IUFRO World Series Vol. 40

Forests, Climate, Biodiversity and People: Assessing a Decade of REDD+

Editors: John Parrotta, Stephanie Mansourian, Christoph Wildburger and Nelson Grima

IUFRO
Interconnecting
Forests, Science and People

IUFRO World Series Vol. 40

IUFRO
Interconnecting
Forests, Science and People

Forests, Climate, Biodiversity and People: Assessing a Decade of REDD+

Editors: John Parrotta, Stephanie Mansourian, Christoph Wildburger and Nelson Grima

Funding for this publication was provided by the German Federal Ministry for Economic Cooperation and Development and the Austrian Federal Ministry of Agriculture, Regions and Tourism. The views expressed in this publication do not necessarily reflect the official policy of the governments represented by these institutions/agencies or that of the institutions with which the authors are affiliated.

Publisher:
International Union of Forest Research Organizations (IUFRO)

Recommended catalogue entry:
John Parrotta, Stephanie Mansourian, Christoph Wildburger and Nelson Grima (eds.), 2022.
Forests, Climate, Biodiversity and People: Assessing a Decade of REDD+.
IUFRO World Series Volume 40. Vienna. 164 p.

ISBN 978-3-903345-14-0
ISSN 1016-3263

Published by:
International Union of Forest Research Organizations (IUFRO)

Available from:
IUFRO Headquarters
Secretariat
Marxergasse 2
1030 Vienna
Austria

Tel +43 (0)1 877 01 51-0
E-mail office@iufro.org
www.iufro.org

Language editor: Stephanie Mansourian
Layout: Eugénie Hadinoto
Cover photographs: Nelson Grima
Printed in Austria by Eigner Druck, Tullner Straße 311, 3040 Neulengbach, Austria

Preface

IUFRO established its Global Forest Expert Panels (GFEP) Programme to effectively link scientific knowledge with political decision-making on forests. GFEP responds directly to key forest-related policy questions by consolidating available scientific knowledge and expertise on these questions. It publishes the findings of its assessments in comprehensive reports and policy briefs, and provides decision-makers and stakeholders with the most relevant, objective and accurate information. Thus, GFEP makes an essential contribution to increasing the quality and effectiveness of international forest governance.

In 2012, IUFRO launched the GFEP report "Understanding Relationships between Biodiversity, Carbon, Forests and People: The Key to Achieving REDD+ Objectives". It analysed the implications of the newly evolving REDD+ (reducing emissions from deforestation and forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks) framework of the UNFCCC and potential impacts of activities foreseen under REDD+. The publication received considerable attention from policymakers and stakeholders and was used as guidance for policy development and implementation related to REDD+.

In the ten years since the publication of the report, REDD+ has made considerable progress and the landscape of related international agreements has also expanded. UN Member States adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs) in 2015. REDD+ contributes directly to achieving SDG 13 on Climate Action and SDG 15 on Life on Land, and indirectly to several other SDGs. Most recently, the Glasgow Leaders' Declaration on Forests and Land Use confirmed the critical role of forests in meeting the SDGs and combatting climate change while maintaining other ecosystem services. At the same time, the Conference of the Parties to the Convention on Biological Diversity (CBD) is negotiating a post-2020 global biodiversity framework to respond to the continuing rapid decline of biodiversity. However, the gap between the political will to meet these global goals and their successful implementation still needs to be closed.

In light of this, a thorough scientific review of the REDD+ framework, its impacts and its successes in meeting the related goals, is a timely response to the ongoing global discussions. This report titled "Forests, Climate, Biodiversity and People: Assessing a Decade of REDD+" revisits the questions examined in the earlier GFEP assessment, and analyses and synthesises scientific information published and lessons learned since 2012. It is my sincere hope that this publication will support a more coherent policy dialogue about the role of forests in addressing the broader environmental, social and economic challenges reflected in the global Sustainable Development Agenda and that those with a responsibility for shaping and implementing REDD+ activities will find this report and its accompanying policy brief a useful source of information and inspiration.

Alexander Buck
IUFRO Executive Director

Acknowledgements

This publication is the product of the collaborative work of scientific experts within the framework of the Global Forest Expert Panels (GFEP) Programme of the International Union of Forest Research Organizations (IUFRO). We express our sincere gratitude to all of them:

Frederic Achard, Maria Brockhaus, Emily Donegan, Amy Duchelle, Julian Fox, Matthew Harris, Örjan Jonsson, Valerie Kapos, Eric Mensah Kumeh, Stephanie Mansourian, Constance McDermott, Carolina de Mendonça Gueiros, Anna O'Leary, John Parrotta, Anssi Pekkarinen, Cesar Sabogal, Marieke Sandker, Christelle Vancutsem, Bhaskar Vira, Judith Walcott and Ramesh Wilson.

Without their efforts and commitments, the preparation of this publication would not have been possible. We are also grateful to the institutions and organisations to which the authors are affiliated for enabling them to contribute their expertise to this assessment. At the same time, we wish to note that the views expressed within this publication do not necessarily reflect the official policy of these institutions and organisations.

Additionally, although not part of the authors' team, we also thank Carina Pohnke for her contribution. Moreover, the authors of Chapter 3 express their gratitude to David Kaimowitz, Donna Lee and the National Forest Monitoring and REDD+ teams at FAO for sharing their ideas and thoughts for the chapter.

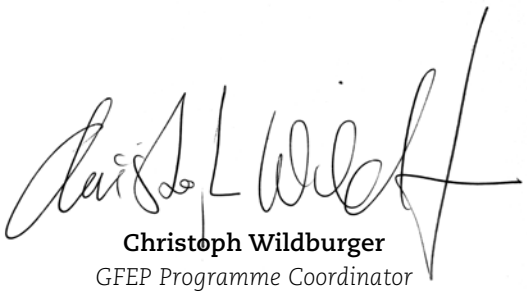
We acknowledge, and also sincerely thank, the reviewers of the report, whose comments have greatly improved the quality of this publication: Helena Nery Alves-Pinto, Toby Gardner, Nancy Harris, Peter Kanowski, Melanie Kolb and Jeffrey Sayer.

We also gratefully acknowledge the generous financial and in-kind support provided by the German Federal Ministry for Economic Cooperation and Development, and the Austrian Federal Ministry of Agriculture, Regions and Tourism.

Our special thanks go to the IUFRO Secretariat for providing indispensable administrative and technical support.

John Parrotta
Editor; Chair of the GFEP Panel on Biodiversity, Forest Management and REDD+ 2012

Stephanie Mansourian
Content Editor



Christoph Wildburger
GFEP Programme Coordinator

Nelson Grima
GFEP Project Manager

Contents

List of Acronyms, Units and Symbols

AE	Accredited Entity
AFOLU	Agriculture, Forestry and Other Land Use
A/R	Afforestation/Reforestation
ART	Architecture for REDD+ Transactions
BAP	Bali Action Plan
BSM	Benefit-Sharing Mechanism
BUR	Biennial Update Reports
CARB	California Air Resources Board
CAS	Country Approaches to Safeguards
CBD	Convention on Biological Diversity
CCB	Climate, Community and Biodiversity Standard
CDM	Clean Development Mechanism
CIF	Climate Investment Fund
CJA	Commodities and Jurisdictions Approach
COP	Conference of the Parties
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CREMA	Community Resource Management Area (Ghana)
CSC	Climate Smart Cocoa
CSR	Corporate Social Responsibility
DRC	Democratic Republic of the Congo
ER	Emissions Reduction
ESA	Environmental and Social Assessment
ESG	Environment, Social and Governance
ESMF	Environmental and Social Management Framework
ESS	Environmental and Social Safeguards
EU	European Union
FACT	Forest, Agriculture and Commodity Trade
FAO	Food and Agriculture Organization of the United Nations
FCPF	Forest Carbon Partnership Facility
FGRM	Feedback and Grievance Redress Mechanism
FIP	Forest Investment Programme
FLEGT	Forest Law Enforcement, Governance and Trade
FLR	Forest Landscape Restoration
FOLU	Forestry and Other Land Use
FPIC	Free, Prior and Informed Consent
FRA	Forest Resources Assessment
FREL	Forest Reference Emission Levels
FRL	Forest Reference Levels
FSC	Forest Stewardship Council
FTEM	Forest Trends' Ecosystem Marketplace
G20	Group of Twenty
GCF	Green Climate Fund
GCF Task Force	Governor's Climate and Forests Task Force
GCFRP	Ghana's Cocoa Forest REDD+ Programme
GDP	Gross Domestic Product
GEF	Global Environment Facility
GFC	Global Forest Change
GFEP	Global Forest Expert Panel
GGC	Green Gigaton Challenge
GHG	Greenhouse Gas
HFLD	High Forest, Low Deforestation
HIA	Hotspot Intervention Area
ICAO	International Civil Aviation Organization
IFC	International Finance Corporation
IPBES	Intergovernmental Panel on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IPLC	Indigenous Peoples and Local Communities
ITMO	Internationally-Transferred Mitigation Outcomes
IUFRO	International Union of Forest Research Organizations
JNR	Jurisdictional and Nested REDD+
LEAF	Lowering Emissions by Accelerating Finance
LTS-LCCR	Long-Term Strategy for Low Carbon and Climate Resilience
LULUCF	Land Use, Land-Use Change and Forestry
MDB	Multilateral Development Bank
MoEF	Ministry of Environment and Forestry (Indonesia)
MoF	Ministry of Forestry (Indonesia)
MRV	Measurement, Reporting and Verification
NbS	Nature-Based Solutions
NDC	Nationally Determined Contribution
NBSAP	National Biodiversity Strategy and Action Plan
NFI	National Forest Inventory
NFMS	National Forest Monitoring System
NGO	Non-governmental Organisation
NOK	Norwegian Krone
NRAP	National REDD+ Action Plan
NYDF	New York Declaration on Forests
ODA	Official Development Assistance
PAMs	Policies and Measures
PEFC	Programme for the Endorsement of Forest Certification

PES	Payment for Ecosystem Services
PLR	Policies, Laws and Regulation
RBP	Results-based Payment
R-PP	Readiness Preparation Proposal
REDD+	Reducing Emissions from Deforestation and forest Degradation, and enhancing forest carbon stocks in developing countries
ROAM	Restoration Opportunities Assessment Methodology
RRI	Rights and Resources Initiative
RSPO	Roundtable on Sustainable Palm Oil
RTRS	Roundtable on Responsible Soy Association
SDG	Sustainable Development Goal
SES	Social and Environmental Standard
SESA	Social and Environmental Strategic Assessment
SFM	Sustainable Forest Management
SIS	Safeguards Information System
SOI	Summaries of Information
TCFD	Task Force on Climate-Related Financial Disclosures
TFND	Task Force on Nature-Related Financial Disclosures
TFS	Tropical Forest Standard
TMF	Tropical Moist Forest
TREES	The REDD+ Environmental Excellence Standard
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
VCS	Verified Carbon Standard
VER	Verified Emissions Reduction
VPA	Voluntary Partnership Agreement
WCS	Wildlife Conservation Society
WEDO	Women's Environment and Development Organization
WWF	World Wide Fund for Nature

Chemical Compounds, Units and Symbols

The International System of Units (SI) is used in this publication.

