platforms

Consumers Goods Forum (CGF): Brings together consumer goods manufacturers and retailers in pursuit of business practices that enable industry-wide efficiency and positive change. It aims for zero net deforestation by 2020. www.theconsumergoodsforum.com

New York Declaration on Forests (NYDF)*:* A non-legally binding political declaration that grew out of dialogue among governments, companies and civil society. It aims to halve natural forest loss by 2020 and end it by 2030. http://forestdeclaration.org

Amsterdam Declaration (AD): The Amsterdam Group is a formation of seven European consumer countries. It aims to achieve a fully sustainable palm oil supply chain by 2020. www.idhsustainabletrade.com/uploaded/2016/06/declaration-palm-oil-amsterdam.pdf

Cocoa & Forests Initiative*:* Top cocoa-producing countries (Côte d'Ivoire, Ghana and Colombia) agreed on frameworks for action in 2017/2018; cocoa and chocolate companies are aiming for no further forest conversion for cocoa production, and for the elimination of illegal cocoa production in national parks. www.idhsustainabletrade.com/initiative/cocoa-and-forests oil, cocoa, coffee, beef and soy). Limited research exists on ZD commitments and their impacts (Newton and Benzeev 2018). Both the type and scope of private sector commitments are linked to the commodity's characteristics and its supply chain configuration. For example, palm oil and its derivatives tend to be embedded in a final product; this makes attributes such as environmentally friendly production both less likely to gain attention and more difficult to trace, compared to single-ingredient products for direct consumption, like coffee. In turn, a proportionally larger number of smallholders are involved as primary suppliers in coffee and cocoa compared to oil palm and beef. This prompts differing motivations and interests in social standards and decent labour, linked to diverse end-consumer market pressures.

Three main approaches to support ZD supply in forest-risk commodities have been adopted by companies and backed up by multistakeholder platforms, NGOs and governments:

- an individual company or group-level approach, based on Voluntary Standard Systems (VSS) to demonstrate compliance with production or management practices, at household, smallholder group, plantation or concession level;
- a sectoral approach, with a focus on supply chain-based interventions, seeking to manage risks or mainstream environmental concerns along the entire supply chain from downstream buyers to upstream producers;
- a mixed supply-chain and territorial approach, labelled as a ZD jurisdictional approach, which relies on public-private partnerships to support sustainability actions, primarily orchestrated by NGOs or multistakeholder coalitions.

These three approaches are described in detail in Table 13.1. The extent to which these approaches are achieving impact against their own theories of change is in question. The first approach is challenged by the degree to which non-compliance with voluntary standards leads to restricted market access. The second, by whether CGM and retailer commitments can lead to whole market change, by forcing other players' adherence to voluntary standards, codes of conduct or specific policies. The third approach depends also on government action; this action is vital, both to reverse the institutional constraints that are limiting wider supplier uptake of sustainability practices, and to establish systems that link more sustainable jurisdictions with responsible buyers and end-consumers.

13.2 The scope of commitments across commodities

In the palm oil sector, implementation of private sector ZD commitments is relatively more advanced. Progress has been seen in cocoa and soy supply chains, however there has been less progress in coffee and beef, despite beef constituting the largest direct cause of deforestation. Differing levels of commitment to zero deforestation can be explained in part by when different certification systems were established (Forest Trends 2017), but consumer pressure also influences this, depending on

Table 13.1 Dominant approaches to zero deforestation in forest-risk commodities

	Individual company or group-focused approach based on adoption of VSS	Sectoral approach with focus on supply chain-based interventions	Mixed supply chain and territorial approach at jurisdictional level
Ultimate goal	To expand sustainable and third-party certified supply	To delink deforestation from commodity supply within a specific sector	To ensure sustainable jurisdictions and verified sourcing areas
Theory of change	A segregated supply from companies complying with sustainability standards contributes to secure access to markets and benefit from price premiums.	Companies in specific value chains sourcing from landscapes at risk from deforestation trace their supply to exclude non-performing farmers, and implement actions to ensure compliance with adopted ZD criteria.	Alignment of state regulations and private sector policies, supported by multistakeholder coalitions in specific jurisdictions, leads to a reconciling of production, environmental, conservation and social inclusion targets.
Implementation unit	Plantation, concession or management unit, involving individual farms and collective operations	The entire supply chain, linking upstream suppliers (small- and large-scale) to downstream end-buyers	Territorial units, which correspond to different jurisdictional boundaries, often at subnational level
Catalysers	Voluntary sustainability standards (e.g., FSC, PEFC, RSPO, RTRS, Rainforest Alliance and UTZ)	NYDF, Business platforms (e.g., GCF, TFA 2020), and government platforms (e.g., Amsterdam Declaration and Marrakesh Declaration)	Governors' Climate and Forests Task Force, BioCarbon Fund, IDH and WWF
Operational approach	Certification and verification of specific management units	Definitions, criteria and methods to set aside forest areas for conservation (e.g., HCS and HCV) accompanied by supply source traceability	Public policies, regulations and standards at territorial level, combined with private sector interventions to clean supply chains
Policy instruments/ mechanisms	• Certification of management and production standards • Auditing/verification • Chain of custody assurance	• Traceability of suppliers • Incentives to enhance suppliers' performance • Monitoring and verification	• Land-use planning • Tenure arrangements • Extension services • Financing schemes

Notes: FSC = Forest Stewardship Council, GCF = Green Climate Fund, GCF = Governors' Climate and Forests Task Force, HCS = High Carbon Stock, HCV = High Conservation Value, IDH = Sustainable Trade Initiative, NYDF = New York Declaration on Forests, PEFC = Programme for the Endorsement of Forest Certification, RSPO = Roundtable on Responsible Palm Oil, RTRS = Roundtable on Responsible Soy, TFA 2020 = Tropical Forest Alliance 2020, UTZ = the label and program for sustainable farming, WWF = World Wildlife Fund / World Wide Fund for Nature.

the vicinity of production to forest areas, impacts of production expansion on iconic species, and business operation size. Palm oil sourcing companies, for example, have faced more reputational risks due to media criticism for their involvement in deforestation that affects orangutan habitat (CDP 2017), while chocolate companies are facing financial risks due to the decreasing productivity of cocoa trees (Camargo *et al.* 2018). Although the Soy Moratorium was labelled as the first zero deforestation agreement in the tropics (Gibbs *et al.* 2015), it failed to cover the Cerrado biome, the most active frontier of large-scale soy expansion (Trase 2018).

Specific interventions depend on supply chain configuration, specific consumer pressures and the regulatory environment; this has led key players across different commodities to adopt different types of commitments to clean their supply chains and reduce their exposure to risk. The scope and type of commitments across key forest-risk commodities are explained in Table 13.2.

2020 is a popular deadline for targets – 33% of companies tracked by Supply Change have at least one commitment targeting 2020 (155 out of 473). Overall, about a third have reported significant progress towards their goals: 32% (49 out of 155) of companies with at least one commitment targeting 2020 are 75% of the way towards their commitment(s), with a minority of companies (15%, 23 out of 155 companies) reporting no progress towards their 2020 commitment(s) (Forest Trends 2018).

13.2.1 Palm oil

Palm oil is the focus of the majority of commitments (59%) made by companies tracked by Supply Change (Forest Trends 2018). However, these commitments only involve key sector players in the sector, i.e., CGMs, traders, and major palm oil corporate groups that produce, process and trade palm oil, and that have adopted No Deforestation, No Peat, No Exploitation (NDPE) policies. A small number of food companies (8 of the 16 more influential groups), including Unilever, Mars and Nestlé, are releasing data on all of their sourcing mills (Greenpeace 2018). A major issue is that an unknown number of independent mills and third-party suppliers have still not adhered to such commitments. The governments of main producer countries Indonesia and Malaysia have made clear that national regulations must be followed (Pirard *et al.* 2017), rather than corporate sector policies (Pacheco *et al.* 2018). National sustainability standards in Malaysia and Indonesia have also been issued to counteract Roundtable on Sustainable Palm Oil (RSPO) standards (Hospes 2014). Traceability is challenging, as a significant portion of oil palm (40% in Indonesia) is planted by smallholders. Illegal tenure, disconnected incentives, a lack of tailored finance and poor regulatory enforcement constitute the main challenges of the sector (Pacheco *et al.* 2017). Mainly at subnational level, different initiatives have emerged to support wider uptake of improved practices, such as jurisdictional certification pilots under RSPO in Central Kalimantan and Sabah (Luttrell *et al.* 2018a).

Table 13.2 Scope and type of key commodity commitments to zero deforestation

	Oil palm	Cocoa	Coffee	Beef	Soy
Ultimate goal	Goals differ, but a large proportion commit to NDPE, in part by protecting high conservation value (HCV) and high carbon stock (HCS) forests.	Goals differ, but a large proportion commit to eliminating deforestation, and sourcing sustainable or certified cocoa.	Goals differ, but most embrace avoiding negative impacts on protected areas and areas of high conservation value, assuring 'no recent' deforestation.	TAC aims to eliminate illegal deforestation; G4 aims to achieve zero deforestation from both direct and indirect beef suppliers. Food companies down the supply chain have also committed to zero deforestation.	The goal is to eliminate any deforestation from the soy supply chain.
Private sector initiatives	These include individual VSS approaches (RSPO), individual and sector-based supply-chain approaches (NDPE policy), and mixed supply chain and territorial approaches, mainly through jurisdictional certification and sourcing.	These include individual VSS approaches (e.g., Fairtrade, UTZ and Rainforest Alliance), individual supply chain approaches through sustainability programmes,[e] and emerging territorial approaches under the Cocoa & Forests Initiative.[f]	These include individual VSS approaches (e.g., UTZ, Rainforest Alliance, organic and Fairtrade) and a few supply chain approaches linked to specific company initiatives, but no territorial initiatives.	These include sectoral supply chain approaches covering only a segment of companies through a public agreement (TAC) and a private bilateral agreement (G4 Agreement). Downstream food companies have embraced ZD commitments, and work through individual company approaches and sectoral approaches.	There are individual VSS approaches (RTRS) and combined territorial and supply chain approaches (Soy Moratorium), but these are limited to the Brazilian Amazon.
Major corporate groups committing	285 companies including producers, processors, traders, manufacturers and traders.[a] All major corporate groups in Malaysia and Indonesia.	19 companies, 3 traders and 1 inputs industry.	• All large roasters and retailers work with VSS. • 3 out of 8 of main companies, roasters and retailers have biodiversity and ZD commitments. • 1 out of 5 major global traders commits to biodiversity conservation.	• TAC, comprising of 56 meatpackers in 3 states (Pará, Mato Grosso and Rondônia). • G4 Agreement, 3 biggest meatpackers.	• Main traders linked to the Soy Moratorium. • At least 91 companies, including producers, processors, traders, manufacturers and traders, have ZD commitments.[a]

Continued to next page

Table 13.2 Continued

	Oil palm	Cocoa	Coffee	Beef	Soy
Regulatory frameworks	National standards, such as Indonesian Sustainable Palm Oil (ISPO), and Malaysian Sustainable Palm Oil (MSPO). Others on land allocation and moratorium.	Regulations differ, yet emphasise supporting productivity, reversing degradation, enhancing sustainable land uses, protecting biodiversity and halting deforestation.	Regulations differ, yet emphasise assuring adherence to national law, increasing productivity, reversing degradation and protecting biodiversity.	Both agreements have incorporated legal framework aspects (e.g., adhesion to Rural Environmental Registry and holding an environmental license).	Sector compliance with the Forest Code, which aims for a deforestation-free supply chain in the Brazilian Amazon.
% of supply covered by commitments	• 21% of global supply under RSPO certification in 2016.[b] • 65% covered under some commitment in 2017, but this only accounts for a third of the planted area in Malaysia and Indonesia.[c] • 74% of Indonesia and Malaysia's palm oil refining capacity covered by NDP policies.[d]	About 2/3 of global supply.[g]	% of global supply: • 6% Rainforest Alliance • 4% organic • 6% Fairtrade • 9% UTZ • 25% 4C.[h]	• 11% of global supply covered under some commitment in 2017.[c] • G4 Agreement and TAC agreement involve only direct suppliers in the Brazilian Amazon.	• 11% of global supply covered under some commitment in 2017.[c] • 42% of all Brazilian soy exports, including soy trader commitments and Soy Moratorium.[i]
Operational challenges	Traceability, unclear tenure, finance and weak regulatory enforcement.	Tenure, finance, extension services, child labour and low yields.	Monitoring and enforcement, slow degradation of coffee landscapes.	Traceability of indirect suppliers, dependence on government actions, transparency regarding law offenders.	Leakage, differing criteria in land-use frameworks across regions.

Notes: (a) Supply Change http://supply-change.org/; (b) RSPO (2016); (c) Haupt *et al.* (2018) https://www.tfa2020.org/wp-content/uploads/2018/06/Progress-on-Corporate-Commitments-and-their-Implementation.pdf; (d) Steinweg *et al.* (2017); (e) Camargo and Nhantumbo (2016); (f) Cocoa & Forests Initiative https://www.idhsustainabletrade.com/initiative/cocoa-and-forests/; (g) World Cocoa Foundation Press Release http://www.worldcocoafoundation.org/two-thirds-of-global-cocoa-supply-agree/; (h) Estimates based on Panhuysen and Pierrot (2018); (i) Estimates from Trase (2018) http://yearbook2018.trase.earth/

13.2.2 Cocoa

About 80% of global production originates from smallholder farmers, who struggle with basic social and technical needs, leading to low yields. Corporate commitments in the cocoa sector historically addressed social issues such as child labour and poverty (International Cocoa Agreements, Dutch Letter of Intent), but now increasingly focus on deforestation (Camargo *et al.* 2018). Although some companies made pledges towards addressing deforestation after the New York Declaration on Forests, and the World Cocoa Foundation (WCF) emphasised environmental issues in its 2014 CocoaAction programme, it was not until 2017 that leading chocolate and cocoa companies joined with cocoa-producing countries Côte d'Ivoire, Ghana and Colombia to collaborate on halting deforestation and restoring forests. Such initiatives are addressing productivity gaps and inefficient land use, by providing smallholders with training and improved access to agricultural inputs, and by supporting agroforestry (Kroeger *et al.* 2017). However not all supply chain companies are committed to tackling deforestation and reducing GHG emissions. Other actors (e.g., input providers, packaging and transportation) are not targeted by campaigns, despite contributing to negative social and environmental externalities (other than deforestation) that can also lead to GHG emissions (Camargo and Nhantumbo 2016).

13.2.3 Coffee

Globally, coffee production varies in scale, from large estates to smallholder systems with few coffee trees. The sector has many well-established VSS, and is characterised by intensive collaboration between VSS and coffee companies, roasters and retailers (Mithöfer *et al.* 2017). Environmental organisations such as Conservation International have pushed commitments towards forest conservation and restoration via the Sustainable Coffee Challenge. In 2016/17, 55% of global coffee production was certified to sustainability standards (Panhuysen and Pierrot 2018). Roasters and VSS frequently partner with each other, with coffee companies increasingly complementing such partnerships with company-own initiatives that focus on technical assistance (Panhuysen and Pierrot 2018). The main VVS narratives focus on 'conserving biodiversity' rather than zero deforestation; for example, the Common Code for the Coffee Community (the 4C Association) – which has the largest coverage of all VSS – does not commit to zero deforestation, and other VSS address zero deforestation indirectly, as only plots not recently converted from forest can be certified. Close to 50% of VSS-certified coffee is produced under 'no recent deforestation' criteria. Only Nestlé and Starbucks have public deforestation positions on their company websites.

13.2.4 Beef

Over the last 40 years, the beef industry has been the main direct driver of deforestation in the Brazilian Amazon. Since 2009, NGOs and public authorities have pressured meatpackers to change their practices, with federal prosecutors threatening to sue meatpackers due to their co-responsibility in deforestation. This has led to two cattle agreements: (i) the Agreement for the Adjustment of Conduct (Termo de Ajuste de Conduta, TAC), which applies to more than 50 meatpackers in the Brazilian Amazon; and (ii) the G4 Agreement, signed by Greenpeace and the three largest meatpacking companies (JBS, Marfrig and Minerva). The agreements differ only in that G4 aims for zero deforestation while TAC demands the removal of illegal deforestation from the supply chain. The agreements have increased control over the beef supply chain, resulting in 83% traceability. This can be partially attributed to food safety issues in beef consumption (Forest Trends 2016). However both agreements face limitations; enabling control only over direct suppliers has led to indirect supplier practices like cattle laundering of unregistered herds (Gibbs *et al.* 2016). Likewise, the enforcement of minimal legal obligations in order to meet the 2012 Brazilian Forest Code meant there were no obligations to change farm-level management.

13.2.5 Soy

Major soybean traders, by endorsing Brazil's Soy Moratorium, agreed not to purchase soy grown on Brazilian Amazon lands deforested after July 2008. In 2016, after several extensions of the moratorium, soy traders decided to maintain the agreement indefinitely. Farms violating the moratorium are identified using satellite monitoring, and noncompliant farmers are blacklisted. Monitoring data and audits confirm high compliance. The moratorium involved traders of around 90% of all Brazilian Amazon sourced soy (Gibbs *et al.* 2015). Yet, this level of control has likely exacerbated the expansion of soy production in other regions, like the Cerrado, where environmental laws are less stringent. The supply chain transparency platform Trase (2018) indicates that four major soy traders – jointly responsible for almost half of Brazilian soy exports between 2006 and 2016 – have made ZD commitments encompassing their entire supply chain. In 2018, the Cerrado Working Group, coordinated by WWF and the Brazilian Association of Vegetable Oil Industries (Associação Brasileira das Indústrias de Óleos Vegetais, ABIOVE), was established to negotiate a new agreement to reduce soy's conversion of natural vegetation in the Cerrado. Efforts were also made to establish programmes with a jurisdictional approach (e.g., the Produce, Conserve and Include strategy in Mato Grosso) to tackle problems associated with leakage (Nepstad *et al.* 2018). Much of the current expansion is taking place in the Matopiba region, which stretches across four states, making jurisdictional coordination more difficult.

13.3 Implementation challenges across approaches

There are several challenges with private sector ZD commitments (see Taylor and Streck 2018). Here we discuss those faced by the three approaches discussed, linked to their underpinning theories of change and operational frameworks for implementation, which have both potential and limitations.

The individual company or group-level approach, which focuses on adoption of VSS, faces challenges due to addressing zero deforestation through certification. While certification can stimulate the adoption of good practices, it is not designed to have impact outside certified land and thus cannot achieve impacts at scale (Forest Trends 2017; van der Ven *et al.* 2018). Likewise, not all VSS include zero deforestation targets, meaning companies committing to VSS-certified supply are not automatically addressing deforestation. Some systems like RSPO NEXT have proposed more stringent criteria, but just a few companies with higher targets have adopted these (RSPO 2017). Critically, certification has not penetrated the market enough to bear out its theory of change. For it to be effective, buyers need to demand certified supply, with criteria that explicitly include zero deforestation.

The sectoral approach to ZD, which focuses on wider supply chain-based interventions, faces three related challenges. First, it is complex in practice to trace the production of all suppliers – including independent smallholders with their unclear tenure rights and informal access to finance and inputs (Pirard *et al.* 2017) – and differentiate between legal, standard-compliant suppliers and those who are not (Nepstad *et al.* 2017). Second, segmentation of the supply chain and market is problematic. Companies source across the same landscape from diverse types of farmers, with varying capacities and incentives to comply with company-imposed standards and regulatory frameworks (Gibbs *et al.* 2016); in addition, some farmers operate through shadow companies (Chain Reaction Research 2018). While certain companies are trying to address deforestation, others are not, and in the absence of sector-wide commitments, such companies can benefit from spurious market advantages. The third challenge is that of additionality from companies adopting ZD commitments. As better-performing companies tend to embrace more ambitious commitments (Haupt *et al.* 2018), upgrading costs become higher, further reinforcing market segmentation for companies lagging behind.

As the jurisdictional supply-chain and territorial ZD approach builds upon the previous two approaches, it faces both previously mentioned challenges and additional ones. One such challenge is a lack of incentive or reward mechanism to improve the performance of suppliers, particularly smallholders. Partnerships and collaborative action are needed, both with financial institutions, so as to mobilise finance, and with private service providers and government agencies, so as to facilitate the adoption of improved practices (Bronkhorst *et al.* 2017). Ensuring that institutional conditions support ZD actions will require state agencies to deal with territorial zoning, land regularisation, extension services and environmental conservation. Verifying progress independently and transparently is critical, as is making that information useful for monitoring progress and enhancing accountability. This will support co-learning on cost-effective actions that contribute to compliance, maximise ZD commitment benefits and minimise trade-offs. Finally, beyond the jurisdiction, a significant challenge is that of potential leakage across locations, as companies applying more rigorous commitments can displace lack of compliance to places where it is easier to circumvent regulations, or less likely to capture attention.

13.4 The way forward

It is highly unlikely that the 2020 targets set by individual companies and initiatives under the New York Declaration on Forests and Consumer Goods Forum will be met. Removing deforestation using the three approaches outlined in Section 13.1 requires addressing existing gaps amongst them. This means committed companies must increase their implementation efforts, additional supply chain actors must adopt commitments, and outside actors must become involved – particularly domestic companies in emerging consumer markets such as China and India. This will require committed companies to enhance their monitoring, accountability and transparency in order to improve their impact and make it visible to society. This should lead civil society organisations and financial institutions to further support these companies, as it is unlikely that more companies will come on board if those trying to improve their performance are exposed to intense criticism due to lack of progress.

The challenges identified here can be tackled in diverse ways. To ensure zero deforestation, VSS must incorporate explicit criteria and methods for companies or producer groups to assess and report compliance with ZD targets, as seen in palm oil and coffee standards. Such improvements must come alongside efforts to expand the uptake of certification across larger territories, as proposed by the jurisdictional certification approach.

The sectoral supply chain-based approach has attempted to deal with the limitations of VSS in halting deforestation. To overcome the remaining challenges this approach faces requires increased investment in traceability systems, and making use of emerging methods and technologies, such as those using fine resolution remote sensing data and blockchain technologies. To overcome segmentation within supply chains and markets, performance gaps between suppliers must be resolved (Pacheco *et al.* 2018). This requires co-investment schemes involving all supply chain actors, including providers of inputs, packaging and transportation (Camargo *et al.* 2018).

The mixed supply chain and territorial approach arose to tackle major challenges like market segmentation and differentiated performance amongst suppliers, along with the need for improved public and private partnerships, particularly at subnational level, so as to foster common goals in specific jurisdictions.

Jurisdictional sourcing offers additional incentives for companies and investors trying to reduce their risk exposure to deforestation. But that alone is insufficient unless companies are committed; additionally, NGOs and governments must initiate co-investment schemes to improve local production systems, delivery of finance, inputs and services, and market deals, so that ZD commitments are more effective for all supply chain actors. Strengthening public governance structures – particularly in areas recipient to leakage – is also vital to reach ZD goals.

Ultimately, for subnational initiatives to be effective, they should align with both national government regulatory frameworks (e.g., environmental law and fiscal incentives) and with wider corporate sustainability policies and consumer country government regulations that support sustainable sourcing of forest-risk commodities. This alignment is essential to scale up the impacts of ZD commitments.

Chapter 14

Climate-smart agriculture
Will higher yields lead to lower deforestation?

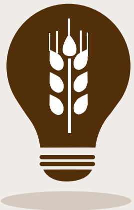
Hambulo Ngoma, Arild Angelsen, Sarah Carter and Rosa Maria Roman-Cuesta

Key messages

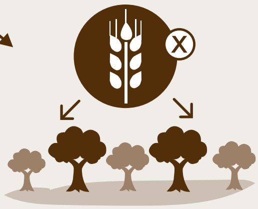
- Sustainable intensification of agricultural production, a key component of climate-smart agriculture, can potentially conserve forests. However, higher yields may provide incentives to expand agricultural land into forests, so policies need to incorporate forest-specific measures to ensure land-sparing outcomes.
- Sustainable intensification policies aimed at supporting forest conservation must take into consideration the characteristics of the commodity, farm practices and context, including capital intensities, market conditions, scale of adoption, target location, and accompanying forest governance and conservation policies.
- National REDD+ strategies promoting forest conservation can benefit from the promotion of sustainable intensification, but thus far few countries combine the two approaches.

Climate-smart agriculture and deforestation in a nutshell

Higher competition for land is arising from increasing populations, income growth and dietary preferences, requiring increased agricultural production, and potentially new land. This land is also required for forest protection and restoration through initiatives such as REDD+.



A number of factors determine whether higher yields from sustainable intensification will spare land or stimulate expansion.



Farmers must have the capacity, labour and inputs to intensify agriculture, while not using these resources to expand agricultural land.

Whether yield increases stimulate expansion depends on links to larger national or international markets.

The scale of adoption influences land-sparing outcomes: large-scale interventions keep prices low, which can spare forests.

Location matters: yield increase in forest-poor lowland regions can limit expansion in forest-rich upland areas.

Forest governance and conservation policies, and their coordination with agricultural policies (including removal of competing subsidies), can stimulate sustainable intensification of agriculture and land-sparing outcomes.

14.1 Introduction

Agricultural systems in the developing world are under pressure. Population and income growth, combined with changes in dietary preferences, have raised the global demand for food, feedstock and fibre. Projections suggest that production has to increase by 60% to meet food demand by 2050, and most of this increase should come from yield improvements (Alexandratos and Bruinsma 2012). Other scenarios suggest lower increases could suffice, if more equitable distribution and less waste of food is achieved (FAO 2017).

Over the past 50 years, most of the increase in global production has been from yield growth rather than area expansion, with sub-Saharan Africa being the notable exception (Jones and Franks 2015; Figure 14.1). Yet, agricultural expansion into forests is estimated to account for about 80% of deforestation worldwide (FAO 2017), and forest loss accounts for about a tenth of global greenhouse gas (GHG) emissions (IPCC 2013). Direct agricultural emissions contribute a similar share, of which 35% occur in developing countries (Wollenberg *et al.* 2016).

At the same time, climate change will negatively and disproportionately affect farming systems and poor smallholders in the developing world (Rosenzweig *et al.* 2014). The large yield gaps of these systems suggest they have the most potential to increase productivity, but climate change is reducing this prospect. Closing yield gaps requires formidable effort from producers, including buying improved seed varieties, adding more inputs such as fertilisers and irrigation, and improving efficiencies of inputs through better crop husbandry and agronomic practices (van Ittersum *et al.* 2016).

Climate-smart agriculture (CSA) aims to meet the triple challenge of raising agricultural productivity and farm incomes, enhancing adaptation and resilience to climate change, and reducing GHG emissions from agriculture (FAO 2013). That last mitigation-focused objective relates to whether CSA contributes to lowering both *on-site* emissions (i.e., on the farm itself) and *off-site* emissions (i.e., by preventing agricultural expansion into carbon-rich habitats such as natural forests). Carbon accounting for CSA commonly ignores the latter effect.

CSA is best defined in terms of its objectives (Campbell *et al.* 2014), rather than as a specific set of agricultural practices or policies. It seeks to identify which practices are appropriate to meet CSA objectives, given the particular local conditions. As such, the question of whether CSA delivers reduced emissions (including from agricultural expansion) is circular – if it does not, then it is not climate-smart. The more pressing question is whether CSA as currently practised contributes to lowering both on-site and off-site emissions.

According to Campbell *et al.* (2014, 41), "sustainable intensification is a cornerstone of CSA". As commonly defined, it refers to "producing more output from the same

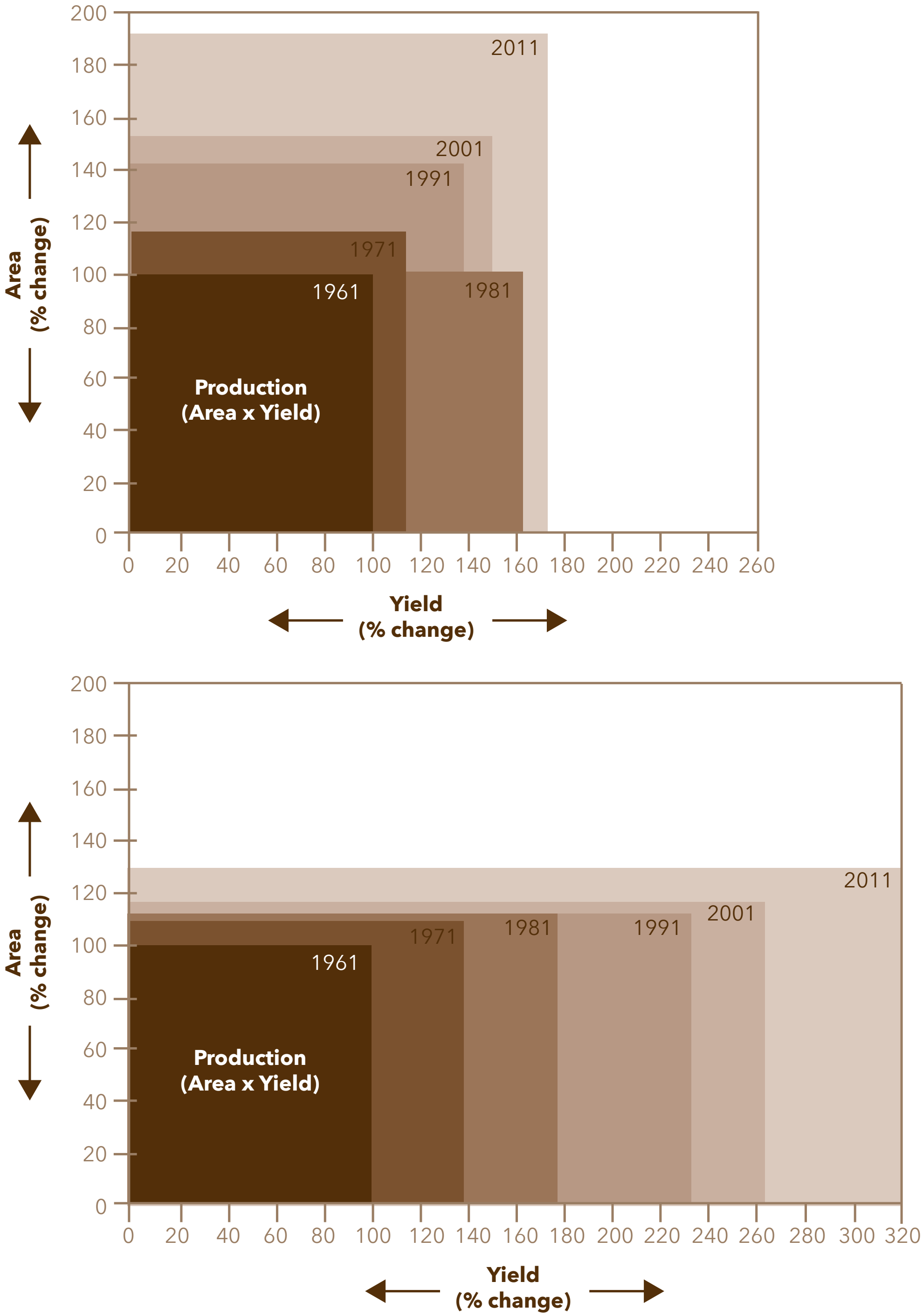


Figure 14.1 Area and yield changes to cereal production in sub-Saharan Africa (upper) and Asia (lower), starting from a baseline of 1961 = 100%

Source: Jones and Franks (2015)

Box 14.1 Examples of climate-smart agriculture and their impact on forests

CSA is defined by its objectives – raising productivity and farm incomes, climate change adaptation and resilience, and reducing GHG emissions from agriculture. As such, depending on location, CSA can include a number of elements to meet these goals: integrated crop, livestock, aquaculture and agroforestry systems; improved pest, water and nutrient management; improved grassland and forestry management; reduced (minimum) tillage and use of diverse varieties and breeds; integrating trees into agricultural systems; restoring degraded lands; improving the efficiency of water and nitrogen fertiliser use; and manure management, including the use of anaerobic bio-digesters (Lipper *et al.* 2014).

In addition to achieving the three goals of CSA and the forest impacts that might be achieved by intensification, some technologies also directly benefit forest conservation. Agroforestry systems can reduce harvest from natural forests of timber, fuelwood, charcoal, fodder and other products that agroforestry trees provide (Minang *et al.* 2011). When implemented in buffer zones around the forest margins, these can be particularly effective. Incentives for farmers to implement agroforestry can include carbon payments, in some countries directly through REDD+ (depending on the forest definition), or under different mechanisms.

area of land while reducing the negative environmental impacts and at the same time increasing contributions to natural capital and the flow of environmental services" (Pretty *et al.* 2011, 7). To be sustainable, agricultural production systems need to have high productivity (output–input ratio), reduce unnecessary use of external inputs (e.g., inorganic fertilisers), use agroecological processes such as nutrient cycling, and reduce practices that have negative environmental and health risks (Pretty *et al.* 2011; Box 14.1). Likewise, higher yields can, following the dominant CSA logic, avoid "the risk that land is cleared for agricultural production elsewhere to compensate for locally lower yields" (Garnett *et al.* 2013, 33).

This land-sparing effect cannot, however, be taken for granted. This chapter examines the factors which make land-sparing following sustainable intensification more likely to occur, and also suggests policies and interventions that favour win-win outcomes.