CO_2 = carbon dioxide
CO = carbon monoxide
CH_4 = methane
Mg = megagramme (1 Mg = 10^6g = 1 tonne)
Mt = Million tonnes
G = giga (10^9)
GtC = Gigatonnes of carbon
ha = hectare (100 ha = 1 km^2)
MgC = Megagramme Carbon (=1 tonne carbon)
Mha = million ha
N_2O = nitrous oxide
P = peta (10^{15})
tCO_2eq = tonnes of carbon dioxide equivalent
yr = year

Chapter 1

A Decade of REDD+: Impacts, Challenges and Lessons

Lead authors: John Parrotta, Stephanie Mansourian, Christoph Wildburger and Nelson Grima
Contributing authors: Emily Donegan, Valerie Kapos, Constance McDermott, Marieke Sandker and Bhaskar Vira

Forests[1] play a pivotal role in regulating our global *climate* and represent a cornerstone of our strategy to tackle *climate change*, as highlighted by the Intergovernmental Panel on Climate Change (IPCC) in 2007 (and again in 2021), and by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES - IPBES, 2018; 2019). While forests hold the key to mitigating climate change by absorbing *greenhouse gases* (GHG), their loss and *degradation* also exacerbate climate change by releasing CO_2 and other greenhouse gases (Pörtner et al., 2021).

Recognising the importance of forests in global climate processes, in 2007 the Bali Action Plan (BAP) was adopted at the United Nations Framework Convention on Climate Change (UNFCCC) to reduce greenhouse gas *emissions* from *deforestation* and *forest degradation* (i.e., REDD). In 2010, the Cancún decision on REDD+ was adopted to expand the role of forests in mitigating climate change to include conservation of forest *carbon stocks*, sustainable management of forests and enhancement of forest carbon stocks. REDD+ was conceived as a voluntary, 'nationally-driven', mechanism for *high-income countries* (as listed in Annex 1 of the UNFCCC) to pay *low- and middle-income countries* (non-Annex 1 Parties to the UNFCCC) for the reductions in forest emissions. The Cancún decision also stipulated that REDD+ activities be implemented in phases, beginning with: (a) the development of national strategies or action plans, policies and measures, and capacity-building (i.e., Readiness Phase), followed by (b) the implementation of national policies and measures and national strategies or action plans that could involve further capacity-building, technology development and transfer, and results-based demonstration activities, and evolving into (c) results-based actions that should be fully measured, reported and verified.

Given that fifteen years have passed since the first agreements around REDD, and ten years since the last Global Forest Expert Panel (GFEP) assessment on REDD+, it is timely for this report to examine the evidence to date on the role of REDD+ in global forest *governance*, its translation into practice at national and sub-national scales, its impacts, remaining challenges and emerging lessons.

In 2012, as the architecture of the international REDD+ regime, and development of associated environmental and social 'safeguards' were coming into greater focus, the International Union of Forest Research Organizations (IUFRO) published a Global Forest Expert Panel (GFEP) assessment report (Parrotta et al., 2012) that evaluated the implications of *forest management* interventions foreseen under REDD+ activities. The 2012 GFEP assessment was based on the most current scientific literature on forest *biodiversity*, climate change and forest management, for different types of forests (according to FAO definitions and FAO's Global Ecological Zone classification system - FAO, 2001; 2012). It provided a broad science-based perspective on relationships between forest biodiversity (as defined by the Convention on Biological Diversity) and carbon (referring to the net balance of CO_2 and non-CO_2 GHG emissions and removals) as well as other *ecosystem services*, and how these complex relationships may be affected by management activities implemented to achieve REDD+ objectives. Based on this knowledge, the GFEP report assessed the potential synergies and trade-offs between and among environmental and socio-economic objectives, and their relationship to governance issues at multiple scales, and identified governance and policy options for REDD+ activities that could capture synergies between biodiversity and carbon while avoiding perverse outcomes.

Among the main findings, the 2012 GFEP assessment concluded that reducing the rates of global deforestation and degradation can indeed make a substantial contribution towards both climate change *mitigation* and biodiversity conservation. The extent to which REDD+ activities could simultaneously reduce GHG emissions and contribute to biodiversity conservation was found to depend on the types of *tropical* and *sub-tropical forests* and forest *landscapes* under consideration, their condition (i.e., degradation status), and the socio-economic and governance contexts in which they exist. Further, the assessment concluded that activities focussing on prevention of deforestation and forest degradation were, in general, likely to yield greatest carbon and biodiversity benefits. Under certain conditions, REDD+ activities could also achieve significant social and economic gains according to this assessment. However, it was clear from the available evidence that the degree to which these goals are met through REDD+ would depend on the specific policies and practices employed, and that unless biodiversity and *human well-being* were given sufficient consideration, there was a high risk that REDD+ would fall short in achieving its objectives.

Purpose of the current assessment

Over the past decade, there has been a significant growth and refinement of the scientific literature

1 All terms that are defined in the glossary of this report (Appendix 1) appear in italics the first time they are mentioned in a chapter.

Forested landscape in Costa Rica
Photo © Nelson Grima

related to the global trends in deforestation and forest degradation, and the potential of REDD+ activities to yield lasting carbon benefits (and biodiversity and socio-economic 'co-benefits'). There is also a growing literature on the experiences and outcomes of REDD+ implementation at global, national, sub-national and local scales. Utilising this expanded knowledge base, the current assessment builds on that of 2012 to evaluate the progress, pitfalls and early outcomes of REDD+ as a means of reducing forest-related GHG emissions, as well as the impacts on biodiversity and the *livelihoods* and well-being of people in the landscapes affected by REDD+ interventions.

The current assessment revisits the issues and questions examined in the earlier GFEP assessment, analysing and synthesising scientific information published in the last decade, along with lessons learned since 2012. It summarises and evaluates changes in global forest governance frameworks and REDD+ related decisions and actions, the evolution and influence of the international REDD+ finance 'landscape', and how this has shaped priorities, rules and norms as they relate to the five REDD+ activities (i.e., reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks) eligible for results-based payments.

This assessment also takes stock of progress and critically examines the available evidence on experiences to date related to the three phases of REDD+ (i.e., the 'readiness phase', the 'implementation phase' and the 'results-based actions phase'). In particular, it evaluates the actual on-the-ground impacts – or projected likely impacts – of REDD+ activities on reducing GHG emissions from forest and associated landscapes at various spatial scales. The assessment also evaluates the current state of knowledge regarding costs, benefits and trade-offs of REDD+ activities, and the efficacy and impacts of related social and environmental safeguards on biodiversity and human well-being in landscapes in which REDD+ activities have been implemented. Further, it assesses the challenges, lessons learned and pathways for the future.

The evolution and shifting boundaries of REDD+ since 2011

Since the adoption of the 2010 Cancún decision on REDD+, developments within and outside of the UNFCCC have changed the landscape of REDD+ governance, finance and implementation at national and sub-national scales.

The Warsaw Framework, adopted at the 2013 UNFCCC COP 19, included a series of decisions clarifying several key issues needed to operationalise REDD+ under the UNFCCC. The first of these re-affirmed that results-based finance can come from a wide variety of sources, both public and private[2]. Another series of decisions from the Warsaw COP focused on modalities for REDD+ monitoring, reporting and verification systems. These included guidelines and procedures for the technical assessments of countries' proposed reference emissions levels or forest reference levels[3] and modalities for measuring, reporting and verifying (MRV) forest emissions[4]. The Warsaw Framework also included key requirements on implementing and reporting on environmental and social safeguards[5].

The UNFCCC's 2015 *Paris Agreement* (UNFCCC, 2016), adopted by 196 Parties at COP 21, represented a critical juncture for REDD+. The Paris COP's ambitious aim of limiting global warming to 1.5°C, and its acknowledgement of the role of forests in achieving this aim, brought new momentum to international efforts to address deforestation, forest degradation and *forest restoration*. Article 5.2. specifically recognises the role of REDD+ and offered provisions for mobilising climate finance.

Since 2012, implementation of REDD+ has advanced considerably. There is a growing body of data and analyses on the experiences of countries during the different phases of REDD+ outlined in the 2010 Cancún decision (i.e., 'readiness phase', 'implementation phase' and 'results-based actions phase') and scientific research has examined both progress and shortcomings of REDD+ implementation.