14.2 Critical factors linking agricultural yields and forests

14.2.1 A framework: Borlaug vs. Jevons

The debate on how higher agricultural yields can benefit forests reflects two very different paradigms. The Borlaug hypothesis is based on the global food equation:

*food production area * average yield = food consumption per person * population*

For a given total production (consumption), an increase in average yield reduces the agricultural area – by definition – and thus spares forests. This is also referred to as the land-sparing hypothesis, or – in the micro-level version applied at household level – the subsistence hypothesis (Angelsen and Kaimowitz 2001c).

In contrast, the Jevons hypothesis (or Jevons paradox) postulates that higher yields make farming more profitable, which incentivises farmers to expand their land – potentially into forests. More profitable practices will also attract labour and capital to the area (and limit outmigration), putting even more pressure on natural forests. The Jevons paradox is also referred to as the rebound effect: greater efficiency of an input (e.g., land) increases its use.

One notable difference between the Borlaug and Jevons hypotheses is that the former refers specifically to food, while Jevons is applicable to all farm products, as it refers to income rather than food production and demand.

So, do higher yields spare land (Borlaug) or stimulate expansion (Jevons)? The basic economics to analyse this question are well established (e.g., Angelsen *et al.* 2001; Choi *et al.* 2011; Villoria *et al.* 2014). Typically, one first analyses the effects at farm (household) level, focusing on farm preferences and constraints. For example, do farmers have the capacity and access to inputs (labour and capital) to adopt new technologies or intensify production, and to expand their agricultural land? Next, aggregate (general equilibrium) effects are analysed, in particular for output markets (will higher output lead to lower prices?) and labour markets (how will labour demand change, and will it lead to changes in wages and migration?). Using this framework, we review critical factors that co-determine the forest outcome.

Many studies refer to *yield increases*, either through *technological progress* (more output with the same or a lower level of inputs) or through *intensification* (more output due to more inputs per hectare). Villoria *et al.* (2014) point to the need to clearly distinguish between these in empirical analyses. Studies on technological progress and intensification are both relevant for CSA, in part because many technologies represent both technological progress and intensification, and in part because few studies directly assess the impacts of common CSA technologies and practices on deforestation.

14.2.2 Climate-smart farm technologies may need more cash and labour

Some new technologies or farmer management practices are costly or increase the amount of labour needed on the farm. For farmers who are constrained by a lack of labour and/or capital, adopting intensive technologies tends to limit expansion. For example, minimum tillage (MT) can increase water retention and soil fertility by restricting tillage to planting stations, but it requires more labour among smallholders to reopen the planting stations and to control weeds, especially for those without access to herbicides.

In a study from Zambia, Ngoma and Angelsen (2018) found that adopting MT had no significant impact on whether farmers expanded cropland into forests or not. However, MT adoption reduced the area of expansion among those who had already expanded, perhaps because MT is more labour-intensive than conventional practices and absorbs any excess family labour that might otherwise be used to expand cropland into forests. Among farmers who did not expand their cropland, the majority (68%) cited lack of resources (labour and/or cash) as the main reason. Looking beyond individual farms, the adoption of labour-intensive practices can also drive up rural wages, and dampen agricultural profitability and expansion (Angelsen and Kaimowitz 2001a).

Because of labour constraints, farmers will also be reluctant to adopt labour-intensive technologies in the first place, unless their profitability or other characteristics make these more attractive than current practices. The labour intensity of MT in smallholder farming systems – which typically feature hand-hoe or animal draft power and limited herbicide use and mechanisation – may also partly explain the relatively low uptake of this practice in Zambia (Ngoma *et al*. 2016). Thus a paradox arises, since farmers "will only be willing to adopt such land-saving practices when land has become scarce and most of the forest is gone" (Kaimowitz and Angelsen 2008, 6).

More labour-saving MT technologies exist: using tractors with rippers reduces the time spent preparing fields for planting. If farmers can afford them, these technologies may be more attractive for the farmers to adopt but are less likely to be land-sparing.

14.2.3 Market size makes a difference

Yield increases boost food supply, and thus lower food prices. This will dampen the incentive to expand agricultural land. The size of the price effect depends on two factors: (i) demand elasticity in the market, i.e., how much demand changes in response to price variation; and (ii) the market share of the sector experiencing technological progress (Angelsen 2007; Hertel 2012). Farmers selling products on national or global markets are less likely to face downward pressure on prices when they increase their supply because their contribution to aggregate supply is low.

The expansionary effect is also likely to differ across regions. Technological progress at global level is likely to take pressure off forests, yet low-yield, land-abundant regions are likely to experience further land expansion (Villoria *et al*. 2014). Globalisation has improved market access for farmers across the world, and will further integrate agricultural markets. In this context, an 'African green revolution' – which has been called for – is likely to lead to a significant increase in crop area in Africa, although crop area is likely to decline by almost the same amount across the rest of the world (Hertel *et al*. 2014).

Farmers prefer to expand production for markets where they will not experience a downward pressure on prices. Such cases of market-driven intensification are more likely to result in negative forest outcomes, as exemplified throughout history by a series of commodity booms and rapid deforestation (e.g., Ruf 2001). Cocoa is one of those global commodities, responsible for much of crop land expansion into the forests of sub-Saharan Africa, but cocoa agroforestry shows some promises (Box 14.2). Technology-driven intensification, conversely, is more likely to dampen cropland expansion (Byerlee *et al.* 2014).

Box 14.2 Cocoa agroforestry at the heart of REDD+ in sub-Saharan Africa

Denis J Sonwa

Cocoa is an important driver of forest change in sub-Saharan Africa (SSA). A recent study of commodity crop-related deforestation found that cocoa production in SSA accounted for 57% of global cocoa expansion between 2000 and 2013. In 2013, the total area allocated to cocoa cultivation in SSA represented 67% of all cocoa cropland worldwide – equivalent to 6.3 million ha. During this period, 132,000 ha was converted to cocoa each year across SSA, and some countries showed substantial increases in land converted to cocoa: 313% in the Republic of the Congo, 150% in Liberia and 80% in Cameroon (Ordway *et al.* 2017). Like other post-conflict countries in the region, the Democratic Republic of the Congo has also seen an increase in cocoa cultivation (De Beule *et al.* 2014).

However, not all research points to bad news; agroforestry appears to increase both the productive and ecosystem function outputs of the cocoa farming system. Recent studies in Ghana show that low-to-intermediate-shade cocoa agroforests in West Africa have no negative impacts on yield compared to conventional production methods, instead creating benefits for climate adaptation, climate mitigation and biodiversity (Blaser *et al.* 2018). In fact, cocoa agroforests with around 30% shade tree cover could optimise the trade-offs between production, climate and sustainability at low-to-intermediate levels of cover.

Researchers found that cocoa, a shade tree, grows under restructuring forest canopy (Sonwa *et al.* 2017a), and that a complex timber and non-timber cocoa agroforest can store 2–3 times the carbon stock of other systems, e.g., cocoa with no/low shade, and cocoa with banana and oil palm (Sonwa *et al.* 2017b). Since 1960, cocoa farming in West Africa has tended to use no/low shade, whereas some cocoa agroforests have emerged in Central Africa. Between 1988 and 2007, 21,000 km^2 of deforested and degraded forestland could have been saved if earlier research findings on cocoa intensification had been applied, with a subsequent carbon saving of 1.4 $GtCO_2$ (Gockowski and Sonwa 2010). To avoid further deforestation and forest degradation, the needs of farmers and markets must be prioritised in decisions about the types of trees promoted for smallholder agroforestry systems (Sonwa *et al.* 2014).

In an effort to reverse the cocoa-deforestation trend, the two main cocoa-producing countries in SSA (Cote d'Ivoire and Ghana) have given cocoa a central role in their NDCs and REDD+ strategies. As a result, many companies committed to a deforestation-free supply chain have chosen to work with them (Kroeger *et al.* 2017; Chapter 13). On the ground, an integrated approach to agroforestry that considers the entire cocoa value chain will be central to these REDD+ efforts.

14.2.4 The scale of adoption influences land-sparing outcomes

The scale at which agricultural technologies and intensification are adopted – and indeed analysed – is critical. The more widespread the adoption, the larger the supply increase and the downward pressure on output prices. Thus, "situations that are win-lose [production – forest conservation] at the local level may be win-win at the global level" (Angelsen and Kaimowitz 2001b, 400). The Green Revolution is one example of this; output markets kept food prices low and thus have, according to some calculations, spared millions of hectares of forests (e.g., Burney *et al.* 2010).

Yet, this apparent positive conclusion comes with a series of caveats. Stevenson *et al.* (2013) estimated that in developing countries, the Green Revolution saved 2 million ha of forest over a period of 40 years (1965–2004), or 50,000 ha per year. By contrast, annual gross tropical forest loss was 8 million ha in the 1990s and 7.6 million ha in the 2000s (Achard *et al.* 2014). In other words, the Green Revolution reduced absolute annual forest loss by 0.6–0.7%; put differently, the annual deforestation rate of 0.490% (Achard *et al.* 2014) would be 0.493% without the Green Revolution. Stevenson *et al.* thus concluded that their estimates are "orders of magnitude lower than predicted by the simple global food equation that does not take account of feedback loops through prices of products, consumption demand, and land-use decisions" (Stevenson *et al.* 2013, 8365). Similarly, econometric studies using national data by Ewers *et al.* (2009) and Rudel *et al.* (2009b) found insignificant or only weakly negative correlations between agricultural yield and deforestation.

14.2.5 Location, location, location

Within a country, yield increases in lowland (forest-poor) regions may put downward pressure on output prices, limiting expansion in upland (forest-rich) regions. Intensified lowland rice production also pulled labour out of upland rice cultivation in the Philippines, thus increasing the effect (Shively and Pagiola 2004). There are exceptions to this. In Sulawesi, Indonesia, Ruf (2001) found that Green Revolution technologies were linked with more forest clearing in the uplands for cocoa planting, because: (i) they mechanised lowland rice production by introducing hand tractors, freeing up labour; and (ii) the increased profitability provided funds for investing in cocoa production in the uplands. Maertens *et al.* (2006) found similar effects in their study, also from Sulawesi.

In order to reduce emissions from deforestation, agricultural policies should therefore be place-specific, a point also argued by the World Bank (2007). For example, policies that promote agricultural intensification in peri-urban and rural regions close to cities can effectively spare forests (Rudel 2009). In Rondônia, Brazil, pasture intensification in farms located closer to markets was more likely to spare forestlands (Fontes and Palmer 2018). Farmers close to markets were also more likely to adopt land-sparing cattle production practices.

Finally, the location and specific ecosystem into which agriculture expands can make a major difference in terms of carbon emissions. Cerri *et al.* (2018) reported that carbon emissions associated with clearing for new pastures and cropland are 4–5.5 times greater in the Amazon than in the Cerrado. Focusing agricultural development on locations where emissions are lower can bring net gains in overall emission reductions.

14.2.6 Forest governance and conservation policies can bring about win-win outcomes

A final factor shaping the yield-forest link is that of forest policies and governance. In South America, agricultural intensification was associated with land expansion in areas with a high score on general governance structures (Ceddia *et al.* 2014), possibly because it created more favourable business opportunities. However, when looking specifically at *environmental governance*, good governance led to a spatial contraction of agriculture, and a sustainable intensification process. Thus, "agricultural intensification needs to be accompanied by policies that specifically focus on the environmental aspects of governance" (Ceddia *et al.* 2014, 5).

Forest governance not only influences the outcomes for forests, but can in itself incentivise agricultural intensification. In Mato Grosso, Brazil, Garrett *et al.* (2017) found that cattle intensification was, in part, spurred by better deforestation monitoring, penalties and enforcement. This relates well to the classical insight by Boserup (1965) that farmers tend to exploit the extensive margin before the intensive margin, if spare land is available. Good forest governance and conservation policies restrict the space available for expansion, and thus spur intensification.

14.3 Integrating forest and agricultural policies

Raising both agricultural production and income is needed to meet food security and poverty reduction goals. At the same time, preserving forests is needed to meet climate, biodiversity and local livelihood goals. Synergies between forests and agriculture may support these goals; for example, forests provide ecosystem services, which benefit agriculture. To achieve these multiple goals, forest conservation and agriculture need to be integrated in national policies through coordination across sectors (Salvini *et al.* 2016; Bastos Lima *et al.* 2017b; Chapter 7). In particular, competing policies – i.e., policies in one sector that undermine objectives in the other sector – should be examined. For example, subsidies to four key forest-risk commodities (beef and soy in Brazil, palm oil and timber in Indonesia) amount to USD 40 billion per year (McFarland *et al.* 2015).

REDD+ offers opportunities to better integrate forests and agriculture, as examples from Zambia, Brazil and Mexico show. Zambia's National REDD+ Strategy identifies CSA elements such as conservation agriculture and agroforestry as important land management practices that can support REDD+ implementation (Box 14.3).

Box 14.3 Integration of climate-smart agriculture and forestry policies in Zambia

Deforestation in Zambia – which is estimated between 167,000 and 300,000 ha annually and is driven in part by agricultural expansion into forestland – remains a major threat to the country's forests and biodiversity. Cognisant of this fact, the Zambian government has put in place policy measures to address both food security objectives and forest conservation, by promoting the adoption of CSA practices and sustainable forest management.

Zambia's National Policy on Climate Change (NPCC) (2016) aims to coordinate responses to climate change and mainstream it into national programmes, in order to enable the country to attain climate-resilient and low-emission rural development pathways. The NPCC advocates for both sustainable forest management and CSA (mainly conservation agriculture and agroforestry) as means to reduce GHG from land use, land-use change and forestry. One of the objectives of Zambia's Second National Agriculture Policy (2016–2020) is "to promote the sustainable management and use of natural resources" through sustainable land management technologies such as conservation agriculture, afforestation and community woodlots, and agroforestry. While recognising that agricultural expansion is among the leading causes of deforestation, the National Forest Policy (2014) is rather silent on specifics, except to call for the use of appropriate farming practices.

Zambia's National REDD+ Strategy (2015) is more upfront: "[C]onservation agriculture as a practice, if successful, could contribute significantly to creating permanent agriculture for small-scale farmers thus reducing the need to convert forests and woodlands to agricultural use while at the same time contributing to climate change mitigation and adaptation from the agriculture sector" (Matakala *et al.* 2015, 12). The promotion of CSA is a priority intervention within the agriculture sector, as much as sustainable forest management is in the forestry sector. Successfully integrating CSA and sustainable forest management holds promise for win-win outcomes in terms of food security and forest conservation, but this will require more coordination than currently exists between the agriculture and forest sectors in Zambia.

Sources: GRZ (2014); Matakala *et al.* (2015); GRZ (2016a, 2016b)

Jurisdictional commitments from the agricultural sector itself, such as zero deforestation commitments, can also be implemented into REDD+ and show promise in terms of benefiting agricultural production and forests (Chapter 13).

Brazil has made a clear connection between the national REDD+ and CSA strategies, particularly for the Amazon and Cerrado biomes (ENREDD+ 2016). The CSA strategy is outlined in the Low-Carbon Agriculture programme (ABC Plan; MAPA/ACS 2012). It provides low-interest loans to farmers who want to implement sustainable agriculture practices. To what extent this large-scale sustainable agricultural intensification (SAI) can reduce deforestation is yet to be seen. De Oliveira Silva *et al*. (2018, 111) state: "Brazil's NDC is a bold statement of its scientific and institutional commitment to reconciling key sustainability challenges via SAI. Our analysis points to the feasibility of the approach pending the role of complementary policies on deforestation and farm support".

Mexico's National REDD+ Strategy (ENAREDD+) offers another example (CONAFOR 2016). ENAREDD+ is based on the national REDD+ vision (CONAFOR 2010) and it: (i) targets sustainable rural development as its main goal, rather than directly targeting forests; (ii) focuses on both adaptation and mitigation; (iii) relies on a landscape perspective with multiple functions and cuts across sectors instead of focusing on individual activities only in the land sector; and (iv) develops national guidelines for internal coherence but builds upon subnational/state REDD+ strategies.

While examples of CSA within REDD+ strategies are not abundant, trees and forests are commonly included in CSA frameworks.[1] However, natural forests are not necessarily targeted by these CSA initiatives; instead commercial tree species as well as commercial agroforests frequently play large roles. Agroforestry and silvopastoral systems are two classical CSA activities connected to forest conservation (Box 14.1). These CSAs help to reduce demand for trees from *natural* forests, for fuel, fodder and other uses (Desquilbet *et al.* 2017; Duguma *et al.* 2017), which in turn has the potential to reduce deforestation and forest degradation.

14.4 The way forward

Agricultural yield increases can result in mixed outcomes on forest cover. These outcomes depend on the characteristics of the commodity, farm practices and context, including labour and capital intensities, market conditions, scale of adoption, location, and accompanying forest governance and conservation policies. The predicament of this potential for diverse outcomes is increasingly being recognised. In a recent report on trends and challenges impacting the future of food and agriculture, FAO noted; "there is a risk that agricultural intensification may lead to more cropland expansion rather than less" (FAO 2017, 36).

Yet forest outcomes are not completely at the mercy of fate. Research suggests that the likelihood of win-win outcomes can be enhanced through supporting forest protection policies. As Byerlee *et al.* (2014, 92) warn, "technology-driven intensification by itself is unlikely to arrest deforestation unless accompanied by stronger governance of natural resources". To provide adequate forest protection, policies need to include land-use zoning, economic instruments, strategic deployment of infrastructure, certification, and sustainability standards (Phalan *et al.* 2016; Chapters 9 and 13).

While recognising that sustainable intensification of agriculture alone does not necessarily lead to forest conservation, it is a first step towards achieving the triple objectives of improved food security, climate change mitigation, and adaptation/ resilience (Carter *et al.* 2018; Lipper and Zilberman 2018). As yet there are few, if

1 See country CSA profiles that include mitigation plans http://sdwebx.worldbank.org/climateportal/index.cfm?page=climate_agriculture_profiles

any, examples of agricultural and forestry policies having been jointly designed with the explicit intention of promoting a land-sparing outcome. Designing and testing the success of such measures should be a key focus of agricultural programmes aiming for zero deforestation (Chapter 13) and forest restoration (Chapter 15).

Given limited resources, countries should prioritise areas where the likelihood for win-win outcomes for CSA is highest. Carter *et al*. (2015) developed a procedure to identify such opportunities, taking into account three variables: (i) *the potential to mitigate*: areas with large agriculture-driven deforestation, and a potential to intensify agriculture (as expressed by a large yield gap); (ii) *an enabling environment:* high score on the governance index (World Bank 2014), and REDD+ engagement; and (iii) *the needs and risk*: a low score on the global food security index (EU 2013). The logic is that high yield gaps imply that CSA can make a difference in farm production and income, good governance will ensure that CSA activities are adopted widely, and active REDD+ policies can help prevent negative forest outcomes.

Chapter 15

Forest restoration

Getting serious about the 'plus' in REDD+

Louis Verchot, Veronique De Sy, Erika Romijn, Martin Herold and Ruben Coppus

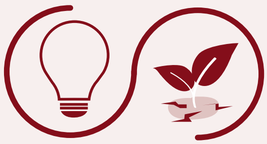
Key messages

- Initiatives that aim to restore degraded forests and landscapes share many goals with REDD+. However, few restoration projects track forest carbon impacts, since pledges are mainly based on area to be restored, and many projects do not include the establishment of reference levels or carbon monitoring in their activities.
- Many restoration projects in Latin America focus on increasing vegetation cover and re-establishing ecological processes and biodiversity. However they do not directly address the causes of degradation, which are remarkably similar across the tropics.
- The restoration goals selected by the studied projects in Latin America and the Caribbean tended to reflect the aims of the donors, rather than the specific causes of degradation. Multilateral donors contribute the largest amounts of funding to large-scale restoration initiatives and have strong social agendas.

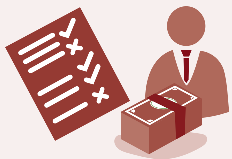
Forest landscape restoration in Latin America

Forest landscape restoration is a way to halt degradation across the tropics. This chapter looks at initiatives in Latin America that aim to restore degraded forests and other ecosystems.

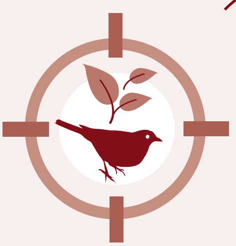
Drivers of forest landscape degradation are similar across the tropics; they vary predictably with the level of deforestation of a country.



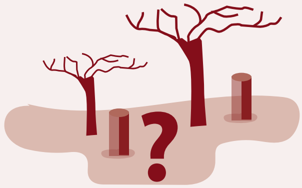
The challenge for national and international restoration programmes is to change incentive structures to promote sustainable land stewardship and restoration of degraded lands.



Objectives vary according to the type of donor funding the project. The largest investments are made by multilateral donors with social and economic goals; impact investors focus on commercially oriented projects, whereas government agencies tend to support smaller projects.



Most projects focus on increasing vegetation cover, recovery of biodiversity, or re-establishing and improving ecological processes.



These priorities aim to enhance ecosystem quality and functioning in degraded landscapes, rather than address the drivers of degradation directly.

It is uncommon for restoration activities to track forest carbon impacts, as pledges are mainly area-based and many projects do not include carbon monitoring in their activities.

15.1 Restoration takes the stage

About 75% of forest lands are degraded, and the rate of forest degradation – 185 million ha between 2000 and 2012 – exceeds that of deforestation (FAO 2015). Land degradation is defined as a long-term loss of productivity and ecosystem function caused by human activity, from which land cannot recover on its own for several decades (Bai *et al.* 2008; Gibbs and Salmon 2015). It is a serious economic problem that is only growing as demand for food, feed, fuel, water and other ecosystem services increases. The Economics of Land Degradation Initiative (Nkonya *et al.* 2016) estimated very high economic losses from soil degradation; these vary across regions but can be as high as 10% of GDP in sub-Saharan countries. With a global population expected to grow by 2.2 billion people by 2050 (UNDESA 2017), and as dietary preferences change, the pressure on land resources will only increase.

Countries are stepping up to meet the challenge. In 2007, the Bali Action Plan put the 'plus' activities into REDD+ by calling for actions to support conservation, the sustainable management of forests, and the enhancement of forest carbon stocks in developing countries, in addition to the two 'Ds' of deforestation and degradation. Several reviews of subnational REDD+ activities show that restoration features prominently in pilot projects (de Sassi *et al.* 2014; Panfil and Harvey 2016). The 2014 New York Declaration on Forests[1] – endorsed by 189 governments, companies, indigenous peoples and civil society organisations (CSOs) – aims to restore 150 million ha of degraded landscapes and forestlands by 2020, and 200 million ha more by 2030. Signatories to the Global Development Framework pledged to include ambitious, quantitative forest conservation and restoration targets for 2030 and, with the adoption of the Sustainable Development Goals (SDGs), all countries agreed to reduce deforestation, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss (SDG 15). Halting degradation and restoring degraded lands appeared as a priority activity in the Addis Ababa Action Agenda of the Third International Conference on Financing for Development (2015), before featuring prominently in Article 5 of the Paris Agreement. Finally, the Bonn Challenge (launched in 2011 by the German government and IUCN, and later endorsed at the UN Climate Summit in 2014) aims to bring 150 million ha of deforested and degraded land into restoration by 2020, and 350 million ha by 2030. Its implementation is supported by regional collaboration platforms across the tropics, including Initiative 20x20 in Latin America and the Caribbean, AFR100 in Africa, and regional ministerial roundtables in many countries across the tropics.

1 https://nydfglobalplatform.org/

Yet despite such widespread support, making the transition from unsustainable exploitation of forest resources to forest stewardship is challenging. This is primarily due to entrenched interests and institutional resistance to change, which impact on policy related to reducing deforestation and land degradation (Brockhaus *et al.* 2017). What we do know is that countries with limited forest resources that have initiated policy change are typically more successful at establishing national programmes for reducing deforestation than those that still have large areas of forest cover (Korhonen-Kurki *et al.* 2014, 2018). The availability of performance-based funding and strong national ownership of the REDD+ process are also important elements for success.

As a leading partner in Initiative 20x20 in Latin America and the Caribbean, the International Center for Tropical Agriculture (CIAT) and partners have been analysing restoration activities in the region for the past three years. In this chapter, we look at the causes of forest degradation across the tropics and examine several initiatives aimed at restoring degraded forests and other ecosystems, to begin to answer two questions: How are programmes addressing causes of forest degradation and prioritising restoration activities? What progress are they making? Our main focus is on restoration efforts in Latin America and the Caribbean, but examples from Africa and Asia are also included (Boxes 15.1 and 15.2).

15.2 From forest degradation to forest restoration

Rates of forest loss are mostly well quantified, and the causes of deforestation are well documented (Chapter 5). Since the above commitments were made, there has been some progress in reducing deforestation (Houghton and Nassikas 2017). However, forest degradation is more difficult to define and quantify, and estimates of emissions from forest degradation are uncertain. This is particularly troublesome, because most countries that are integrating REDD+ objectives into national actions to mitigate climate change are prioritising activities associated with reducing degradation, restoring forests and enhancing carbon sinks (Salvini *et al.* 2014).

Across the tropics, there are typically four major categories of direct drivers or activities leading to forest degradation: (i) timber harvesting; (ii) biomass harvesting for energy (fuelwood and charcoal production); (iii) grazing livestock within forests; and (iv) fire (Hosonuma *et al.* 2012). In a pan-tropical analysis, Hosonuma *et al.* (2012) showed that timber harvesting was the most important driver in Latin America and Asia, followed by biomass harvesting for energy (Figure 15.1, A). Fire and livestock grazing accounted for small percentages of total forest degradation in these regions. In Africa, biomass harvesting for energy was the largest driver, followed by timber harvesting; livestock grazing accounted for a small percentage but was still twice as important in Africa as it was in Latin America or Asia. Fire was a small driver of forest degradation in Africa.

Box 15.1 Forest landscape restoration in Ethiopia

Habtemariam Kassa

Ethiopia has committed to restoring 22 million ha of degraded forests and agricultural lands by 2030. By conserving natural forests and establishing new ones, forests are expected to play significant role in the socioeconomic development of the country, to account for 50% of the national emissions reduction potential, and to contribute to building a carbon-neutral economy by 2030 (CRGE 2011). Between 2016 and 2020, Ethiopia aims to put 2 million ha of natural forests under participatory forest management (PFM) while identifying and demarcating 4.5 million ha of degraded land for restoration, afforestation and reforestation. In addition to the state-led Sustainable Land Management Programme, which implements soil and water conservation work on degraded communal lands in a large number of districts, PFM and area exclosures are the two major state-led forest landscape restoration mechanisms. The Environment, Forest and Climate Change Commission has identified eight major types of tree-based restoration options for improving tree cover in different landscapes, such as lakesides and riverbanks, buffer zones of natural forests, rangelands and agricultural landscapes (MEFCC 2018).

Although the country has made a large national restoration commitment, political will at state and lower levels of government is still lacking to integrate this into local-level plans. The national FLR pledge represents a bold initiative that could bring about climate and economic benefits, yet the state-led FLR initiatives face a number of challenges:

- Population pressure is driving the demand for more farmland.
- There is no national land-use policy or land-use plan to define forest lands and to govern land-use changes.
- There is no clear national FLR strategy to guide the planning and implementation of FLR initiatives.
- Costs of FLR initiatives are largely borne by rural communities.
- Efforts are limited to the middle-elevation and highland areas of the country, while deforestation and land degradation are also severe in the lowlands where rapid land-use changes are occurring.
- Socioeconomic factors that undermine effectiveness and sustainability of FLR initiatives are not adequately addressed, e.g., tenure rights of rehabilitated lands are poorly defined, conservation goals dominate in setting objectives of rehabilitating degraded lands and as a result little emphasis is given to enhancing land productivity and income to land managers that would have sustained their continued engagement in FLR.
- Engagement of land managers in negotiating the often contradictory objectives of restoration (economic and conservation) and the means to achieving objectives is suboptimal.
- Certain soil and water conservation practices are employed almost everywhere as there is little attention to location and ecozone specificity of sites and practically no emphasis on the cost–benefit analysis of alternative restoration options.
- Communities commonly fail to sustain their engagement, as equitable benefit-sharing mechanisms are hardly discussed and agreed upon.
- There is a lack of capacity even at the national level to identify and use existing technology and decision-support tools to establish rigorous FLR planning and monitoring systems to systematically support the processes and assess outcomes of FLR interventions in different contexts and at different levels (Kassa 2018; Kassa *et al.* 2017)

Box 15.2 Potential, challenges and possible solutions for peatland restoration in Indonesia

Herry Purnomo

Indonesia has one of the world's largest areas of tropical peatland after Brazil and the Congo Basin, at around 15 million ha of peatland, mainly on the islands of Sumatra, Borneo and Papua. Peatlands are under increasing pressure from population and economic growth, and despite a government regulation stipulating that peatlands over 3 m deep should be protected, they are being rapidly converted to agricultural land, and are used by large-scale wood pulp and oil palm plantation corporations. This drainage of peatlands makes them prone to fire, and in the last three years 2.6 million ha of land – including 33% of all peatlands (LAPAN 2015) – has been burned; this led to an estimated 1.2 billion tCO_2e emissions (Huijnen *et al.* 2016) and record fires in 2015 that exposed 43 million people to toxic haze and led to economic losses of USD 16.1 billion (Glauber and Gunawan 2016).

Initiatives supporting peatland restoration have been undertaken at different levels, and by diverse stakeholders. The Peatland Restoration Agency (BRG), established in 2016, provides a major opportunity to reduce fires on peatlands, and aims to restore 2.5 million ha of peatland over five years (2016–2021). Government Regulation (PP) No. 57/2016 for peatland management and conservation has been issued, along with regulations to operationalise it. These policies have seen some successes in the past (Jong 2017) and are supported by environmental NGOs and CSOs. The BRG, ministries of agriculture and of environment and forests, together with oil palm and pulp and paper companies have developed peatland and fire prevention programmes targeting communities and farmer groups. However, not all stakeholders are in favour of these plans. Some local communities contest the loss of productive land and livelihoods; companies that hold permits for land currently allocated for peatland restoration expect to be compensated for their investments; and even some government institutions have expressed their disagreement.

A better understanding of the underlying political economy is needed in order to identify institutional arrangements that are both efficient and equitable for stakeholders. Central government bodies, like the BRG and MOEF, will be unable to implement the restoration agenda if the interests of local government, private sectors and local communities are not considered. At the community level, understanding how income can be generated from peatland restoration efforts is crucial, and various options should be explored before action is taken to ensure that livelihoods are protected.

15.2.1 Viewing restoration through the lens of forest transition theory

Using the forest transition curve model, which depicts a typical change in forest cover over time in a given geographical area (Mather 1992; Rudel *et al.* 2005), Hosonuma *et al.* (2012) divided the phases of landscape transition into four categories: pre-transition, early-transition with high levels of forest cover and accelerating deforestation, late-transition with large areas of forest lost and declining rates of deforestation, and post-transition, in which natural forest loss approaches zero and secondary forest recovery or tree planting contributes to an overall increase in forest cover (see Figure 15.1, B). Degradation from timber harvesting was important in all phases of the transition curve, but decreased in the late-transition phase. During

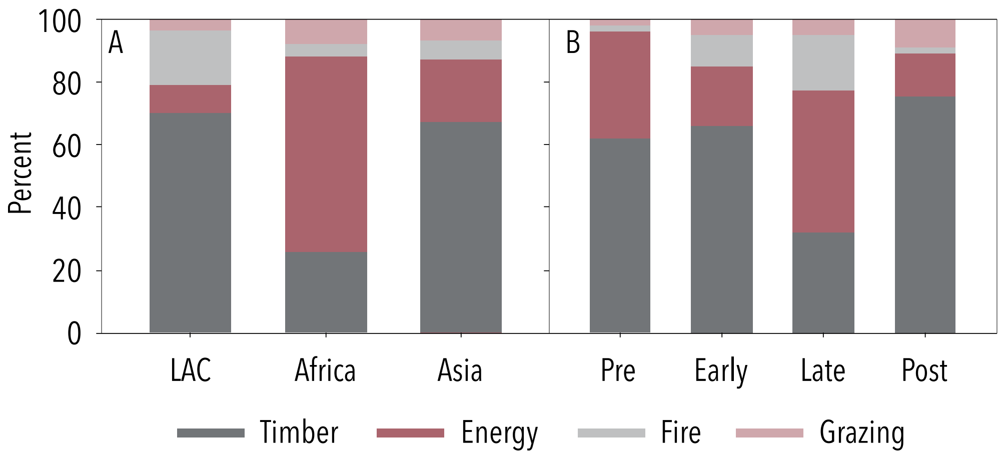


Figure 15.1 Estimates of the relative proportions of degradation resulting from four proximate drivers, by continent (A) and by phase of forest transition (B), for the period 2000–2010

Source: Hosonuma *et al.* (2012)

this phase, biomass harvesting for energy, along with uncontrolled fires, were more important agents of degradation than in earlier phases. Many African countries are in this late phase of the transition curve, as the remaining forest areas are being cut for fuelwood. In the post-transition phase, economic development reduces fuelwood collection and charcoal production, as other energy sources become available. Timber extraction is usually better managed in this phase.