Over the past decade, many countries have transitioned from the readiness phase and activities to the implementation phase, and some of them have reached the results-based actions phase. To date, the majority of multilateral funding for REDD+ has come from three sources: the Forest Carbon Partnership Facility (FCPF), the UN-REDD Programme and the Forest Investment Programme (FIP) of the Climate Investment Funds. In addition, the Green Climate Fund (GCF) was established at COP 16 in Cancún and recognised as a financing mechanism for REDD+ results-based payments in 2014 at COP 19. In 2017, the GCF established a USD 500 million REDD+ pilot financing programme; by 2020, these funds were fully allocated, with results-based payments approved for eight countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Indonesia and Paraguay). The GCF is also engaging in a growing number of forest and land use projects. To date (January 2022) 52 projects have been funded under the "forestry and land use" theme, for a total of USD 1.5 billion (GCF website), including the USD 500 million REDD+ pilot financing programme noted above.

As REDD+ has evolved over the past 15 years, so too have a number of global negotiations, initiatives and programmes aimed at addressing climate change, deforestation, *land degradation*, biodiversity loss, and other major environmental and development challenges:

- The 2030 Agenda for Sustainable Development and its 17 *Sustainable Development Goals* (SDGs) was adopted by UN Member States in 2015 (UNDESA website). REDD+ contributes directly to achieving SDG 13 (Climate Action) and SDG 15 (Life on Land), and indirectly to several other SDGs.
- Since 2019, the Conference of the Parties to the Convention on Biological Diversity (CBD) has been negotiating a post-2020 Global Biodiversity Framework to respond to the continuing rapid decline of biodiversity (CBD website). The Framework, expected to be finalised and approved at the CBD COP 15 meeting (in Kunming, China) in 2022, includes several targets and actions consistent with and supportive of REDD+ (i.e., protected areas, reducing forest degradation, *sustainable forest management* and forest restoration). These include, among others, the Framework's Target 2 (related to restoration of degraded *ecosystems*) and Target 8 (on climate change mitigation and *adaptation*).
- Under the UN Convention to Combat Desertification (UNCCD), the land degradation neutrality target also includes activities associated with REDD+, including tackling drivers of

2 UNFCCC Decision 9/CP.19: https://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf#page=24

3 UNFCCC Decision 13/CP.19: https://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf#page=34

4 UNFCCC Decision 14/CP.19: https://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf#page=39

5 UNFCCC Decision 12/CP.19: https://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf#page=33

forest loss and degradation, and *afforestation*, *reforestation* and restoration (UNCCD website).

- Although non-binding, the Bonn Challenge on FLR launched in 2011 has generated significant interest and mobilisation around forest restoration, with over 60 governments having committed to restoring over 210 million ha at the time of writing (Bonn Challenge website). The UN Decade on Ecosystem Restoration (2021–2030) is likely to further expand the role of and interest in forest restoration (UN Decade on Ecosystem Restoration website).
- The Global Environment Facility (GEF) has included in its draft strategy for the new replenishment period (GEF-8 – 2022–2026) a new integrated programme on "Landscape Restoration" (GEF, 2021). As a major source of funding for implementation of the Rio Conventions, this is likely to impact on future investments in REDD+ or associated activities.

In parallel, the voluntary carbon market has been growing over the last decade, mostly driven by a rise in private sector demand for avoided deforestation offset credits, linked to commitments by companies and other institutions for their planned transition to achieve 'net zero deforestation' by agreed target dates. The voluntary market is also expected to expand significantly through the inclusion of REDD+ and avoided deforestation offsets as part of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), which is being coordinated by the International Civil Aviation Organization (ICAO).

Meanwhile, international efforts to address forest loss and degradation stemming from illegal logging or the *conversion of forests* for production of commodities such as palm oil, soy, beef, leather, cocoa and sugar have continued to evolve. These public and private efforts include, among others, the Forest Law Enforcement Governance and Trade's (FLEGT) Voluntary Partnership Agreements (VPAs), the Lacey Act, the EU Timber Regulation aimed at eliminating illegal wood from EU supply chains and the Roundtable on Sustainable Soya. They highlight the central role of law enforcement and market-based mechanisms in the global forest regime.

These developments have both blurred and expanded the boundaries of REDD+, with important implications for its governance, funding, scope of activities, and on-the-ground management interventions and outcomes. In this report, we examine closely how these developments have influenced REDD+ implementation as well as the lessons learnt for REDD+ and related efforts to enhance the climate mitigation potential of forests and forested landscapes through activities aimed at halting and reversing deforestation and forest degradation.

Overview of the report

Chapter 2 of this assessment examines how an evolving array of actors, institutions and finance shape who and what matters for REDD+, what counts as success or failure and who decides. It analyses how the dynamics of power and authority that shape REDD+ play out across three principal interfaces – states, finance and markets – which influence in different ways its governance, actions and outcomes both within and outside the official structures of the UNFCCC. It explores the wider geo-political system within which REDD+ operates and identifies the wide range of actors and actions potentially responsible for REDD+ impacts. At the same time, it also highlights the limited power of REDD+ alone to shift the course of global land use change.

Chapter 3 evaluates the climate change mitigation potential from REDD+, critically evaluating the available scientific literature related to the quantification of forest carbon fluxes, mitigation potential of enhancing forest carbon stocks, and the extent to which REDD+ could contribute to meeting the ultimate goal of the 2015 Paris Agreement. It also summarises the evidence to date on carbon outcomes, examining recent global deforestation and forest degradation trends, as well as critically examining the available evidence related to reported and actual impacts to date of REDD+ on deforestation. Verification options for carbon outcomes, including through independent remote sensing observations, are also discussed.

Chapter 4 lays out the landscape of environmental and socio-economic benefits and risks associated with REDD+ implementation and reviews the experience of REDD+ implementation on non-carbon outcomes, focusing particularly on the past 10 years. Due to the difficulty in directly attributing early REDD+ outcomes to national or sub-national scale interventions, the chapter relies on pilot project-scale programmes (and a longer history of the implementation of related initiatives in the forestry sector) to infer broader insights about the documented and expected impacts of REDD+ implementation on biodiversity, environmental services and livelihoods, and social and economic outcomes. It evaluates available evidence and experience regarding the interactions between carbon, biodiversity and socio-economic impacts of REDD+ implementation, and discusses

associated trade-offs, synergies and feedbacks.

Chapter 5 assesses the challenges that arise in the overarching international REDD+ process, and in national, sub-national and local level application. Specifically, the chapter evaluates how current process, institutional, management and financial challenges at the local, sub-national, national and international scales (as well as across these scales) are likely to affect future implementation of REDD+. It also considers lessons learnt from experience in the last decade in an effort to better inform future interventions, identifying emerging lessons for different groups of stakeholders. In reviewing both challenges and lessons, the chapter places an emphasis on *forest landscape restoration* (FLR) in light of the UN Decade on Ecosystem Restoration (2021–2030) and the growing prominence of FLR in forest-related interventions including REDD+.

Chapters 2–5 also identify critical knowledge gaps that are currently limiting understanding and/or certainty regarding REDD+ governance and impacts of REDD+ implementation on climate mitigation objectives as well as on biodiversity and human welfare in landscapes in which REDD+ activities have been implemented.

Chapter 6 concludes with high level key messages emerging from this assessment.

References

Bonn Challenge website. The Bonn Challenge. Available at: https://www.bonnchallenge.org/ [Accessed on 26 January 2022].

CBD website. Convention on Biological Diversity. Global Biodiversity Framework. Available at: https://www.cbd.int/conferences/post2020 [Accessed on 16 February 2022].

FAO (2001). Global Forest Resources Assessment 2000. Main Report. Food and Agriculture Organization of the United Nations: Rome, Italy.

FAO (2012). Global ecological zones for FAO forest reporting: 2010 Update. Food and Agriculture Organization of the United Nations: Rome, Italy.

GCF website. Green Climate Fund. Available at: https://www.greenclimate.fund/ [Accessed on 26 January 2022].

GEF (2021). First Meeting for the Eight Replenishment of the GEF Trust Fund. Global Environmental Facility.

IPBES (2018). The IPBES assessment report on land degradation and restoration. (Eds.) L. Montanarella, R. Scholes, and A. Brainich. Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services: Bonn, Germany. pp. 748.

IPBES (2019). Global assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. (Eds.) E.S. Brondízio, J. Settele, S. Diaz, and H.T. Ngo. IPBES Secretariat: Bonn, Germany. pp. 1144. ISBN: 978-3-947851-20-1.

Parrotta J.A., Wildburger C., and Mansourian S. (2012). Understanding relationships between biodiversity, carbon, forests and people: the key to achieving REDD+ objectives. A global assessment report. International Union of Forest Research Organizations (IUFRO): Vienna. pp. 161. ISBN: 978-3-902762-17-7.

Pörtner H.-O., Scholes R.J., Agard J., Archer E., Bai X., Barnes D., Burrows M., Chan L., Cheung W.L. (William), Diamond S., et al. (2021). IPBES-IPCC co-sponsored workshop report synopsis on biodiversity and climate change. IPBES-IPCC co-sponsored workshop report on biodiversity and climate change; IPBES and IPCC.

UN Decade on Ecosystem Restoration website. Preventing, halting and reversing the degradation of ecosystems worldwide. Available at: https://www.decadeonrestoration.org/ [Accessed on 26 January 2022].

UNCCD website. United Nations Convention to Combat Desertification. Land Degradation Neutrality. Available at: https://www.unccd.int/actions/achieving-land-degradation-neutrality [Accessed on 16 February 2022].

UNDESA website. Transforming our world: the 2030 Agenda for Sustainable Development. Available at: https://sdgs.un.org/2030agenda [Accessed on 16 February 2022].

UNFCCC (2016). Paris Agreement to the United Nations Framework Convention on Climate Change, T.I.A.S. No. 16-1104. United Nations Framework Convention on Climate Change: Bonn.