The forest transition theory describes a general pattern that has been observed in many places across the globe, but policies affect how the transition spells out; likewise, the optimal policy mix changes along the forest transition curve (Angelsen and Rudel 2013). For example, the introduction of biogas, produced from agricultural waste, manure and other organic matter, is gaining popularity in many tropical countries as a means to reduce pressure on wood resources where biomass harvesting is degrading forests. It has been shown to reduce degradation and enhance forest regeneration (Agarwala *et al.* 2017). In China, widespread farming on sloping lands led to forest loss, severe soil erosion and large-scale flooding, causing loss of lives. In response, the government introduced forest conservation and rural development policies that led to widespread conversion of cropland to forests (Gutiérrez Rodríguez *et al.* 2016).

15.2.2 Restoration activities in Latin America and the Caribbean

In our ongoing research (Box 15.3) we are characterising restoration efforts across the region. Restoration projects are well distributed across the continent, with the highest concentrations in areas around the Amazon basin, and in Colombia,

Box 15.3 CIAT's research project on land restoration in Latin America

We compiled a database of 154 restoration projects throughout the region (Figure 16.2) from freely available public information and previously assembled databases and project descriptions provided by the World Resources Institute (WRI), CIFOR (Murcia and Guariguata 2014; Méndez-Toribio *et al.* 2018), Bioversity International, the World Agroforestry Centre (ICRAF) and Peru's National Forest Service (SERFOR) (Cerrón *et al.* 2017). The database includes projects that have been developed through Initiative 20x20, and others belonging to initiatives from the Global Environment Facility (GEF), Clean Development Mechanism (CDM), Forest Investment Program (FIP) or local initiatives led by NGOs and national governments. While not exhaustive, the database includes all restoration initiatives for which data were readily available. We provide summaries of the data in this chapter.

We also pursued the semi-quantitative objective of generating a typology of activities, to see how projects cluster. A subset of 97 recent and ongoing restoration projects were used to define a typology of restoration activities, and we used multivariate exploratory and clustering techniques to group the projects according to common characteristics.

The database, with these projects, has been published through the LUCID portal (http://lucid.wur.nl/datasets/forest-and-landscape-restoration).

Ecuador, Mexico and Peru. These are also areas with high potential for vegetation growth, as clearcutting or logging activities have taken place in these tropical biomes. Restoration projects also occur in non-humid tropical areas, particularly in the shrublands, grasslands, steppes and mountainous areas of Argentina, Chile, Bolivia and Peru.

Restoration projects differ in scale, with smaller activities (<1,000 ha) typically focusing on the establishment of plantations, and larger activities (>100,000 ha) focusing on natural regeneration. Figure 15.2 maps the 154 projects, and Figure 15.3 summarises their most important goals. Most projects have multiple goals, the most common of which is to increase vegetation cover (for 117 projects). Increased vegetative cover is also linked to biodiversity recovery (a goal of 105 projects) and the recovery of ecological processes (a goal of 100 projects).
Many projects (84) also aim to provide local employment and to enhance the livelihoods of local communities. In particular, all Forest Investment Program (FIP) and Clean Development Mechanism (CDM) projects, and most Global Environment Facility (GEF) projects, try to create local employment. In total, 74 projects have climate change mitigation (carbon sequestration) as a goal; this includes all FIP and CDM projects and most GEF projects. Fewer projects from Initiative 20x20 (41%) have this goal, and projects labelled as 'other' typically do not have this focus (6%). Promoting agroforestry productivity is a goal in 60 projects, and 46 projects include the goal of promoting silvopastoral productivity; these two goals occur most often in GEF and FIP projects (more than 50% of all GEF and FIP projects have one or both).

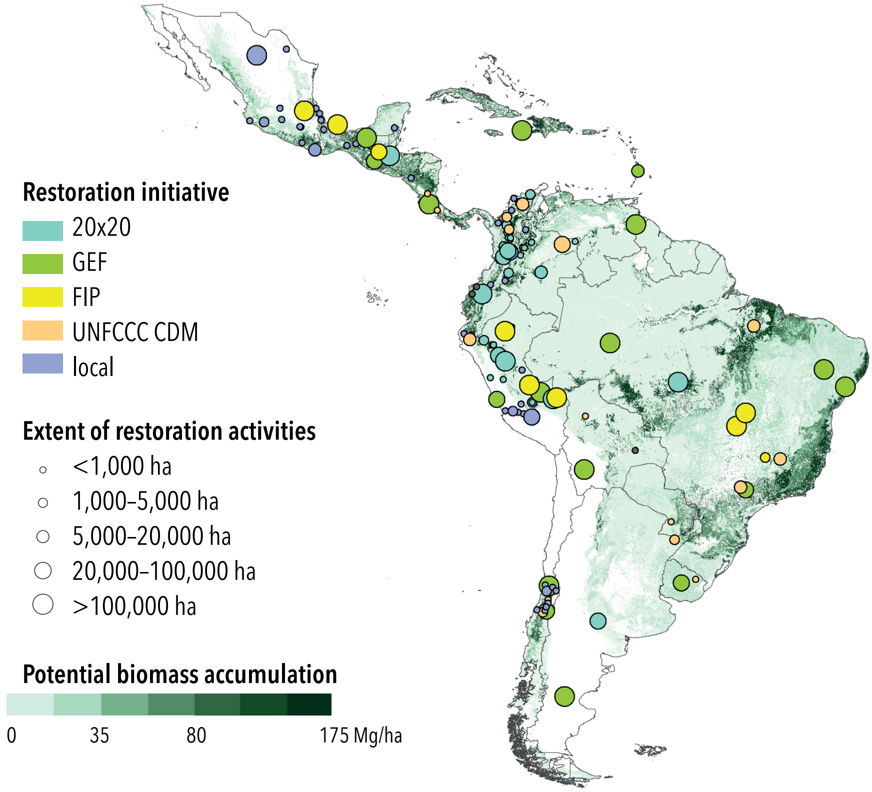


Figure 15.2 Map of 154 restoration projects in Latin America and the Caribbean

Note: 20x20 = Initiative 20x20; GEF = Global Environment Facility; FIP = Forest Investment Program; CDM = Clean Development Mechanism. Dots represent the centre location of the administrative boundaries of the restoration projects. The colour of the dots indicates the type of initiative (source of funding) and the size indicates the extent of the restoration activities in the project. The project centres are overlaid onto a map showing the potential forest aboveground biomass accumulation, indicating the carbon sequestration potential when areas are restored to forests. The database for the map can be found online: http://lucid.wur.nl/datasets/forest-and-landscape-restoration.

Source: Based on data from WRI (Potapov *et al.* 2011), FAO global ecological zones (FAO 2010) and GEOCARBON global forest biomass (Santoro *et al.* 2015; Avitabile *et al.* 2016).

Restoration projects are implementing a variety of activities to reach these objectives. Apart from restoring vegetation, many projects implement activities to control erosion, stabilise land, restore soil or recover riverbeds. Projects that aim to increase vegetation cover often use natural regeneration or assisted regeneration to enhance vegetation growth, e.g., many of the GEF and FIP projects. A major strategy in CDM projects, and some others, is to make use of mixed species or monoculture plantations, to increase vegetation cover and sequester carbon. These types of projects usually also benefit the local community, by providing employment opportunities. Other common project activities include exclusion of grazing (fencing), control of fires and fertilisation.

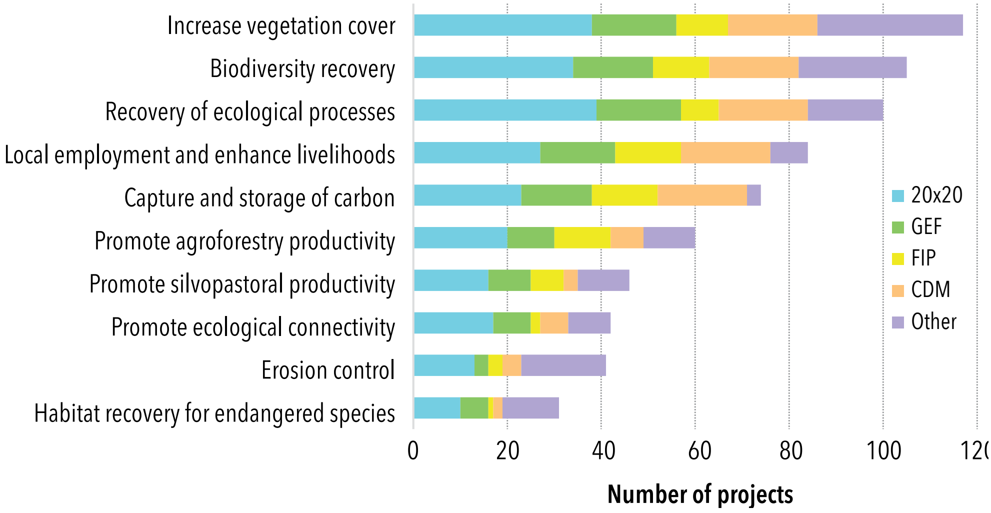


Figure 15.3 Overview of project goals of the 154 restoration projects, displayed for the initiatives

Note: 20x20 = Initiative 20x20; FIP = Forest Investment Program; GEF = Global Environment Facility; CDM = Clean Development Mechanism. One restoration project can have multiple goals. The bars indicate the number of projects per restoration initiative that have a particular goal in their restoration strategy.

Payment for ecosystem services (PES) schemes were not frequently incorporated into the restoration projects surveyed. Only 14 of 154 projects showed evidence of this activity. This is probably due to uncertainties about their long-term sustainability and the limited effectiveness of PES in promoting forest restoration (Pirard *et al*. 2014). Also, PES schemes tend to be more efficient when a single, clearly defined ecosystem service is targeted (Wunder 2013); this is often not the case, given the multifunctional character of most projects. The economic incentives of projects with funding from impact investors focused on timber and non-timber products, as well as carbon sequestration. All CDM-funded projects in developing countries entail emissions reduction activities that can earn certified emissions reduction credits, which can be traded, sold and used by industrialised countries. PES schemes were, to a certain degree, associated with funding from international donors (30%) but were almost absent in the other types of projects.

Our typology classification (Box 15.3) resulted in the creation of three groups, based on the environmental, socioeconomic, organisational, financial and technical dimensions that characterise the approaches to restoration of degraded lands:

1. **Restoration projects funded with public money from international donors such as GEF and FIP, with occasional support from national governments and/or private investors.** This group is characterised by restoration of large areas, as well as large budgets, sound planning that addresses the degree and causes of degradation, and the establishment of baselines and a monitoring plan.

The projects address global socioeconomic and environmental themes that are in line with the SDGs.

2. **Restoration projects funded with private money from impact investors and companies.** This group is distinguished by incomplete planning, where the degree of degradation is often not determined and a baseline study and a monitoring plan are frequently omitted. The emphasis is on timber production; global themes such as improving rural livelihoods and biodiversity are addressed to a lesser extent.
3. **Restoration projects funded with public money from (sub)national governments and occasionally national and international donors.** This group is characterised by small-scale local projects with low costs. In general, this group is not linked with the international agenda except for improving biodiversity.

Many projects financed with private money are a direct result of Initiative 20x20, but the relationship between local restoration projects and the initiative is less clear. Various countries have made ambitious pledges to the Bonn Challenge, and Initiative 20x20 is working with them to implement these (e.g., Colombia 1 million ha, Brazil 12 million ha, Peru 3.2 million ha)[2]. Although these projects appear to be disconnected from national restoration agendas, they will likely be used to meet national pledges to Initiative 20x20.

15.3 Restoration projects need to invest more in monitoring and reporting

There is increasing international pressure to ramp up monitoring and reporting on the results of actions, particularly following adoption of the SDGs, and with the growing number of Bonn Challenge pledges. It is easy for groups and countries to pledge to restore land, but how can we know what has really been restored by 2020? How do we know if there is real change on the ground? How do we know what is being restored, or what the benefits of restoration actions have been?

Answering these questions is important for the international community, but it represents a cost to projects. A proper monitoring programme can, however, improve the effectiveness of restoration projects, and increase cost efficiency by allowing for adaptive management of projects. Monitoring can inform restoration project design and site selection and ensure progress towards implementation milestones and restoration goals. It can also improve efficacy of the restoration process itself, by feeding information back to project managers about successes and failures, thereby improving future restoration decision-making.

Restoration activities undertaken in Latin America and the Caribbean have many different goals, including increasing agricultural productivity, protecting watershed

2 http://www.bonnchallenge.org/commitments

and improving water quality, supporting local incomes, and reducing soil erosion. As such, many systems exist for reporting on restoration efforts, including country-led and global efforts. Depending on the project's goals, different factors and processes need to be monitored: environmental variables (e.g., changes in forest/vegetation cover, biodiversity, soil, water and climate); production systems (e.g., data on yield and livestock in agroforestry and silvopastoral systems); and socioeconomic variables (e.g., food security, household income and gender equality). Measuring progress requires multiple data sources and methods, including collection of ground data, field visits, community monitoring, spatial maps and GIS data, remote sensing data, participatory workshops, household surveys and questionnaires, and statistical data. In questionnaire responses on project-level monitoring and reporting, all types of data were regarded as very important or somewhat important by the projects; however, approaches that require lower technical capacity and provide lower statistical rigour were more widely used in the implementation of current projects.

Monitoring and impact assessment requires financial and human resources. Many academic and practitioner guidelines insist on the need for rigorous monitoring of projects, to enhance efficiency and effectiveness of implementation and improve reporting (e.g., Murcia *et al*. 2016). Yet experience on the ground shows that projects do not routinely invest resources in these activities, and managers often resist diverting resources from restoration activities that achieve their primary objectives. It is typically only in hindsight that underinvestment in project monitoring is lamented, when projects cannot demonstrate impact (Lindenmayer *et al*. 2012). Thus, it is perhaps not surprising that responses to our survey singled out financial resources as the major constraint to project monitoring (Table 15.1). Obtaining data and other technological issues were considered much less important.

Table 15.1 Obstacles encountered during monitoring of project progress

Answer option	Percentage of projects
Insufficient financial resources	80%
Difficulty in obtaining other types of data (ground measurements, household surveys)	40%
Insufficient technological resources (computer facilities, software, mobile devices)	30%
Difficulty in obtaining GIS data and maps (due to low internet speed, cloud cover, low data availability or other issues)	30%
Lack of skilled human resources	30%
Difficulty in motivating land owners and communities	30%
Lack of coordination	25%

Note: Survey questions were answered by 20 project representatives.

A middle ground between the desires of academics and those of project managers needs to be found. Improving restoration monitoring requires lowering the costs, or providing positive incentives to projects that invest resources in these activities. PES schemes, being dependent on performance, can represent a potential incentive; however, they require a payment culture and well-defined land or resource tenure regimes (Wunder 2013). Aggregation of monitoring and reporting in ways that spread costs and gain scale efficiencies may improve the willingness of smaller projects to allocate resources to monitoring efforts. A search of environmental reporting literature revealed a scarcity of experimentation with alternative reporting schemes that could inform the international restoration agenda. This is an area that is ripe for innovation.

15.4 Conclusion

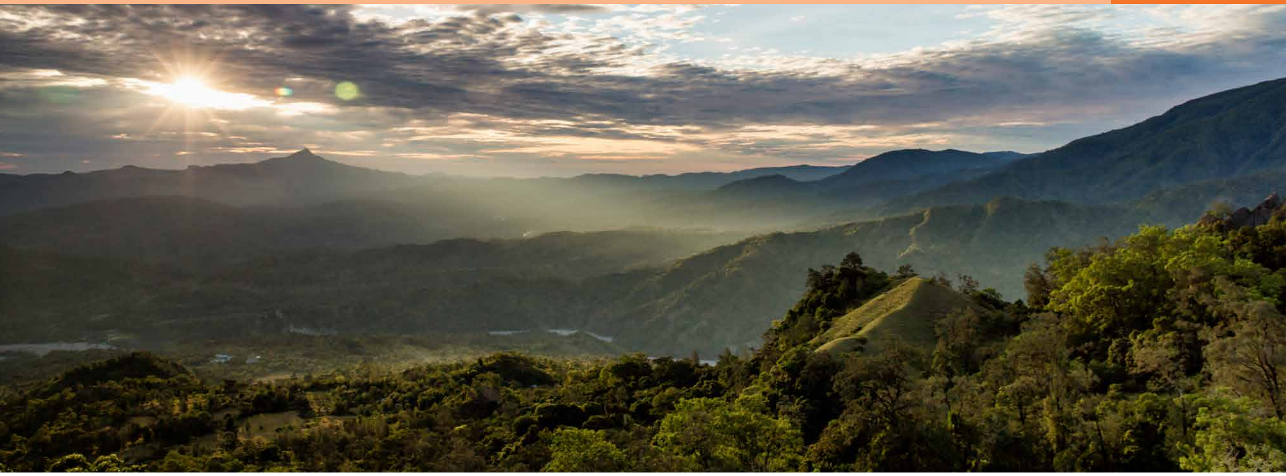
The drivers of forest degradation are remarkably similar across the tropics, and they vary predictably with the level of deforestation of a country. While this might suggest that generic approaches to restoration could be scalable, the challenge for national and international restoration programmes is to change incentive structures so that they promote sustainable land stewardship and restoration of degraded lands. Analyses so far indicate that successful restoration is more likely when certain key elements are present, like local ownership of restoration programmes, the availability of financial resources, and continuous advances in the rules that govern resource use.