Chapter 2

The Evolving Governance of REDD+

Lead author: Constance McDermott
Contributing authors: Bhaskar Vira, Judith Walcott, Maria Brockhaus, Matthew Harris, Eric Mensah Kumeh and Carolina de Mendonça Gueiros

TABLE OF CONTENTS

Abstract

This chapter applies a political ecology lens to the evolution of REDD+ governance since 2012. We find REDD+ faces ongoing tensions between globally-, nationally- and locally-driven environment and development agendas, and between the need to rein in the global finance and commodities sectors as drivers of deforestation, while also courting them as critical sources of REDD+ funding. The result is an increasingly complex landscape of REDD+-related governance and finance, where boundaries between what is, and isn't, REDD+ remain unclear and contested, and navigating for accountability becomes challenging despite increasing (yet skewed) data availability and transparency.

Key developments over the last ten years include the growing number of countries that have reached the final 'Phase 3' of REDD+, entailing results-based payments (RBPs). This is changing REDD+ dynamics by, inter alia, empowering financial actors to write the rules for both carbon accounting, and the dominance of 'safeguards' as a frame to address non-carbon values. This contributes to tensions between policy-centric, fragmented rule-making and pressures for 'harmonisation' and potential consolidation of power (as is happening within the financial sector itself).

There has also been a growing suite of efforts, both within and outside the REDD+ umbrella, to look beyond forest carbon to finance REDD+. In particular, various forms of supply chain governance aim to provide financial incentives (e.g., individual and jurisdictional certification, 'deforestation-free' supply chains and 'green finance') or focus on sanctions and divestments from commodities tied to forest loss (e.g., through government mandated import restrictions and financial due diligence requirements). Across all of these efforts, there are ongoing tensions between more inclusive, participatory approaches to REDD+ and the more dominant logic of market-based governance based on commodification, standardisation and profit accumulation. We conclude that ongoing attention to these power dynamics will be essential to promote positive environmental and social outcomes.

2.1. Introduction

2.1.1. Framing REDD+ and assessing causality: A political ecology perspective

This chapter examines how an evolving array of actors, institutions and finance shape who and what matters for REDD+, what counts as success or failure, and who decides. We apply a 'political ecology' lens to highlight the power dynamics involved in defining environmental problems, and in favouring particular forms of environmental knowledge and values over others (Forsyth, 2008). REDD+ was initially proposed by a coalition of 'Rainforest Nations' from developing countries[1] as a means for developed countries to compensate southern countries for foregoing development of their *forest*[2] frontiers. This idea was supported by economic analysts as a 'cheap' and 'fast' way to reduce global *emissions* (Stern, 2006). A political ecology perspective helps explain why, despite the apparent promise of 'win-win' outcomes, REDD+ actors and institutions have struggled to deliver on this promise, and REDD+ processes are fraught with geopolitical and ideological contestation (McDermott, 2014).

Building on the previous IUFRO Global Forest Expert Panel (GFEP) report (Parrotta et al., 2012), this chapter analyses how the dynamics of power that shape REDD+ play out across three principal sources of authority – state sovereignties, bilateral and multilateral finance and carbon markets – which influence in different ways its *governance*, actions and outcomes both within and outside the official structures of the United Nations Framework Convention on Climate Change (UNFCCC). While our primary focus is on efforts to reduce *forest* loss in ways that serve REDD+ strategies and objectives, we also emphasise how REDD+ is but one relatively poorly funded instrument within a broader geo-political system driving land use change. This mapping out of the landscape and boundaries of REDD+-related governance then sets the stage for Chapters 3 and 4 on REDD+ impacts by identifying the wide range of actors and

1 In this report, the terms "developed" and "developing" countries are only used in reference to UNFCCC decisions, and in line with respective UNFCCC terminology.

2 All terms that are defined in the glossary of this report (Appendix 1) appear in italics the first time they are mentioned in a chapter.

actions potentially responsible for those impacts. At the same time, it also highlights the limited power, or indeed legitimacy, of REDD+ alone to shift the course of global land use change.

The initial framing of REDD+ as a UNFCCC mechanism to pay for avoided forest *carbon emissions* implies a simple chain of cause and effect, whereby reductions in forest loss are clearly linked to UNFCCC-endorsed financial compensation. However, a growing body of literature that examines the enactment of REDD+ at international to local levels, reveals a much more complex, dynamic and contested picture. This chapter's focus on power, or the 'political ecology' of REDD+ as a mechanism that frames forests as *carbon sources* or *sinks*, highlights how the types of institutions and knowledge claims embedded in REDD+ shape the nature of its outcomes. This includes assessing:

- which actors are included or excluded from decision-making and benefit distribution,
- the relative emphasis being placed on carbon versus non-carbon values, and
- how REDD+ is influenced by, and influences, the broader forest and land-use governance landscape.

All of these factors in turn affect the durability, legitimacy and political traction of the REDD+ agenda(s) into the foreseeable future.

We begin this analysis in the following Section 2.2.1, which situates REDD+ in the broader context of forest and land use governance trends. While it is beyond the scope of this report to assess impacts across this entire governance landscape, it is arguably these larger trends that will most strongly influence the future contours of REDD+ and its impacts on forest values. This broad-brush discussion is then followed by Section 2.2.2 on recent developments in the 'official' architecture of REDD+ under the UNFCCC, as well as related intergovernmental processes. This discussion of intergovernmental state-based rules is then followed by Section 2.2.3, which analyses bilateral and multilateral REDD+ finance and market-based finance as alternative sources of REDD+ authority. Section 2.2.4 then addresses safeguards as part of the UNFCCC's stated approach for managing the social and environmental non-carbon impacts and 'co-benefits' of REDD+, and their close linkage with diverse sources of REDD+ finance.

This mapping of the international REDD+ architecture is then followed by Section 2.3 which analyses national, jurisdictional and local or project-based REDD+ activities. This includes a comparative analysis of countries' REDD+ strategies and progress across a range of dimensions, including reference levels, measurement, reporting and verification (MRV), nesting and jurisdictional approaches. We then examine three REDD+ case study countries, Brazil, Ghana and Indonesia, as examples to compare and contrast their different progress and approaches. Section 2.4 draws on all previous sections to reflect on emerging trends, and Section 2.5 concludes.

2.2. International REDD+ Governance

2.2.1. Situating REDD+ within broader governance trends

The international governance of forests and land use has evolved considerably since the 2010 COP 16 in Cancún when REDD+ was officially agreed under the UNFCCC. In a general sense, this has involved an expansion of substantive focus from forests and the forest sector to the broader '*landscape*' and to 'land use' more generally. Also signalling a broadening of vision, the launch of the 2030 Agenda for Sustainable Development in 2015 served to codify inter-governmental commitments to sustainability as defined by its 17 *Sustainable Development Goals* (SDGs) and associated targets and indicators. Embedded in the SDGs is the recognition of the inter-dependence of the environmental, social and economic dimensions of sustainability and a commitment to afford all goals equal priority. These SDGs potentially provide guideposts for assessing the impacts of REDD+ as a *mitigation* mechanism and also the impacts of its associated social and environmental safeguards.

A parallel stream of international activity has focused on the *restoration* of degraded lands and forested landscapes, contributing to the launch in 2021 of the UN Decade on Ecosystem Restoration, 2021-30 (UN Decade website). This includes commitments announced under the Bonn Challenge (Bonn Challenge website) in 2011, aiming to restore 350 million hectares of forests globally by 2030; AFR100 (the African Forest Landscape Restoration Initiative), a country-led effort to bring 100 million hectares of land in Africa into restoration by 2030 (AFR100 website); Trillion Trees, which is a joint venture between BirdLife International, Wildlife Conservation Society (WCS) and WWF, to end *deforestation* and restore tree cover (Trillion Trees website); and the World Economic Forum's 1t.org platform, which aims to mobilise private sector interest in global conservation and restoration efforts for one trillion trees (1t.org website). A number of these initiatives are also framed within

an emergent narrative around Nature-Based Solutions (NbS) (Seddon et al., 2021) – simply defined as "solutions to societal challenges that involve working with nature" (Seddon et al., 2021: 1) and are being seen as integrated approaches to addressing the coupled challenges of *climate change* and *biodiversity* loss.

Meanwhile, international efforts to address 'illegality' have continued to evolve (Kleinschmit et al., 2016). These efforts, in line with SDG 16 and its focus on the 'rule of law' (McDermott et al., 2019), first focused global attention on illegal practices associated with international trade in tropical timber. Initiatives in this space include the EU's continued engagement with the Forest Law Enforcement Governance and Trade's (FLEGT) Voluntary Partnership Agreements (VPAs) and the EU Timber Regulation aimed at eliminating illegal wood from EU supply chains.

This focus on legality, and on the concept of private sector 'due diligence' to ensure responsible supply chains, has since expanded well outside of the forest sector. For example, the EU has been developing a wide range of due diligence legislation focused variously on land-use related finance (e.g., the EU Action Plan: Financing Sustainable Growth – European Commission, 2018a) and trade in international commodities associated with deforestation, such as palm oil, soy, beef, leather, cocoa and sugar, as well as timber, with the stated aim of mitigating climate change, deforestation and furthering the SDGs more generally (EU Action Plan on Forests; European Commission, 2019).

Both preceding and in parallel with these multilateral state interventions, the private sector is now increasingly engaged in defining and implementing its own deforestation-free or 'zero deforestation' (UN-REDD Programme, 2021a) commitments aimed at forest-related commodities. The terms 'deforestation-free', 'zero gross/net deforestation' and 'zero illegal deforestation' are often used interchangeably, and encompass "a number of approaches or commitments made by governments and/or companies, including zero-deforestation commitments and deforestation-free jurisdictional approaches, which focus on combining efforts – for example, by the public and private sectors – to promote sustainable commodity production and reduce or eliminate deforestation in a landscape (Garrett et al., 2019, and

Transporting freshly cut logs in Mexico
Photo © Nelson Grima

Taylor and Streck, 2018, in Hicks and Scott, 2019)" (UN-REDD Programme, 2021a: 2). By 2020, about 80 out of the 350 most influential companies in key forest-risk supply chains had pledged to eliminate deforestation from their supply chains (Thomson, 2020).