From the 154 projects surveyed in Latin America and the Caribbean, findings show that the restoration goals selected by projects tended to reflect the aims of the donors, rather than the specific drivers of degradation. The largest investments are being made by multilateral donors, while impact investors and governmental agencies support smaller projects and have more targeted, often commercially oriented goals. Smaller projects focused on employment creation (within the project), while larger ones focused on creating long-term economic opportunities as part of their sustainability plans. Most projects focused on increasing vegetation cover, recovering biodiversity, or re-establishing and improving ecological processes. While these priorities have the laudable goal of enhancing ecosystem quality and functioning in degraded landscapes, they fail to address the drivers of degradation directly. Unless projects begin to address these underlying drivers, the sustainability of restoration actions cannot be assured.

The goals of restoration initiatives overlap with those of REDD+, since most of the primary activities of these initiatives also lead to enhancements in vegetation carbon stocks. Unlike REDD+, however, it is uncommon for restoration activities to track forest carbon impacts, as restoration pledges are mainly area-based rather than based on tonnes of carbon. Restoration project monitoring approaches build on multiple data streams; however, approaches used in the projects studied are primarily low-tech and community-oriented. Typical expectations are that 5–10% of project resources should be devoted to monitoring, but this is likely to be a significant burden on smaller projects. If countries are to report on restoration activities and achievements, practical approaches to national measurement and reporting must be developed which integrate project results and lessons learned.

The Bonn Challenge has stimulated a lot of political interest in landscape restoration, and this has translated into significant pledges in Latin America and the Caribbean. Older initiatives by large multilateral donors have generated some significant lessons, but actions by impact investors and subnational governments are being implemented on much smaller scales and with different objectives. As might be expected, impact investors focus on commercial activities that are likely to give financial returns, while large-scale multilateral and bilateral donors support projects with stronger social agendas. Balancing public goods and services with private benefits will be an important challenge as governments seek to leverage private resources to scale up restoration efforts. Lessons from PES experiences may be relevant, but many large restoration projects have multiple objectives and lack clearly defined ecosystem services. Clarifying and quantifying the environmental benefits, and determining who is benefiting, will improve the prospects of PES approaches for restoration initiatives. Finally, the success of ongoing and past restoration efforts has been poorly documented, which makes learning lessons and assessing impact difficult.

Restoration efforts in Latin America are predominantly undertaken through projects. Yet land degradation is a widespread problem affecting all ecosystems in the region. Projects are gaining experience in practical solutions that work in specific contexts, and it is unlikely that they can be scaled up for significant impact at national or regional levels. The way forward requires stepping up the scale and the sophistication of approaches through less reliance on projects and more focus on systematic approaches backed by policy reform and appropriate incentives and disincentives.



Conclusions

Lessons for the path to a transformational REDD+

Arild Angelsen, Christopher Martius, Amy E Duchelle, Anne M Larson, Pham Thu Thuy and Sven Wunder

Key messages

- Results-based payment, REDD+'s innovative feature, has largely gone untested. International funding (both public and private) remains scarce, and demand through carbon markets is lacking.
- REDD+ helped forests gain prominence on the international and some national policy agendas. National REDD+ initiatives improved countries' monitoring capacities and understanding of drivers, increased stakeholder involvement, and provided a platform to secure indigenous and community land rights. Local REDD+ initiatives have achieved modest but positive outcomes for forests. Well-being impacts have been limited and mixed, but are more likely to be positive when incentive components are included.
- For REDD+ to be effective, forest-based mitigation needs to be incorporated in national development and climate action plans, and mainstreamed across sectors and levels of government. A strong positive narrative on how forests contribute to economic development and climate goals can support this integration.

16.1 Success, or lack thereof, depends on expectations

REDD+ has not achieved what many actors expected a decade ago: rapid, cheap and lasting reduction of emissions from tropical deforestation and forest degradation. Generally, one potential explanation for unfulfilled expectations is that the initial hopes were unrealistic. In contrast, with lowered expectations, the smallest advances will be perceived as success. But human nature is ambitious. 'Optimism bias' is among our cognitive flaws; we systematically overestimate the likelihood of our success, and underestimate the likelihood of our failure (Sharot 2011).

In hindsight, many initial hopes for REDD+ were indeed idealistic. Writing on the "dynamics of expectations" in REDD+, Massarella *et al*. (2018, 375) note that typically, in their early stages, international conservation and development programmes get significant funding and much attention, and generate high expectations, which are then rarely fulfilled. High expectations – and some degree of naïveté – play a role in consciously mobilising finances and enthusiasm, thus increasing the chances for success; however, they also drive up expectations, and therefore set the stage for major disappointments.

In this chapter we take stock of nearly a decade of REDD+ initiatives at global, national, subnational and local scales. Inspired by the use of medical metaphors (e.g., Seymour 2018; Wunder 2018), with forest loss being the targeted 'disease' and REDD+ the alleged 'cure', we summarise notable achievements and disappointments (the cure's impacts), and how to explain these (diagnosis). We then look ahead (prognosis), and provide suggestions for how REDD+ could become more transformational (an improved cure). In the epilogue we ask, what will happen to the REDD+ concept itself as it begins to mature?

16.2 On balance, what has REDD+ achieved so far?

We summarise the achievements using main steps in a theory of change (Chapter 2). Most REDD+ initiatives have so far failed to make decisive headway towards stopping tropical deforestation (Box 1.1; Chapters 9 and 10). But it is important to take stock of the building blocks established, and the intermediate milestones achieved. Our evaluation draws on the research presented in this book, as well as an earlier summary of national and subnational REDD+ implementation to date (Duchelle *et al*. 2018a).

16.2.1 Finance and building blocks

The amount of finance committed to REDD+ activities – USD 1.1–2.7 billion per year – falls well short of prior expectations, yet is significantly above past funding for forests (Chapter 3). Readiness funding, combined with dedicated national efforts, has in many countries improved the enabling conditions to address deforestation and forest degradation, including promoting a better understanding of deforestation drivers, improving forest monitoring capacities, increasing stakeholder engagement, and providing a platform to secure indigenous and community land rights (Lee and Pistorius 2015; Romijn *et al.* 2015; Chapters 6 and 8). But new information as well as political goodwill will be needed by all actors to address issues of participation, transparency, accountability and coordination across sectors and levels of government (Chapters 5 and 7).

Although results-based payment (RBP) is a cornerstone of REDD+, moving from the readiness to the results-based finance stage remains challenging (Chapters 2 and 4). RBP likely contributed to forest policy and governance advances in Brazil, Guyana and Indonesia (Seymour and Busch 2016), but current and emerging RBP initiatives arguably compromise on some key principles, including payments based solely on results and at recipient discretion over how results are achieved, and independent verification of results (Chapter 4). Some forest-rich countries have already made important financial contributions to REDD+ implementation, and this should be better acknowledged in global finance discourses and negotiations (Chapter 3).

At the same time, newer, potentially complementary, global initiatives have appeared on the world stage. Zero deforestation initiatives are considered key for addressing agricultural drivers of deforestation, but are marred by implementation challenges and knowledge gaps (Chapter 13). Several countries are addressing the agricultural sector head-on, including by placing climate-smart agriculture (CSA) on their agendas, but the impacts of these initiatives on forests is uncertain, and often not monitored (Chapter 14). Similarly, although restoration is critical to enhancing carbon stocks (the 'plus' in REDD+), few initiatives track their carbon impact progress, or deal effectively with the drivers of degradation (Chapter 15).

16.2.2 REDD+ intermediate outputs and outcomes

A decade of national and international debate has drawn attention to key REDD+ dimensions that can make a difference in forest-based mitigation, such as addressing equity concerns, ensuring inclusive decision-making (Pham *et al.* 2017b), providing transparent and accountable information and data (Khatri *et al.* 2016), and promoting the participation of indigenous peoples (Brockhaus *et al.* 2017). More than 50 countries now recognise the important role of reducing forest-based emissions in their NDCs, and a similar number have elaborated national REDD+ strategies.

The initiation of REDD+ led to hundreds of 'demonstration activities,' with currently more than 350 REDD+ projects in 53 tropical countries covering 43 million ha (Chapter 10). While some can report positive outcomes (Chapters 10 and 11), others are limited by their inability to address agents and contextual drivers of deforestation, including broader issues such as tenure security, which in some cases must be addressed at higher levels (Chapter 8).

Against the background of the challenges of early national- and project-level approaches to REDD+, subnational jurisdictional approaches – government-led, holistic approaches to forest and land use across legally defined territories – have begun to emerge. They encourage alignment between REDD+ incentives, sustainable supply chain initiatives, domestic policies and finance to address the interconnected issues of deforestation, rural livelihoods and food security (Nepstad *et al*. 2013a). A recent analysis of progress towards jurisdictional sustainability in 39 states and provinces in 12 tropical countries, which hold 28% of the world's tropical forests, highlights formal commitments to reducing deforestation and concrete actions to implement these pledges (Chapter 12).

16.2.3 REDD+ impacts on forests and people

Lessons on the effects of REDD+ interventions are useful to inform the design and implementation of REDD+ policies and measures at higher scales. But the lack of studies that use a counterfactual scenario to reliably measure REDD+ impacts limits broad conclusions. At the national level, no particular forest conservation policy instrument stands out as a 'silver bullet'. Achieving the multiple objectives of REDD+ will likely require policy mixes that are sensitive to local contexts (Chapter 9). Although subnational jurisdictional approaches hold promise, there has been little rigorous assessment of their outcomes thus far (Boyd *et al*. 2018; Chapter 12). At the local level, the few studies that focused on carbon/land-use outcomes show moderately encouraging results (Chapter 10), while the more numerous studies on well-being show small and mixed results, which are more likely to be positive when incentive components are included (Chapter 11).

Results based on rigorous evaluation of 23 local REDD+ initiatives in CIFOR's Global Comparative Study on REDD+ (GCS REDD+; Box 1.2) highlight some important, though still quite embryonic, lessons. First, more than half of the 23 initiatives reduced deforestation at the community level, although with small effect sizes (Bos *et al*. 2017; Chapter 10). Second, no systematic negative impacts of REDD+ on local welfare were observed at these sites (Sunderlin *et al*. 2017; Chapter 11), with some site-level evidence of significant livelihood benefits (Duchelle *et al*. 2018c). Third, issues embedded in national law, such as land tenure, cannot be fully addressed at the project scale. For instance, while REDD+ interventions did not worsen smallholder tenure insecurity, there is little evidence that implementers' efforts to address tenure security produced notable results (Sunderlin *et al*. 2018; Chapter 8). Fourth, while there are examples of REDD+ projects enhancing women's participation in village decision-making (Kariuki and Birner 2016; Sharma *et al*. 2017), there is also evidence that implementers could do more to promote gender equality and safeguard women's rights (Larson *et al*. 2018; Chapter 11). Very little of this knowledge and experience has been applied to REDD+ decision-making at the national level; most REDD+ strategies are gender blind and a lack of concern for gender issues prevails among national organisations working on REDD+ in developing countries (Pham *et al*. 2016).

Fifth, meaningful participation in local REDD+ initiatives is often limited, including non-comprehensive free, prior and informed consent and insufficient attention to integrating local needs (Chapters 7 and 11). Finally, incentives for smallholders and communities can significantly alleviate the burdens of land-use restrictions, including those delivered through national-level policies (e.g., through law enforcement or protected areas), which are associated with some REDD+ initiatives (Duchelle *et al.* 2017; Chapter 11).

Our findings mirror the long-recognised micro–macro paradox of development aid (Mosley 1987; Arndt *et al.* 2010): satisfactory results at the project level are not necessarily matched at the macro level (with some notable exceptions, e.g. Brazil). Development aid literature offers a number of explanations, which – translated to the REDD+ context – include: crowding-out of other conservation initiatives (e.g., public expenditure switching), leakage to areas outside project boundaries, or simply the fact that projects are too small and too few to have any detectable macro-level impact. Indeed, Brazil's success in reducing deforestation was largely due to national-level policies.

16.3 Why was progress less than expected?

How can we explain the lack of progress described in the previous section? We summarise and discuss four hypotheses put forward in the debate, using a medical metaphor.

16.3.1 'REDD+ is the wrong medicine'

The hypothesis that REDD+, either as envisioned or as practised, is the wrong solution comes in at least four versions:

(i) REDD+ relies too much on RBP. Some claim that *REDD+ was (and still is) flawed in its reliance on results-based payment (RBP)*. The argument put forward by, among others, Fletcher *et al.* (2016) is that REDD+ is a market-based instrument, the design of which is fundamentally flawed. Angelsen *et al.* (2017) have contested that this argument itself is flawed: REDD+ as practised cannot be labelled a market-based instrument, and this critique seems to address REDD+ as initially envisioned, not as currently practised. It therefore cannot explain the lack of results. However, one could argue that the REDD+ concept initially relied too much on RBP, and that it could have been more successful if other components such as unsolved tenure issues and drivers had been better addressed early in REDD+ design.

(ii) REDD+ relies too little on RBP. In direct contrast with the previous hypothesis is the proposition that *REDD+ as truly results-based payment has never been tested, which is why REDD+ has not delivered the envisioned results*. In reality, most current REDD+ projects are hybrid interventions with limited application of conditional payments; often modified versions of pre-REDD+ integrated conservation and development projects. But this hypothesis, just as the previous one, is hard to test, as we do not know how REDD+ would have developed, nor how effective it would have been, in the alternative scenario of truly results-based payment. Chapter 10 suggests that we have too little evidence to conclude on the effectiveness of conditional payments vis-a-vis other types of interventions. Yet literature on PES points to the challenges of designing genuinely conditional initiatives that are both effective at reducing forest carbon emissions and strongly pro-poor (Chapter 11).

(iii) REDD+ has become projects, not national policy reforms. Still others argue that the continuous *implementation of REDD+ through projects, without moving on to the alleged national policy focus, has caused REDD+ to underperform*. This explanation holds some truth, but is also overly simplistic. The Bali Action Plan (UNFCCC 2007), which defined and launched REDD+, proposed subnational 'demonstration activities', but the emphasis was on policy approaches and national-level action. Conservation and development NGOs were quick to tap into the new funding opportunities that REDD+ provided, while national policy reforms faced resistance from powerful actors that profited from continued forest conversion and exploitation. National policies can be very effective (Assunção *et al*. 2012, on the case of Brazil). Chapter 12 highlights how subnational jurisdictional approaches show more promise, as they operate at higher scales, in departure from the 'project-ification' of REDD+. Yet in some cases, local projects can serve as a proof of concept, or a nudge to broader action.

(iv) REDD+ has not granted tenure rights to indigenous peoples and local communities. Another important hypothesis is that *securing the land and forest tenure rights of indigenous peoples and local communities is the best way to protect forests, and that not enough progress has been made on these efforts under REDD+*. Community management of forests has been shown to reduce deforestation rates in Bolivia, Brazil and Colombia (Stevens *et al*. 2014; Blackman and Veit 2018). A recent study looking at 52 tropical and subtropical countries found that 22% (218 GtC) of the forest carbon in these countries was stewarded by indigenous peoples and local communities, but that a third of this area lacks formal recognition of their tenure rights (RRI 2018b). Meanwhile, other studies have found that community titling alone will not be enough to protect forests (Robinson *et al*. 2014). A recent meta-analysis found no consistent association between more secure land tenure (land ownership, legal title, or duration of occupancy) and either higher or lower deforestation (Busch and Ferretti-Gallon 2017). Indeed, while climate mitigation actions might overlap with local priorities, communities have no particular incentive to include global climate effects in their decision-making. The extent to which securing tenure alone would have worked is therefore hard to assess. While it may in some cases exclude large commercial users, it is likely that additional incentives or regulation might be needed in forests under significant pressure.

16.3.2 'The dosage is too small'

The second hypothesis is that *REDD+ funding (the 'dosage') has been too small for impact*. International results-based payments were never implemented at the scale initially envisioned, of about USD 10–15 billion per year (Stern 2007); with current disbursements at only 7–25% of this (Section 16.2), REDD+ simply was unable to make a difference. In addition to this, current REDD+ funding is also dwarfed by the subsidies for key forest-risk commodities (beef and soy in Brazil, palm oil and timber in Indonesia) which, for these four commodities combined, amount to USD 40 billion per year (McFarland *et al.* 2015, 43). Such subsidies significantly foster private investment in activities that drive deforestation.

Lack of predictable long-term funding has led many local REDD+ initiatives to shy away from making conditional payments; they were afraid to raise expectations to levels they could not eventually fulfil (Sunderlin *et al.* 2015). Limited prospects for large-scale results-based funding may also have kept some actors from getting involved.

While we agree that much higher future investments in REDD+ are needed, there are also weaknesses in this argument. Significant amounts of pledged REDD+ funding are yet to be spent; unspent Norwegian support alone corresponded to NOK 10.5 billion (ca. USD 1.2 billion) by the end of 2016 (Development Today 2017). If such funding had been too easily available without institutions and capacities in place to ensure transparency and accountability, we could now be looking at a vast sea of inefficiencies and corruption. This could have buried REDD+ very quickly. Thus, while urgency is needed, careful, accountable and transparent spending is imperative.

16.3.3 'The disease has progressed too far'

Research suggests that *REDD+ has been blocked by powerful actors*. This links to the previous 'too small' hypothesis, but takes more of a fatalistic approach. The argument goes that REDD+ activities, often focused on smallholders and indigenous peoples, have ultimately failed to challenge the powerful actors behind deforestation and forest degradation. Essentially, this argument is about power imbalances. Powerful actors interested in maintaining the status quo, such as private companies driven by profits from natural resource overexploitation and state institutions promoting exploitation as a route to economic growth, have blocked reforms (Brockhaus and Di Gregorio 2014; Luttrell *et al.* 2014).

There is some sense in this perspective. The key idea of REDD+ as a global RBP system was to make forests more valuable as carbon sinks than as suppliers of agricultural land and unsustainably harvested timber. REDD+ was – and perhaps still is – an idea to buy out these interests. The amount of mobilised funding has not permitted that, and maybe it never will. Using development aid – the main source of international funding for REDD+ – to buy out large commercial actors would never have been politically feasible in donor countries. If the loss of government revenue was fully compensated, however, perhaps this could have provided a sufficient incentive for national governments to change key policies, such as land concessions, agricultural subsidies and infrastructure investments.

16.3.4 'Recovery is possible, given more time'

The REDD+ verdict depends not only on perceptions and expectations, but also on time. The main conclusion from Section 16.2 – that there have been some positive intermediate outputs and outcomes but few significant impacts – *may* indicate that we will eventually see significant emissions reduction and other co-benefits. The many small steps of recovery taken together, one could argue, will eventually make a large impact in the future – we just have to be patient. Innovations take time to get a foothold, more than human short-sightedness and impatience (yet another behavioural flaw) will sometimes allow.

As for whether or not this moderately optimistic view of the future of REDD+ will play out, only time can tell. A more cynical response would be that words are cheap, while actions are costly. The progress made so far in terms of, for example, including REDD+ in NDCs and developing policy strategy documents, does not make much of a real difference on the ground, unless these policies are implemented effectively. Implementation is hindered by both local capacity and funding constraints, as well as powerful interests. The pessimist would thus expect many national governments – developed and developing alike – to end up 'thinking globally and acting verbally'.

16.4 How can REDD+ become more effective?

If we still accept the notion that REDD+ constitutes an adequate cure for deforestation and forest degradation, what needs to be done differently for it to achieve its goals?

16.4.1 Diversifying and coordinating the cure

Results-based payment with diversification. Monetary incentives and compensation are needed for REDD+ to be not only effective and efficient, but also equitable. RBP will likely continue to play a large role in REDD+, however REDD+ as an objective must be underpinned by broader efforts. At national and subnational levels, policy reforms that go beyond RBP are needed, including those that focus on land-use planning, tenure and agriculture. Instead of a one-size-fits-all approach, a programmatic approach to the complexity of land-use decision-making is needed to address the variety of drivers and problems.

Better coordination and country ownership. In moving towards jurisdictional approaches at subnational and national scales, there is a need for better policy integration and coordination to address underlying deforestation drivers and ensure broad incentives. To date, however, those who deforest have often been more effective at coordinating their efforts to achieve their land- and resource-related goals, than those supporting REDD+ or other initiatives that combat deforestation and climate change (Ravikumar *et al.* 2018). Cross-sectoral coordination has worked best when a central government mandates collaboration, an effective overarching institution guides the process, and a master plan with buy-in from all sectors is provided (Chapters 6 and 7). REDD+ has created new platforms for cooperation, but fostering lasting change may require a new forests-for-development narrative and a broader coalition for change (Section 16.4.3).

Being at the table. As some indigenous leaders have aptly been heard to say, "if you are not at the table, you are likely to end up on the menu" (Roberto Borrero, International Indian Treaty Council, GLF Bonn 2017). The light that REDD+ has shone on well-known rights concerns has provided platforms and opportunities for the creation, in some cases, of legal norms to protect the rights of indigenous peoples. REDD+, however, has had greater positive impact on participatory rights than substantive ones (Jodoin 2017). Indeed, secure indigenous, traditional and rural community rights in many cases could be central to successful forest-based mitigation strategies.

16.4.2 Finding the right dose

International finance nudges … Current international REDD+ finance, made available through a few intrepid donors, is insufficient. Emerging market-based approaches for tropical forest offsets under regulated compliance markets could help close the gap between the funding available for REDD+ and what is needed to meet the Paris Agreement objectives (EDF and Forest Trends 2018). The proposed Tropical Forest Standard in California's Cap-and-Trade Program (Chapter 12), and the International Civil Aviation Organization (ICAO) market-based measure (Gonçalves 2017), which is under negotiation, are two such examples. Additionally, the potential of Internationally Transferred Mitigation Outcomes, in relation to Article 6 of the Paris Agreement, could provide an important future financing stream for REDD+ (Streck *et al.* 2017).

… but domestic incentives decide. A new perspective emerges from the fact that many forest-rich countries invested considerable domestic finance, or reallocated financial flows within the country, to incentivise forest conservation and restoration. In 2014, India created the first ecological fiscal transfer for forests, estimated at USD 6.9 to 12 billion annually (Busch and Mukherjee 2018; Chapter 4). There are also emerging opportunities in Colombia and Indonesia in terms of their respective carbon tax and green bonds programmes, and innovations in domestic rural finance, as seen with Brazil's low-carbon agricultural credit programme (Nepstad *et al.* 2013b). These examples do not necessarily put extra burdens on central governments' budgets; rather they change the economic incentives for state and private actors in a way that is compatible with green development strategies.

Bold policies are sorely needed. The notion of incremental, evolutionary change is appealing, in the sense that 'many small streams make a big river'. On the ground, REDD+ has evolved into many pragmatic, locally-adapted solutions that address the objective of reducing forest-based emissions in a dozen different ways. Yet our analyses have shown the limitations of 'small streams', at least when they remain very small. Bold forest conservation and restoration initiatives are sorely needed, such as those seen in Brazil, Costa Rica, Ethiopia, India and South Korea. Such initiatives have also been characterised by national political and intellectual ownership through a pro-forest narrative, a political will to act and carry through with decisions sometimes over decades, and the existence of coordinated multi-ministry efforts. Change has to come from both the top and the bottom; REDD+ needs massive roll-out in big jurisdictional programmes, but also needs the many grassroots approaches that are more adaptive, and hence sometimes, more effective. The main ingredient missing now is more national governments willing to take on bold policy reforms to integrate forests into national planning and to change fundamental economic incentives for land-use decisions.

16.4.3 Nurturing optimism by stressing positive side effects

A positive, exciting narrative on forests. New national narratives are needed about the positive role that forests can play in support of the UN Sustainable Development Goals, not primarily as reservoirs of agricultural land, but as providers of key products and services for economic development. Rather than dwelling on doomsday scenarios, a positive narrative of green/sustainable development can mobilise farmers and firms, voters and politicians (Nepstad 2018).

Recent science has equipped us with strong arguments to support such a narrative. Forests play a critical role in local livelihoods, providing a fifth of household income in forest-rich locations (Angelsen *et al.* 2014). Forests also support food security and contribute to improved nutrition for rural populations (Sunderland *et al.* 2013; HLPE 2017). Sustainably managed forests will provide key recyclable materials (timber, fibre and fuel) for a bio-based, circular green economy (Stern *et al.* 2018). Likewise, forests provide numerous environmental services, including water filtration, flood control, biodiversity conservation and agricultural pollination (TEEB 2010). Exciting new research points to the role of forest's as a bio-pump; precipitation is recycled by forests and transported through 'aerial rivers'. As Ellison *et al.* (2017) note: "Forests and trees must be recognized as prime regulators within the water, energy and carbon cycles". Without this water supply, whole breadbasket regions might fall into drought and depression.

16.4.4 Shortening the long road to recovery

Experimentation needs support. Forest loss is embedded in complex political and economic systems, characterised by a 'path dependence' that often results in slow changes (Brockhaus and Angelsen 2012). Yet despite the lack of financing and the sluggishness of REDD+ to date, a lot of experimentation has happened and is continuing across the tropics. To further move REDD+ forward beyond debate to practical action, stakeholders could support both existing innovative experiments and encourage new ones. Likewise, if countries felt able to develop a moderate risk appetite and attempt policy experimentation, all actors could learn, adjust and scale up.

Be brave and assess impacts. Very few rigorous studies are available to assess the forest impacts of REDD+ interventions. This is surprising, given that this was the initial rationale of REDD+, and carbon or tree cover are relatively easy to measure compared with social impact assessment. Why? Chapter 10 points to a mix of financial, technical and political challenges, highlighting that "independent evaluations can be risky, as disappointing short-term evaluated impacts in a learning phase could jeopardise the future financing of REDD+ projects and programmes". Projects and policies are showcases for both practitioners and politicians, and concerns about perceived failure can prevent sound learning and the development of more effective interventions. It is vitally important that impact assessment is not an afterthought; for true learning to take place, it requires careful integration from the outset, with data collection and a plan for establishing a realistic counterfactual or baseline against which to measure true impacts.

16.5 Epilogue: REDD+'s next decade

Some take the birth year of REDD+ to be 2005 (at that time, just 'RED'), when the basic concept of compensated reductions was put on the UNFCCC agenda at COP11 in Montreal. Thus, REDD+ is now entering its 'teenage years', still full of potential but at risk of going in the wrong direction – or in too many directions. We look at three potential scenarios for the future of REDD+.

In one scenario, REDD+ matures and results-based payments are being broadly applied at jurisdictional scales. REDD+ becomes well integrated into national planning, and is successfully coordinated across sectors and levels of government. Local initiatives on tenure and indigenous rights are supported by national policy reforms. Public and private initiatives in agricultural supply chains support these efforts, and restoration of forest carbon starts reviving degraded landscapes.

In another scenario, the original idea of REDD+, emphasising economic incentives to bring about change, is fading away, becoming the latest in a long series of conservation fads (Redford *et al.* 2013). The risk is that 'REDD+ the objective' simultaneously loses ground on the climate agenda, driven by widespread fatigue among all stakeholders involved, who are concluding (too hastily) that deforestation and forest degradation were too hard to reverse. Or, these stakeholders turn their attention to the 'next new thing', an exciting fad that keeps them energised and hopeful for the next few years.

A third scenario sees REDD+ as an objective maintained, but with a different name and a revised approach. The incentive-driven theory of change is de-emphasised, but incentives maintain a space in the toolbox alongside other tools. A re-baptised and revamped REDD+ brings about change by embracing new actors and sectors, thus becoming a centrepiece of broader low-emission/green/sustainable development approaches.

We – all stakeholders involved in REDD+, including researchers such as us – will determine the future fate of REDD+. We have the collective power to choose in which direction REDD+ will go, or which combination of these scenarios ought to prevail.

The preferred REDD+ scenario may differ markedly among stakeholders, but perhaps we can still agree on a few things. First, regardless of how its name may evolve, the objective of REDD+ cannot be altered or diluted. Arguably, the world cannot stay below the 1.5°C or even 2°C targets without massive reductions in emissions from deforestation and forest degradation and increases in forest carbon stocks. Second, we should maintain a critical and open debate on the means to stay below that target. Critical, because investing heavily in ineffective initiatives would be fatal for our climate. Open, because the current debate often reflects ideologically biased positions, or particular vested stakeholder interests pursuing alternative agendas that cloud their judgment – and eventually prevent them from learning.

The balancing act, which we as editors have sought to strike in this book, has been that of providing a constructive critique: a critical, evidence-based analysis of REDD+ implementation so far, without losing sight of the urgent need to reduce forest-based emissions to prevent catastrophic climate change.

Terms and abbreviations

3Es	effectiveness, efficiency and equity
AFOLU	agriculture, forest and other land uses
AFR100	African Forest Landscape Restoration Initiative
AIDESEP	Interethnic Association for the Development of the Peruvian Rainforest
BA	before-after
BACI	before-after/control-intervention
BAU	business as usual
CAT	cap and trade
CBD	Convention on Biological Diversity
CCBA	Climate, Community and Biodiversity Alliance
CCB(S)	Climate, Community & Biodiversity (Standards)
CDM	Clean Development Mechanism
CER	certified emission reduction
CGIAR	CGIAR is a global research partnership for a food secure future
CH_4	methane
CIAT	International Center for Tropical Agriculture (Centro Internacional de Agricultura Tropical)
CIF	Climate Investment Funds
CIFOR	Center for International Forestry Research
CO_2	carbon dioxide
CONAREDD+	National REDD+ Committee (Brazil)
COP	Conference of the Parties

CSA	climate-smart agriculture
CSO	civil society organisation
DID	difference-in-difference approach
DRC	Democratic Republic of the Congo
EC	European Commission
ENAREDD+	National REDD+ Strategy (Mexico)
ER	emission reduction
FAO	Food and Agriculture Organization of the United Nations
FCPF	Forest Carbon Partnership Facility
FCPF-RF	Forest Carbon Partnership Facility Readiness Fund
FIP	Forest Investment Programme
FLR	forest landscape restoration
FPIC	free, prior and informed consent
FRELs	forest reference emission levels
FRLs	forest reference levels
GCF	Green Climate Fund
GCF TF	Governors' Climate and Forests Task Force
GCS REDD+	Global Comparative Study on REDD+
GDP	gross domestic product
GEF	Global Environment Facility
GHG	greenhouse gas
GIS	geographic information system
Gt	gigatonne
ha	hectare
ICDP	integrated conservation and development project
IMAFLORA	Institute for Agriculture and Forest Management Certification, Brazil (Instituto de Manejo e Certificação Florestal e Agrícola)
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
LED-R	low-emission rural development
LEDS	low-emission development strategy
LoI	Letter of Intent
LULUCF	land use, land use change and forestry
MLG	multilevel governance
MoU	Memorandum of Understanding
MRV	measuring (monitoring), reporting and verification

MT	minimum tillage
Mt	megatonne
N_2O	nitrous oxide
NCBs	non-carbon benefits
NDC	Nationally Determined Contribution
NGO	non-governmental organisation
NOK	Norwegian Kroner
NYDF	New York Declaration on Forests
ODA	official development assistance/aid
OECD	Organisation for Economic Cooperation and Development
PA	protected area
PAMs	policies and measures
PES	payment for environmental/ecosystem services
PPCDAm	Action Plan for the Prevention and Control of Deforestation in the Legal Amazon
RBP	results-based payment
RCT	randomised controlled trial
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
RL	reference level
RRI	Rights and Resources Initiative
SFM	sustainable forest management
SIS	safeguards information systems
SEPAL	System for Earth Observation Data Access, Processing and Analysis for Land Monitoring (FAO)
SNV	Netherlands Development Organisation
SSA	sub-Saharan Africa
TNC	The Nature Conservancy
ToC	theory of change
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNDP	United Nations Development Programme
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
UN-REDD-NP	UN-REDD National Programmes
VCS	Verified Carbon Standard (formerly: voluntary carbon standard)
VER	verified emission reduction
VSS	Voluntary Standard Systems
WFR	Warsaw Framework for REDD+
WRI	World Resources Institute
WUR	Wageningen University & Research, The Netherlands
WWF	World Wildlife Fund/Worldwide Fund for Nature
ZD	zero deforestation

Glossary

Terms in **green** have their own definitions in this list.

Additionality

Additionality is the requirement that a REDD+ activity or project must generate impacts, such as reduced emissions or increased removals, that would not have happened without the activity, i.e., in the **business-as-usual (BAU)** scenario. In practice, this boils down to setting a realistic counterfactual or **reference level**, against which future emissions can be measured.