While the scope and ambition of these international pledges and initiatives continue to grow, ongoing research has questioned their overall effectiveness. For example, a five-year assessment conducted in 2019 of large commitments to forest protection and restoration reports "little evidence these goals are on track" and claims the actions taken to realise them "often lack ambition and remain isolated" (NYDF Assessment Partners, 2019: 13). Likewise, researchers have criticised the proliferation of legality initiatives for aligning with the interests of relatively powerful state and corporate interests without challenging the more systemic issues of over-consumption and inequality in access to *forest resources* (Rutt et al., 2018). At the same time, conflicting goals, governance mechanisms and policies across forest, agriculture, mining, infrastructure and other sectors constrain the power of forest-focused policies to address the underlying drivers of forest loss (Ravikumar et al., 2018).

Frustration with the lack of progress of existing forest commitments coupled with a growing sense of urgency over the role of forests in climate change, is generating even more ambitious and far-reaching forest pledges. This was most recently witnessed at the UNFCCC COP in 2021, where leaders of over 100 countries signed the Glasgow Leaders' Declaration on forests and land use, pledging to "halt and reverse forest loss and land degradation by 2030 while delivering sustainable development and promoting an inclusive rural transformation" (UN, 2021: 2). Notably, this pledge precedes consensus on how forest loss will be defined, or whose land is considered degraded, let alone how such a dramatic change in land use trajectories will be achieved 'inclusively' in a nine-year time frame. It also indicates what Singer and Giessen (2017) have called a "climatization" of forests (i.e., a framing of forests primarily as sources or sinks of carbon) that risks overshadowing attention to other values. Whether this escalating ambition drives a corresponding level of action – and in what way and for whose benefit – or simply serves to distract from a lack of past action, remains an open question.

As will become clear in the following analysis, these broader forest and land use governance trends and tensions are either directly or indirectly shaping how REDD+ is being governed and operationalised. This is perhaps most clearly evident with regards to international finance, as well as state and private sector investments in individual REDD+ countries. As remarked in a study of EU financing of REDD+, the "flows of private money into the soft commodity production and value chains of REDD+ recipient countries (…) appear to be three orders of magnitude larger than the total public [governmental] REDD+ support in the period 2008–2015, making private sector investments in sustainable commodity production a potentially major force in addressing REDD+ carbon and non-carbon objectives" (European Commission, 2018b: 1). In addition, there has been increased interest in bringing together private and public resources to accelerate *climate* action, with a focus on ensuring REDD+ results are of 'high quality', with strong social and environmental safeguards and governance approaches (for example ART-TREES discussed below). It is with this broader dynamic in mind, that we now turn to international developments more specifically focused on REDD+ and its associated safeguards.

2.2.2. International state-based authority and REDD+

The Warsaw Framework, agreed at the 2013 UNFCCC COP 19, adopted seven decisions clarifying a range of key issues needed to operationalise REDD+ under the UNFCCC (UNFCCC, 2014). The first of these re-affirms that results-based finance can come from a wide variety of sources, both public and private [Decision 9/CP.19]. This effectively keeps the door open to diverse financial and market actors to not only provide financial support, but also influence REDD+ rules of engagement. Another series of decisions from the Warsaw COP focus on modalities for REDD+ monitoring, reporting and verification systems. These include guidelines and procedures for the technical assessments of countries' proposed reference emissions levels or forest reference levels [Decision 13/CP.19] and modalities for measuring, reporting and verifying (MRV) of forest emissions [Decision 14/CP.19]. The Warsaw Framework also includes key requirements on implementing and reporting on safeguards [Decision 12/CP.19] (see Section 2.2.4 for more information).

The UNFCCC's 2015 *Paris Agreement* marked another critical juncture for REDD+. The Paris COP's ambitious aim of limiting global warming to 1.5 degrees, and its acknowledgement of the role of forests in achieving this aim, brought new momentum to international efforts to address deforestation, *forest degradation* and *forest restoration*.

Also critical to REDD+ governance, Article 6 of the Paris Agreement enshrined a flexible approach to climate finance in general, including the finance of REDD+ activities, that allows countries to pursue a wide range of financing options from the public and private sector outside of the UNFCCC's own finance mechanisms (United Nations, 2015: 7). In addition, in Decision 18/CP.21, recognising that non-carbon benefits are important for the long-term sustainability of REDD+ and can contribute to climate change *adaptation*, countries were invited to submit information on their nature, scale and importance related to REDD+ implementation. While this decision does not constitute a requirement, this agreement from the Paris COP may result in better market access in terms of meeting requirements and objectives beyond carbon of donors looking to finance REDD+ actions or pay for REDD+ results. It has arguably paved the way for countries to be compensated for non-carbon benefits, as demonstrated through the 2.5% premium the Green Climate Fund (GCF) offered during its pilot programme for REDD+ results-based payments (RBPs) for providing optional information on the nature, scale and importance of non-carbon benefits for the long-term sustainability of REDD+ activities (GCF, n.d.).

2.2.3. The evolving international finance landscape

The 2015 Paris Agreement had direct and indirect implications for finance for REDD+. It explicitly recognised REDD+ in Article 5.2 and made provisions for mobilising climate finance, including finance for REDD+. Article 6 of the Paris Agreement provides three main mechanisms for mobilising finance for REDD+: as part of joint-responsibility nationally determined contributions (NDCs); through internationally-transferred mitigation outcomes (ITMOs); and the sustainability mechanism under Article 6.4 (Streck, 2016). REDD+ finance through ITMOs can take three main approaches: developed countries increasing their *emissions* targets and including emissions reductions elsewhere (e.g., through REDD+ verified emission reductions (VERs)); by having a dual target, i.e., a second international mitigation target that complements their domestic target; or through a specific REDD+ mitigation target (Streck, 2016).

In parallel, the voluntary carbon market has been growing over the last decade, mostly driven by a rise in private sector demand for avoided deforestation offset credits, linked to commitments by companies and other institutions for their planned transition to achieve 'net zero' by agreed target dates (for instance, Microsoft has pledged to be carbon negative by 2030 (Microsoft website), while Amazon has made a commitment to achieve carbon neutrality by 2040 (Amazon website)). The voluntary market is also expected to expand significantly through the inclusion of REDD+ and avoided deforestation offsets as part of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), which is being coordinated by the International Civil Aviation Organization (ICAO).

The scope of financial intermediation to support REDD+ and related activities has expanded through a growing emphasis on the need to address what is described as the "*biodiversity* financing gap" – the difference between the current total annual flows toward global biodiversity conservation and the estimated total amount of funds needed to sustainably manage biodiversity and maintain *ecosystem* integrity (Deutz et al., 2020). Nature-based solutions and carbon markets feature as important mechanisms, nested within these broader initiatives to deliver additional capital flows in support of biodiversity (see also UNEP, 2021).

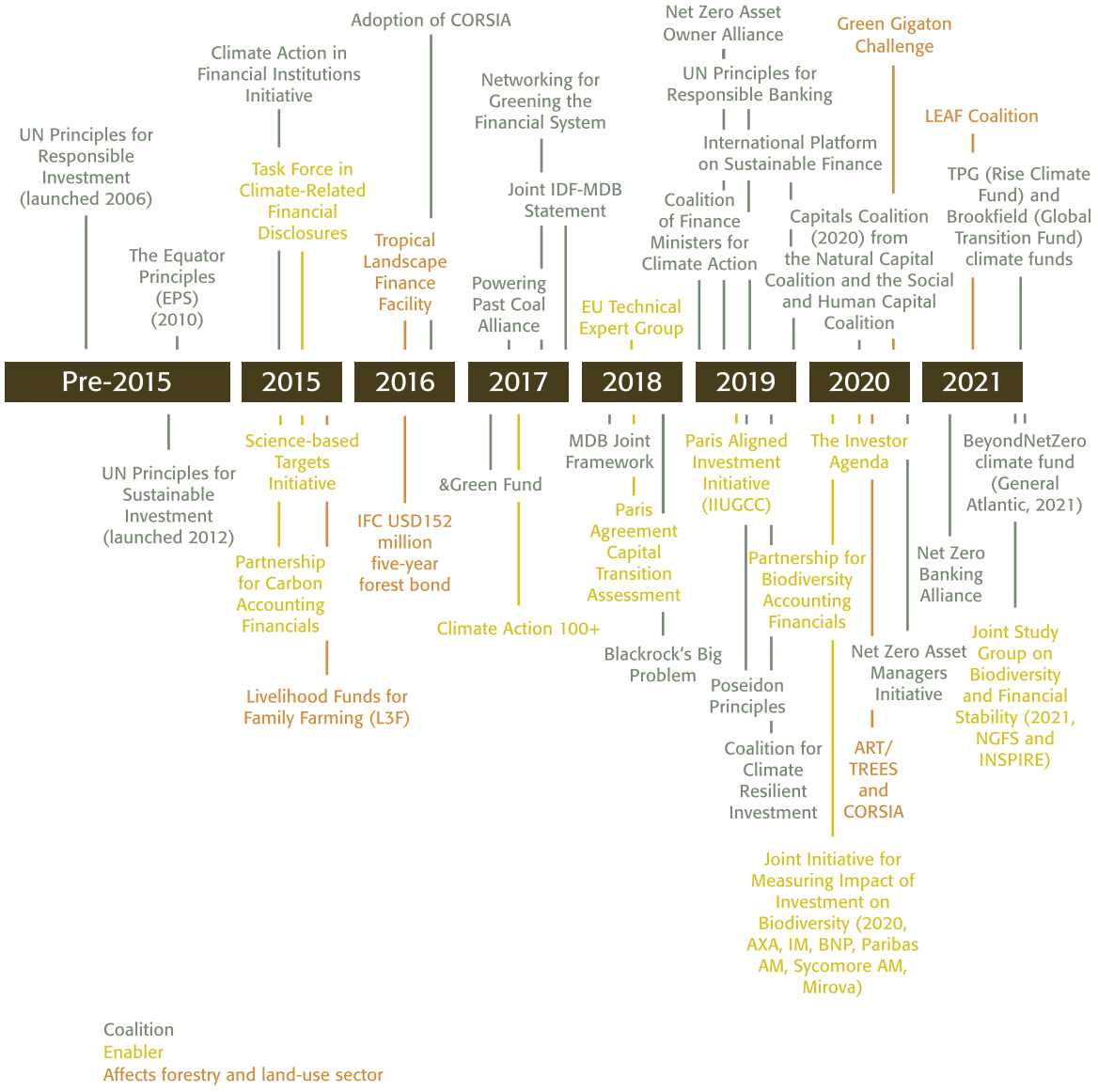
While there is clearly momentum behind these efforts to harness public and private finance in support of international environmental goals, the global coronavirus pandemic (COVID-19) has resulted in considerable pressures on these financial flows. In 2020, COVID-19 led to a decrease in all types of private finance (Macquarie et al., 2020) and has also stretched the focus of public finance, especially to support public health efforts and to offset the impacts of the pandemic on employment and economic activity (Choi et al., 2020). Combined with the 3.5% fall in world gross domestic product (GDP) in 2020 (IMF, 2021), this could lead to a reduction in climate finance, including finance for REDD+ (see also Wunder et al., 2021, who model the potential macroeconomic impacts of COVID-19 on forest outcomes). Although there have been high profile suggestions that the COVID-19 pandemic could benefit climate mitigation efforts, through a 'great reset' (Schwab and Malleret, 2020) or by mainstreaming NbS (UNEP, 2021), at the time of writing there is insufficient evidence of significant commitments to support the rhetoric of 'building back better' (O'Callaghan and Murdock, 2021). Some have even suggested that the recovery has seen more finance focused on carbon-intensive activities than on climate mitigation and adaptation (Macquarie et al., 2020). Given the increase in government and public debt and reduced credit ratings of emerging markets and developing countries (COP26 Presi-