AFOLU

AFOLU is an acronym for 'agriculture, forestry and other land use.' The term was introduced by the Intergovernmental Panel on Climate Change National Greenhouse Gas Inventory Guidelines (IPCC GL) (2006) following on from the 1996 Guidelines, which covered only agriculture and forestry.

Agents of deforestation and forest degradation

Agents of **deforestation** and **forest degradation** are individuals, households, companies, associations, states or other actors linked to both the **direct drivers** and the **underlying causes of deforestation and forest degradation** (Chapter 5).

Benefit sharing

The distribution of direct and indirect gains (monetary and non-monetary) from the implementation of REDD+ is known as benefit sharing. Some use the term to also include the costs of REDD+, focusing on the *net* benefits.

Business-as-usual (BAU)

This term refers to estimated future **deforestation** and **forest degradation** rates or emissions that are expected to occur in the absence of any intervention such as REDD+, i.e., under the continuation of policies and practices which were in place before REDD+. The BAU scenario for changes in **carbon stocks** is used as a **reference level**/baseline/benchmark against which to assess the impact of REDD+ policies and actions and to define **emissions reduction**.

Cap and trade (CAT)

CAT is an approach used in a compliance **carbon market,** where **carbon credits** are traded to meet regulated emission targets (caps). In an international market, countries agree on the permitted emissions for each country (or subnational unit) – the cap. Countries that emit less than the cap can sell **carbon credits** to countries emitting more than the cap. In domestic CAT markets, emission caps are allocated to sectors or companies. A major rationale for the CAT approach is its ability to lower aggregate **mitigation** costs.

Carbon credit

A verified (voluntary market) or certified (compliance market) **emissions reduction** of one **tCO_2e**, generated by a project or another intervention.

Carbon markets

A market in which carbon **emissions reductions** are traded, usually in the form of **carbon credits**. This can be: (i) a voluntary market, where **emissions reduction** targets are not regulated by a public authority; or (ii) a compliance market, where **carbon credits** are traded to meet emission caps (regulated emissions reduction targets).

Carbon rights

Carbon rights define which parties have the right to the benefits generated from carbon emission reductions, e.g., by selling a **carbon credit** in voluntary and compliance **carbon markets**, or through a government-sponsored **PES** scheme. They can be – but are not necessarily – tied to the ownership of forest land. Carbon revenue can also be shared among stakeholders, e.g., different levels of government.

Carbon stock

The quantity of carbon contained in a carbon pool, e.g., in tree biomass or in soil.

Co-benefit

These are the positive effects that a policy or measure aimed at one objective might have on other objectives. Co-benefits, also called ancillary benefits, are often subject to uncertainty and depend on, among others, local circumstances and implementation practices. In REDD+ these may be social and environmental co-benefits, which result in better **well-being outcomes**.

Environmental co-benefits might include the provision of **ecosystem/ environmental services.**

Deforestation

The permanent conversion of land from forest to non-forest cover. In the 2001 Marrakesh Accords, deforestation is defined as "the direct human-induced conversion of forested land to non-forested land". The Food and Agriculture Organization of the United Nations (FAO) 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". Forest cover loss is a broader term than deforestation as it also includes changes in plantation forests and natural losses (e.g., from wildfires), where land use as a forest remains the same.

Direct drivers of deforestation and forest degradation

Direct drivers are human activities that directly cause **deforestation** or **forest degradation**, e.g., agriculture expansion, infrastructure extension and wood extraction. Compare with '**Underlying causes of deforestation and forest degradation**'.

Disincentive-based instruments

Policies or interventions that discourage or prevent actions. In the case of REDD+ these disincentives include the establishment of protected areas and other actions that restrict access to and/or conversion of forests, e.g., enforcement of forest protection laws and regulation, forest monitoring or the imposition of fines. It may also be referred to as 'direct regulations' or 'command-and-control' instruments.

Displacement (emissions displacement) – see **Leakage**.

Ecosystem/environmental services

Services provided by the environment or ecosystems, which provide benefits to humans, e.g., water provisioning or carbon storage. Payments can be made for the provision of these services (see **PES**).

Emissions reduction

Emissions reduction (ER) is the actual emissions (AE) over a given time period, relative to the counterfactual or **reference level** (RL): ER = AE – RL.

Enabling policies and measures

Enabling measures are policies and measures (sometimes abbreviated as PAM) that create the appropriate conditions for REDD+ initiatives to operate, but that in themselves do not necessarily lead to reduced emissions or other goals. Such measures include capacity building, and activities and policies aimed at clarifying ownership and access rights over forests, trees and carbon.

Externalities

Externalities (or, external effects) are consequences (negative or positive) on other stakeholders that arise from an activity. **GHG** emissions are the prime example of a negative global externality. **PES**, or **results-based payment**, aims to give economic incentives for the recipients to 'internalise the externalities' in their decisions.

Forest restoration

Forest restoration refers to actions to increase the productivity and ecosystem functions of forested or previously forested land. It includes sustainably managing forests, combating desertification, halting and reversing land degradation, and restoring degraded lands. These actions relate to the 'plus' in REDD+, which calls for the enhancement of forest **carbon stocks** along with actions to support conservation and the sustainable management of forests.

Forest degradation

Degradation refers to changes within a forest that negatively affect the structure or function of the forest stand or site, and thereby lower its capacity to supply products and **(ecosystem/environmental) services**. In the context of REDD+, degradation can be measured in terms of reduced **carbon stocks** in forests that 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.

Forest transition theory

The forest transition theory depicts a typical pattern in forest cover change over time in a given geographical area. It follow four phases: (i) high forest cover and low **deforestation** (pre-transition); (ii) high forest cover and accelerating **deforestation** (early-transition); (iii) medium/low forest cover and declining **deforestation** (late transition); and (iv) low forest cover and minimal **deforestation**, where secondary forest recovery or tree planting contributes to an overall increase in forest cover (post-transition).

Free, prior, and informed consent (FPIC)

FPIC refers to peoples' right to give or withhold consent to developments that may affect them. It is a specific right of indigenous peoples recognised by the United Nations Declaration on the Rights of Indigenous Peoples, but is also a fundamental principle in international law, embedded in the universal right to self-determination. It is widely considered a minimum ethical requirement for REDD+. 'Free' refers to consent given voluntarily; 'prior' means consent given in advance of any activities beginning; and 'informed' refers to the quality of information available for the decision. Consent may also be withdrawn.

Greenhouse gases (GHGs)

The atmospheric gases responsible for causing global warming and climate change. The major greenhouse gases are carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). Less prevalent, but very powerful, greenhouse gases are hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6).

Impact evaluation/assessment

An analysis of impacts resulting from an action, in this case the performance of REDD+ policies, programmes, projects or other interventions. 'Impact assessment' commonly refers to more rigorous scientific methods than 'impact evaluation'. The key in any impact assessment is to establish the counterfactual, e.g., by using control sites (Chapter 10).

Incentive-based instruments

Policies or interventions that use positive economic incentives (monetary rewards) for actions that promote societal objectives. The intention is to stimulate desired action and to compensate stakeholders for any losses associated with the change in behaviour. Traditionally, the term 'incentive' has been used for conditional rewards, e.g., **PES**. Currently, incentives can be referred to as being both conditional and non-conditional, the latter referring to, for example, monetary transfers to forest users with 'no strings attached'.

Indirect drivers – see **Underlying causes of deforestation and forest degradation**.

Jurisdictional approaches

Government-led, comprehensive approaches to forest and land use across one or more legally defined territories. Jurisdictional sustainability approaches seek to protect forests, reduce emissions and improve livelihoods across entire political-administrative territories (Chapter 12).

Land tenure

The social relations and institutions regulating access to and use of land. It includes who owns the land and who uses, manages and makes decisions about it. The concept refers to both formal (legal) and informal (customary) rules (Chapter 8).

Leakage

Carbon leakage happens when interventions to reduce emissions in one area (subnational or national) lead to higher emissions outside the intervention boundaries. The official UNFCCC term is 'displaced emissions'. A typical example would be when designation of a protected area reduces or restricts forest clearing inside the boundaries, but farmers clear more land outside. Leakage may also happen though output markets, e.g., lower timber harvesting in one area/country increases prices and stimulates logging elsewhere.

Low-carbon development

Low-carbon development – often used interchangeably with the terms low-emission development and green development – describes national economic development plans and strategies that encompass low-emission and/or climate-resilient economic development (Chapters 6, 9, 12).

Measurement, reporting and verification (MRV)

MRV is a technical instrument to confirm **GHG** emissions and **GHG emissions** reduction objectively. For example, in order to obtain **results-based finance**, countries should measure, report and verify (MRV) their **GHG** emissions and **GHG emissions reduction** from the implementation of REDD+ activities, in line with UNFCCC (technical) requirements. At times, the 'M' is referred to as 'Monitoring'.

Mitigation

Action to prevent further accumulation of **GHGs** in the atmosphere by reducing the amounts emitted or by storing carbon in sinks.

Multi-stakeholder forums or platforms

These are purposely organised interactive processes that bring together a range of stakeholders to participate in dialogue, decision-making and/or implementation regarding actions that seek to address a common problem or to achieve a goal for their common benefit. These are organised at different levels: global (e.g., Round Table on Responsible Soy), national (e.g., Brazil's Action Plan for the Prevention and Control of Deforestation in the Legal Amazon, PPCDAm), and local (e.g., District Forest Coordination Committees in the Terai Forest, Nepal).

Nationally Determined Contribution (NDC)

Post-2020 climate change **mitigation** and adaptation actions that, by ratifying the Paris Agreement, each party to the UNFCCC binds itself to pursuing. The Paris Agreement requires countries to prepare, communicate and maintain increasingly ambitious NDCs. By April 2018, 197 countries had submitted their NDCs or Intended NDCs (INDCs) (Chapter 6).

Opportunity costs

Opportunity costs refer to the foregone benefits of choosing a particular option, that is, the best alternative use of a resource. In the **REDD+** context, the opportunity costs of conserving one hectare of forest is the profit from the best alterative use of that forest land, e.g., converting it to oil palm. Opportunity costs can be measured per year or for all future years (net present value).

Payments for ecosystem/environmental services (PES)

PES is a conditional (**results-based**), **incentive-based instrument** in which payments are made for **ecosystem or environmental services**. In the case of

REDD+, these services are reduced emissions or increased removals relative to an agreed **reference level**.

Readiness – see **REDD+ phases**.

REDD+

Literally, REDD is short for Reducing Emissions from Deforestation and forest Degradation. In the Bali Action Plan (2007), UNFCCC defined REDD+ (then RED/REDD) as: “Policy approaches and positive incentives on issues relating to reducing emissions from **deforestation** and **forest degradation** in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest **carbon stocks** in developing countries”. In the current debate, REDD+ may refer to different things, at time causing confusion: (i) an umbrella term for local, subnational, national and global actions whose primary aim is to reduce emissions from **deforestation** and **forest degradation** and enhance forest **carbon stocks** (increase removals) in developing countries; (ii) those activities within the definition that rely on **results-based** or conditional payments (**PES**), which was a core idea when REDD+ was first launched; (iii) the objective of reducing emissions and increasing removals from forests in developing countries; (iv) the mechanisms created under the UNFCCC framework.

REDD+ implementation – see **REDD+ phases**.

Reference levels

Generically, reference levels (RLs) is used synonymously with ‘baselines’ or the **BAU** scenario, i.e., for the case of **REDD+**, what will happen to **deforestation** and **forest degradation** – and resulting emissions – in the absence of any **REDD+** intervention. Under UNFCCC, two types of reference levels are discussed: forest reference emission levels (FRELs) and forest reference levels (FRLs), which are commonly recognised as gross and net emission levels respectively; thus a FREL includes only emissions from **deforestation** and degradation, whereas an FRL also includes enhancement of forest **carbon stocks**. Some also distinguish between RLs as a **BAU** scenario, and as the benchmark for REDD+ payments. This distinction is not made by UNFCCC, and the submitted FRLs/FRELs are both meant to reflect **BAU** and be used for **results-based payment**.

Results-based payment

A transfer of money conditional upon achieving a predetermined performance target, thus a type of conditional **incentive-based instrument**. This is related to the last of three **REDD+ phases** recognised by the UNFCCC (Chapter 4).

REDD+ phases

REDD+ is intended to be developed in three UNFCCC-recognised phases. The first, REDD+ readiness, includes the development of REDD+ country actions, including capacity building, policy design, consultation and consensus building, and testing and evaluation of a REDD+ national strategy; these actions are taken prior to the comprehensive implementation of REDD+. Implementation is the second phase, and the third is **results-based payment**. International financial support changes between the phases: from a focus on capacity building (inputs and activities) in Phase 1, to policy reforms (outputs) and successfully implemented (outcomes) in Phase 2, to actual **emissions reduction** (impacts) in Phase 3 (Chapter 2).

Social and environmental safeguards

The UNFCCC Cancún Agreements stipulate seven safeguards (UNFCCC 2011, Decision 1, App. 1 Para. 2) that encourage REDD+ programmes to take into account social and environmental issues in their design and implementation. Safeguards include: respect for the rights of indigenous peoples and local communities, effective participation in REDD+ design and implementation, promotion of biodiversity and social **co-benefits**, and avoidance of displaced emissions (**leakage**). Some multi- and bilateral donors and third-party certifiers require additional standards for demonstrating high social and environmental performance.

Swidden agriculture / shifting cultivation

Swidden, often used interchangeably with shifting cultivation, is a land-use system characterised by rotation of fields rather than crops, the use of fire to clear fields, and a period of fallow.

Theory of change

A theory of change (ToC) is a roadmap to successful societal transformation. It explains how and why an initiative should work and makes explicit the underlying mechanisms and assumptions that allow a proposed action to achieve its expected outcomes and anticipated impact (Chapter 2).

Transaction costs

A cost that is incurred when making an economic exchange. It includes costs related to information, enforcement, implementation and monitoring. Transaction costs are typically used in relation to a **PES** system, but the term is sometimes also used beyond the original meaning, to include any REDD+ costs except **opportunity costs**.

tCO_2e

Carbon dioxide equivalent (CO_2e), in tonnes, is a way to place emissions of various radiative forcing agents on a common footing by accounting for their effect on climate. It describes, for a given mixture and amount of greenhouse gases, the amount of CO_2 that would have the same global warming ability, when measured over a specified time period.

Underlying causes of deforestation and forest degradation

Underlying causes are social, economic, political, cultural and technological variables and processes that are often distant from their area of impact, e.g., rising global market prices, national policies that provide incentives for agricultural expansion, and public resettlement schemes (Chapter 5).

Voluntary standards

These are standards established generally by private sector bodies, for which demonstration of compliance with production or management practices is voluntary. In the context of REDD+ this includes **zero deforestation commitments** (Chapter 13).

Well-being outcomes

Well-being impacts of REDD+ can be measured in terms of income, perceived well-being, distributive equity and social capital. Other dimensions related to well-being, such as **land tenure** security, local capacities, institutions, and social networks, can also be impacted by REDD+. Well-being outcomes, when positive, can be viewed as social **co-benefits** (Chapter 11).

Zero deforestation commitments

These are voluntary commitments by companies to eliminate **deforestation** from their supply chains. These can include individual company or group-level adoption of **voluntary standards**; sector-wide supply chain-based initiatives; and mixed supply chain and territorial initiatives at jurisdictional levels (Chapter 13).

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Constructive critique. This book provides a critical, evidence-based analysis of REDD+ implementation so far, without losing sight of the urgent need to reduce forest-based emissions to prevent catastrophic climate change.

Need to test REDD+ at scale. Results-based payment, the novel feature of REDD+, has largely gone untested. International funding (both public and private) remains scarce, and demand through carbon markets is lacking.

Better national enabling conditions. Over 50 countries have included REDD+ in their Nationally Determined Contributions and developed national REDD+ strategies. REDD+ has improved countries' monitoring capacities and understanding of drivers, increased stakeholder involvement, and provided a platform to secure indigenous and community land rights – all key conditions for addressing deforestation and forest degradation.

Modest forest and social impacts. Local REDD+ initiatives have achieved modest but positive outcomes for forests. Well-being impacts have been limited and mixed, but are more likely to be positive when incentives are included.

National coordination, with a positive narrative. Forest-based mitigation strategies must now be mainstreamed across sectors and levels of government. A strong positive narrative on how forests contribute to economic development and climate goals could boost forest-based mitigation, in spite of the current political uncertainties in key emitting countries.

Evolving REDD+ and new initiatives. REDD+ has evolved, and new initiatives have emerged to support its broader objective: private sector sustainability commitments, climate-smart agriculture, forest and landscape restoration, and more holistic jurisdictional approaches working across legally defined territories.

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