dency, 2021), there is a risk that the much-needed climate finance will not materialise. COP26 in October-November 2021 included climate finance as one of its four goals (COP26 website) and there is pressure on developed countries to meet their pledge of USD 100 billion in climate finance per year (COP26 Presidency, 2021). The ability to deliver on these demands to increase finance for nature and NbS will be an important indicator of international solidarity over the next year.

Sustainability coalitions and initiatives have proliferated in the financial sector over the last decade, as summarised in Figure 2.1. This timeline provides an overview of a rapidly evolving financial landscape, which illustrates a growing interest in blending public and private finance to support the sustainability transition, as well as showing a number of new initiatives that are being led or championed by central bankers, finance ministers, institutional investors, asset managers and broad international coalitions.

Figure **2.1**

Timeline of sustainability coalitions and initiatives



Source: Authors' illustration, adapted from Pinko et al. (2021)

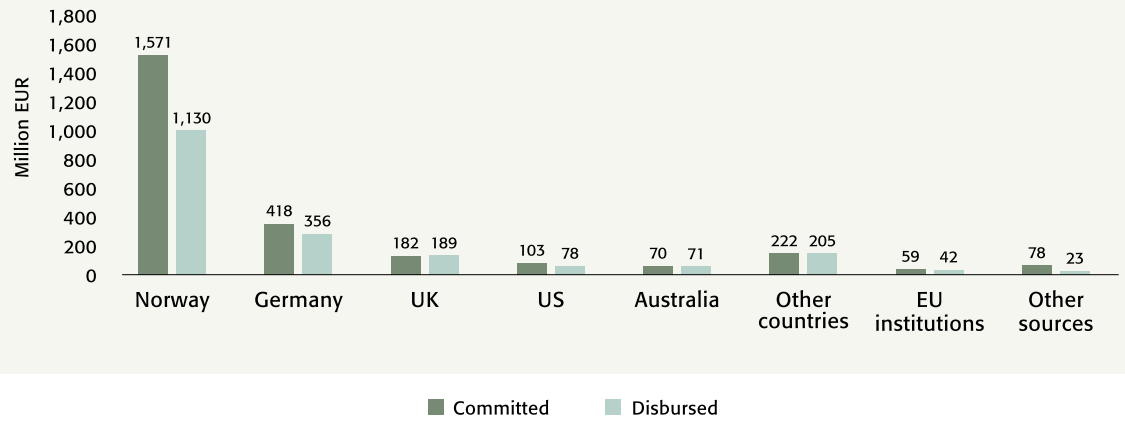
Within this complex and evolving international financial landscape for REDD+, climate change and biodiversity, it is important to attempt to parse out the different types of financial flows, by both their sources and their potential uses. Specifically in the context of REDD+, finance has been used to support all three phases – readiness, implementation and results – with a recent review suggesting that the majority of finance has focused mostly on "supporting countries to get ready for REDD+ by providing funding for capacity-building for accounting, developing national and/or sub-national strategies, designing safeguards systems and other pre-requisites to track and verify emissions reductions" (Granziera et al., 2021: 6). Ten years on from our previous GFEP assessment (Parrotta et al., 2012), this demonstrates the challenges in moving from a simple idea to the reality of creating implementable REDD+ strategies that are sensitive to the political economy of local contexts, as well as the technical challenges of developing consistent and transparent systems for monitoring and verifying emissions reductions, and for applying and reporting on social and environmental safeguards.

2.2.3.1. Bilateral and multilateral finance for REDD+

Bilateral and multilateral funding has supported most historical payments for REDD+ activities, especially commitments from the governments of Norway and Germany (see Figure 2.2, from Atmadja et al., 2018, which estimates the scale of commitments towards all activities labelled as REDD+, from different Overseas Development Assistance (ODA) sources, and demonstrates the dominance of bilateral flows from Norway and Germany).

Figure **2.2**

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



Source: Atmadja et al. (2018: 32).

The majority of multilateral funding comes from three sources: the Forest Carbon Partnership Facility (FCPF), the UN-REDD Programme, and the Forest Investment Programme (FIP) of the Climate Investment Funds. Most sources comment on the difficulties of tracking REDD+ financial flows, but some estimates are reported in Table 2.1, tracking multilateral financing between 2008 and 2020.

Table **2.1**

Multilateral funding for REDD+, 2008-2020

	Amount pledged (million USD)	Amount deposited (million USD)	Amount approved (million USD)	Number of projects
UN-REDD	329	329	323.5	35
FCPF Carbon Fund	874.5	874.5	311.2	46
FCPF Readiness Fund	466.54	466.54	311.2	8
FIP	735.9	735.9	573.7	48

Source: Authors' estimates based on data reported in Watson and Schalatek (2021) and Climate Funds Update (Climate Funds Update website).

The Warsaw Framework for REDD+ (Decisions 2/CP.17 and 14/CP.19) specified that RBPs could be drawn from both non-market and market-based finance. While elements of bilateral finance, especially from Norway, have been contingent on performance, these results did not generate carbon credits that were eligible for transactions in existing carbon markets (Granziera et al., 2021). The use of additional third-party standards, typically developed for either domestic compliance or international voluntary carbon markets, has allowed countries to access REDD+ payments which meet these criteria. This includes Emissions Reduction Payment Agreements under the FCPF's Carbon Fund, for which initial payments for results were expected in 2021 (with a total contract value of USD 700 million, across fourteen countries; Granziera et al., 2021).

The Green Climate Fund (GCF) was established at COP16 in Cancún [Decision 1/CP16] and is the largest multilateral climate fund (GCF, 2021a). At COP19 (Dec. 9/CP.19; UNFCCC, 2014) the GCF was further recognised as a financing mechanism for REDD+ RBPs and in 2017 it launched a five-year (or until funds exhausted, which was in 2020) USD 500 million REDD+ pilot financing programme (Table 2.2.; GCF, n.d.). This was available to developing country Parties to the UNFCCC which met specified criteria, including having Warsaw Framework elements in place, such as including a REDD+ national strategy or action plan, forest reference levels and a safeguards information system (GCF, 2017). With the first tranche of funding having been fully committed, the GCF board is currently analysing opportunities for the continuation of the REDD+ Results-Based Payments Programme (GCF, 2021b).

Eligibility for GCF RBPs was assessed through a GCF scorecard, which included a 'pass/fail' rating (e.g., on safeguards elements), a quantitative assessment (e.g., for carbon elements) or qualitative assessment (e.g., non-carbon elements) (GCF, 2017). The total volume of emissions reductions (ERs) paid for are calculated (GCF, 2017) by:

$$\text{Volume of ERs offered} \times \frac{\text{Total score achieved}}{\text{Maximum score}} = \text{GCF volume of ERs}$$

The maximum score achievable is 48. The total payments are then calculated with a default value of USD 5/tCO_2eq and then an additional 2.5% funding, contingent on scoring a 2 for "use of proceeds and non-carbon elements" (all eight countries received this) (GCF, 2017).

Table **2.2**

Summary of GCF RBPs for REDD+ projects

Project	Country	Results period*	GCF financing (USD)	REDD+ results receiving GCFv RBPs (tCO_2eq)**	Share of total UNFCCC results awarded with GCF RBPs	Implementation stage
FP100	BRAZIL (AMAZON)	2014 – 2015	96,452,228	18,819,947	1.5%	UNDER IMPLEMENTATION (100% DISBURSED; 28/04/2020)
FP110	ECUADOR	2014	18,571,766	3,623,759	75%	UNDER IMPLEMENTATION (100% DISBURSED; 28/09/2020)
FP120	CHILE	2014 – 2016	2,607,552	12,411,230	67%	UNDER IMPLEMENTATION (100% DISBURSED; 21/09/20)
FP121	PARAGUAY	2015 – 2017	50,000,000	14,145,000†	19%	UNDER IMPLEMENTATION (100% DISBURSED; 27/11/20)
FP130	INDONESIA	2014 – 2016	103,781,250	20,250,000	14%	UNDER IMPLEMENTATION (100% DISBURSED; 12/07/21)
FP134	COLOMBIA	2015 – 2016	28,208,123	5,504,024	17%	UNDER IMPLEMENTATION
FP142	ARGENTINA	2014 – 2016	82,000,000	18,731,707††	11%	APPROVED (13/11/20)
FP144	COSTA RICA	2014 – 2015	54,119,143	10,599,833	71%	UNDER IMPLEMENTATION (100% DISBURSED; 05/04/21)
TOTAL:			**496,740,062 †††**	**104,045,499**		**DISBURSED: USD 386,531,939**

Notes for table:

* *Results period refers to the years during which the emissions reductions were made.*

** *Approved emissions reductions are not always the same as the ERs that were funded.*

† *The UNEP could only take funds up to USD 50,000,000 (covering 9,756,097.56 tCO_2eq ER) despite approval of 14,145,000 tCO_2eq ERs.*

†† *An additional 7,492,683 tCO_2eq set aside as an interim mechanism to manage risks of reversals.*

††† *Had all of Paraguay's approved REDD+ results been added, the total RBPs would add up to USD 519 million.*

2.2.3.2 Market-based finance for REDD+

Carbon credits have been transacted in voluntary carbon markets and as part of domestic compliance markets. Each carbon offset or credit is the equivalent of one metric tonne of carbon dioxide emissions that has been reduced, avoided or sequestered by an entity. Voluntary carbon markets cover all manner of offsets that are transacted between a buyer – such as a company, local government, institutional investor, or even an individual – and a seller, typically at project-scale, demonstrating emissions reductions through the avoidance of planned or unplanned deforestation. Most of these transactions have not included credits from jurisdictional REDD+ programmes, but the development and wider acceptance of third-party verification and accounting standards and the increased push towards hybrid forms of public-private financing for REDD+ is changing this landscape.

In a biennial assessment of the voluntary carbon market, Ecosystem Marketplace (2021) estimated that more than 99% of forestry and land-use credits transacted in 2019 used an independent standard. Of these, the Verified Carbon Standard (VCS) had a dominant market share, covering 89% of the forestry and land-use credits tracked by the Ecosystem Marketplace. Additionally more than 80% of VCS credits used the Climate, Community and Biodiversity Standard (CCB), which verifies co-benefits beyond carbon (and, by using this standard, projects can get a 70% premium on the carbon price; see Angelsen et al., 2018). The Ecosystem Marketplace estimates that 42% of VCS credits transacted related to REDD+ activities. The total volumes traded, and values of transactions, in the voluntary carbon market have fluctuated, with renewable energy and forestry and land-use credits being dominant (see Box 2.1, which provides more detail of REDD+ and forests in voluntary carbon markets). With this inter-annual volatility as a caveat, Ecosystem Marketplace (2021) estimates that forestry and land-use volumes were 36.7 $MtCO_2eq$ in 2019, with a transaction volume of USD 159.1 million.

Architecture for REDD+ Transactions (ART) is a voluntary initiative that aims to facilitate large-scale forest-based solutions to deliver against the global climate goals in the Paris Agreement. ART has developed an independent standard for the measurement, monitoring, reporting and verification of reductions and removals from the forest sector – The REDD+ Environmental Excellence Standard – known as TREES. Under TREES, countries and sub-national jurisdictions are able to generate verified emission reduction credits by reducing emissions from deforestation and forest degradation, which can be issued on a public registry. In April 2021, the Leaders' Summit on Climate announced the Lowering Emissions by Accelerating Finance (LEAF) Coalition, which is a public-private initiative supported by the governments of Norway, the United States and the United Kingdom, along with a number of large corporate entities. Using the ART-TREES standards, the LEAF coalition aims to mobilise USD 1 billion in financing, and will facilitate transactions between companies and larger spatial units within jurisdictional REDD+ programmes, potentially magnifying the scale of REDD+ activity. The coalition's initial call for proposals was live at the time of writing and has received more than 30 proposals from jurisdictions which cover over half a billion hectares of forest (LEAF Coalition website).

In 2020, the International Civil Aviation Organization (ICAO) approved carbon offset standards for airlines to achieve their climate goals, based on two standards, Verra's Jurisdictional and Nested REDD+ (JNR) standard and ART-TREES. This allows jurisdictional initiatives, as well as some REDD+ projects that are nested under a national or sub-national REDD+ programme, and verified using one of these standards, to be eligible to sell emission credits under ICAO's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Also in late 2020, a coalition of public, private and philanthropic partners (including UN-REDD) came together to launch the Green Gigaton Challenge (GGC), described as "a new global effort to catalyse funds to transact one gigaton of high-quality emissions reductions from forest-based natural climate solutions by 2025 and annually after that as an aspirational goal" (Green Gigaton Challenge website). GGC focuses on jurisdictional efforts at national and sub-national levels, and connects them with companies that are seeking to complement their internal emissions reductions with the purchase of high-quality carbon credits. The focus is on sending a 'demand signal' to governments, to unlock what is seen as an unfulfilled supply potential for REDD+, till now hampered by an under-developed market for jurisdictional emission credits. The GGC also aims to set a floor price of USD 10 per tonne of CO_2eq (which is significantly higher than most REDD+ transactions), to provide added assurance to forest countries. GGC also intends to use ART-TREES as its reference standard.

2.2.3.3. The political ecology of REDD+ finance

A challenge associated with this fast moving and evolving financial landscape is the difficulty of

Box **2.1**

REDD+ and forests in voluntary carbon markets

Voluntary carbon markets have existed since 1989 (Donofrio et al., 2020a) and there has been increasing hope that they will reduce the cost of meeting the Paris Agreement (Edwards, 2021). Up to 2019, the cumulative volume of market-wide voluntary offset transactions amounted to 1.3 billion tCO_2eq, equivalent to over USD 5.5 billion (Donofrio et al., 2020b). In 2019, 104 $MtCO_2eq$ of voluntary carbon offsets were traded (up 8% from 2018), of which 36.7 $MtCO_2eq$ were from the forestry and land-use sector (Donofrio et al., 2020a). This highlights the high demand for offsets produced from nature-based projects, accounting for 58% of offsets bought by Europe, of which 71% are REDD+ (Donofrio et al., 2021). The volume of offsets associated with nature-based and natural-climate solutions increased by 30% in 2019, but coincided with a 28% decrease in price (Donofrio et al., 2020b).

The price of credits produced from REDD+ varied by project type: whilst those for avoided unplanned deforestation fetched USD 3.65 per tCO_2eq, those aimed at avoiding planned deforestation fetched USD 4.21 per tCO_2eq (Donofrio et al., 2020a). Furthermore, offsets verified by standards that take account of non-carbon benefits – such as the Gold Standard, which requires that projects incorporate sustainable development and climate mitigation – fetched a higher price on the carbon market (Donofrio et al., 2021). For example, carbon credits verified with the Climate, Community and Biodiversity (CCB) standard, rather than just the Verified Carbon Standard (VCS), received a 70% premium price (Angelsen et al., 2018). Credits verified with Verra's VCS and VCS+CCB accounted for 66.25% of total offsets traded in 2019 (Donofrio et al., 2020a) and 90% of forestry and land use offsets (Ecosystem Marketplace, 2021).

However, estimates suggest that to meet the Paris Agreement the volume of voluntary offsets transacted needs to increase 15-fold by 2030 and 100-fold by 2050 (Donofrio et al., 2021), and the price will need to increase to between USD 50 and USD 100 per tCO_2eq (Ecosystem Marketplace, 2021). Looking to the future, carbon prices should increase as there is increased demand for offsets, which will make more projects economically viable (Donofrio et al., 2020b). There is a clear gap in the market for public sector buyers of offsets, with for-profit buyers representing 98% of Europe's buyers and 87% of North America's buyers (Donofrio et al., 2021). Despite the COVID-19 pandemic, the voluntary carbon market strengthened with more companies making climate-neutral or net-zero pledges and an increased demand for offsets (Donofrio et al., 2020a).

tracing capital flows in a clear and transparent manner, and the lack of consistent reporting. UNEP (2021) notes the uncertainty of estimates on the quantum of finance for NbS, and the need for agreement on a system for labelling, tracking, reporting and verifying the state of finance for nature. There is also a proliferation of categories – Nature-based Solutions, Carbon Finance, Forest Carbon Finance and Finance for REDD+. In the case of REDD+, a further challenge is identifying financial flows to non-forest sector activity (especially agriculture) which contributes to avoided deforestation, especially where these programmes are being implemented at national and sub-national jurisdiction. The New York Declaration on Forests (NYDF) makes a distinction between "green" finance (aligned with objectives for the conservation, protection and sustainable use of forests) and '"grey" finance (without stated objectives to positively impact forests, but with the potential to impact on forests) (NYDF Assessment Partners, 2020). There is a specific challenge with estimating the private sector's REDD+ financing and investments, since the voluntary carbon market does not include potentially much more significant private sector commitments to deforestation-free supply chains (see Sections 2.2.1, 2.2.3.4 and Atmadja et al., 2018). Bilateral and multilateral funding also confronts complex power dynamics between donor and recipient countries, and is often tied up with complex geopolitical considerations that go beyond the forest sector and REDD+ (see also discussion of this issue in the country case studies).

Apart from the uncertainties about the scale of the market, a further concern is the proliferation of technical needs – especially for monitoring, reporting and accountability – which have creat-

ed a new industry of intermediaries and consultants, who corner a significant proportion of forest carbon finance, but their activities do not directly contribute to the storage of carbon or the reduction of emissions (Fleischman et al., 2021). The costs of engaging this level of sophisticated expertise also creates significant barriers to entry for small landowners, and projects that are led by *Indigenous Peoples* and local communities. This is especially problematic in jurisdictions where forest and carbon rights are unclear or contested, and the question of who benefits from REDD+ becomes entangled with unresolved and contested rights to land and forests, and associated opportunities for development (Streck, 2020).

A further concern emerges from the authors associated with the Oxford Principles for Net Zero Aligned Carbon Offsetting (Allen et al., 2020), who argue that paying for emissions reductions is an important part of the transition to net zero, but increasingly the focus must be on carbon removal, generated by projects that directly remove carbon dioxide from the atmosphere (such as planting trees, soil carbon enhancement, etc.). Other authors offer yet a different reason to move beyond a narrow focus on forest carbon payments, highlighting the contribution of territories with minimal or no deforestation, often those controlled by Indigenous Peoples and local communities, to the conservation of forests and the mitigation of climate change (van Dam, 2020). Forest fiscal transfers, such as India's ecological transfers to state governments under its federal-provincial Finance Commission, may be important ways to structure financial incentives that reward the conservation of existing forests, not just avoiding deforestation (Busch and Mukherjee, 2018).

2.2.3.4. Beyond carbon: other REDD+ related finance

Interest from the private sector in addressing deforestation and forest degradation stems from both the need to minimise or eliminate negative *impacts* and a desire to contribute to positive solutions. One focus is on demonstrating sustainable supply chains within commodity markets, through the use of certification standards, such as the Programme for the Endorsement of Forest Certification (PEFC website); the Forest Stewardship Council (FSC website); the Roundtable on Sustainable Palm Oil (RSPO website); and the Roundtable on Responsible Soy Association (RTRS website). A broadening of this agenda has come about through pressure within the investment community to declare impacts on climate change such as through the Task Force on Climate-Related Financial Disclosures (TCFD website), and on biodiversity (e.g., with the newly launched Task Force on Nature-Related Financial Disclosures, TNFD website). These initiatives are at least partially a response to growing consumer activism around the impacts of the brands that they are associated with, and a related need for disclosure and transparency within corporate supply chains. They also signal greater vigilance amongst private and institutional investors about the perceived impacts of their investments on climate and biodiversity. These defensive responses are primarily focused on a narrative around 'doing no harm', or as more recently formulated, doing no 'net harm', while continuing to pursue the conventional goals of expansion and diversification of commodity trade and exports, and profit maximisation.

Further developments focus on the desire of private sector actors to 'do good' – this includes social venture capital, the increasing rise of 'green bonds', and other forms of results-based or incentive payments. These instruments focus on the need to demonstrate positive social returns on investments, in addition to the expected financial sustainability. Trade-offs include an acceptance of lower financial returns (often in the short term) if these secure higher social returns, and the willingness to adopt longer investment time frames ('patient' capital).

One focus of these new forms of market-, supply chain- and investment-led governance is the need for measurable performance indicators, which tend to prioritise particular forms of knowledge (expertise embedded in western-led, peer reviewed publications), and the reduction of complex social and environmental outcomes to those that are quantifiable and measurable in commodified units. These can result in a reductive focus on these measurable outcomes, at the expense of the less tangible process-based and institutional elements that contribute to effective and long-lasting interventions in the forest sector (Gupta et al., 2014; Arts et al., 2019).

2.2.4. The evolution of safeguards

The implementation of REDD+ activities has the potential to deliver social and environmental benefits beyond the reduction of *greenhouse gas* (GHG) emissions, but may also entail risks. To reduce potential risks and enhance the benefits of REDD+, the UNFCCC has agreed seven social and environmental safeguards, otherwise known as the Cancún safeguards (Box 2.2), which are to be "addressed" and "respected" throughout the implementation of REDD+ activities. Although the

UNFCCC does not specifically define the terms "address" and "respect", "address" has been widely understood to mean the existence of policies, laws and regulations (PLRs) 'on paper' that support safeguards, while "respect" refers to the implementation or enforcement of these PLRs. In addition, there are three core requirements on REDD+ safeguards that countries need to meet in order to be eligible for RBPs:

Box **2.2**

Cancún safeguards for REDD+

When undertaking [REDD+] activities, the following safeguards should be promoted and supported:

(a) That actions complement or are consistent with the objectives of national forest programmes and relevant international conventions and agreements;

(b) Transparent and effective national forest governance structures, taking into account national legislation and sovereignty;

(c) Respect for the knowledge and rights of Indigenous Peoples and members of local communities, by taking into account relevant international obligations, national circumstances and laws, and noting that the United Nations General Assembly has adopted the United Nations Declaration on the Rights of Indigenous Peoples;

(d) The full and effective participation of relevant stakeholders, in particular Indigenous Peoples and local communities;

(e) That actions are consistent with the conservation of natural forests and biological diversity, ensuring that the [REDD+] actions are not used for the conversion of natural forests, but are instead used to incentivize the protection and conservation of natural forests and their ecosystem services, and to enhance other social and environmental benefits;

(f) Actions to address the risks of reversals;

(g) Actions to reduce displacement of emissions.

Source: UNFCCC Decision 1/CP.16, Appendix I, paragraph 2

Further guidance provided by the Warsaw Framework and the Paris Agreement have defined elements such as key characteristics of safeguards information systems (SIS) and minimum content for summaries of safeguards information, which are often used as criteria to determine a country's eligibility for results-based finance. However, as detailed in Section 2.3, which includes information on country experiences, challenges and lessons learned, country progress over the past 10+ years has often been slow in meeting these safeguards requirements, due in part to limited guidance provided by the UNFCCC on what safeguards mean in practice and how they should be applied, evaluated and reported on. This has been made more complex by the evolving landscape of REDD+ finance, which has often entailed additional safeguards frameworks and requirements. While the UNFCCC has provided the guiding framework for REDD+ safeguards, they are being shaped in practice by the evolving financial landscape related to RBPs, as detailed in the following sections.

2.2.4.1. Safeguards beyond the UNFCCC

Different funders and market-based standards have developed extensive frameworks of safeguards requirements that are applied on top of those of implementing partners and those of the UNFCCC. As a result, countries have had to analyse social and environmental aspects against multiple safeguards frameworks, and in many cases to demonstrate compliance with three or more sets of safeguards and related processes.

While this has at times had a positive influence in encouraging countries to consolidate and finalise key safeguards processes in order to be eligible

for REDD+ RBPs, it also calls into question who is defining the rules for REDD+, and which actors are included or excluded from decision-making and benefits distribution.

Bilateral and multilateral funding

Forest Carbon Partnership Facility (FCPF) – Carbon Fund

The FCPF has adopted guiding principles related to safeguards in financing REDD+, which include the requirement that emissions reduction (ER) programmes meet "World Bank social and environmental safeguards and [support] the safeguards included in UNFCCC guidance related to REDD+" (programmatic element 3, FCPF Participants Committee [FCPF-PC], 2012). Indeed, the World Bank highlights that "the World Bank safeguards policies, procedures and practices are consistent with the Cancún safeguards for REDD+" (FCPF, 2016: 18).

As an example, in the case of Costa Rica, the relevant World Bank Operational Policies were activated and were considered alongside their legal framework in the development of their approach to safeguards (MINAE, 2018). With the input of relevant stakeholders, Costa Rica performed a Social and Environmental Strategic Assessment (SESA) and developed an Environmental and Social Management Framework (ESMF) between 2014 and 2015. This identified areas of risk, and specified actions and tasks to address these risks within the ER programme. As well as the World Bank Operational Policies, Costa Rica applied the Cancún safeguards to the ESMF. They noted that many of the pre-existing policies from the last two decades already complied with the UNFCCC requirements, but ensured that the policies and actions of the ER programme respect and support the safeguards. Costa Rica incorporated their SIS into their National Environment Information System. In reporting for the Emission Reductions Programme to the FCPF Carbon Fund, Costa Rica is also currently analysing past safeguards performance for the period of results for which payment is being sought (MINAE, 2018). The evolution of other non-carbon elements is discussed further in Chapter 4.

UN-REDD Programme

The United Nations Collaborative Programme on Reducing Emissions from Deforestation and forest Degradation in developing countries (UN-REDD Programme) does not have its own safeguards framework, but rather works with countries to help meet UNFCCC safeguards requirements, as well as to develop approaches to meeting other safeguards requirements, such as those of the FCPF. The Programme does have guidance on issues such as *tenure*, gender and non-carbon benefits, which countries have used to inform REDD+ advances, and also national safeguards frameworks. For example, Chile has integrated UN-REDD Programme guidance on gender to its national safeguards framework (see their first summary of safeguards information, submitted to the UNFCCC in 2017 – CONAF, 2018).

Forest Investment Program (FIP)

The Forest Investment Program (FIP) is one of the nine programmes of the Climate Investment Funds (CIF; CIF, n.d.). Safeguards guidance for FIP projects is focused on stakeholder inclusion and transparency (Climate Funds Update, n.d.). FIP does not have its own safeguards and the safeguards of each project depend on the partner multilateral development bank (MDB) (ibid.). However, an evaluation of CIF commissioned by the CIF Trust Funds Committee found that MDBs "have no formal process for applying quality control, safeguards, or evaluation at the level of the country investment plan" and that "FIP guidelines are ambiguous on whether free, prior and informed consent (FPIC) rules apply to projects affecting indigenous people" (IDB, 2014: 6). A recent assessment of the engagement of women in CFI found that "the degree of recognition of women and gender-related groups as stakeholders engage in program planning and development varies considerably, even by the MDB safeguard policies" (Women's Environment and Development Organization [WEDO], 2020: 35). According to a CIF results report on their projects in Mexico (partnered with the World Bank and the Inter-American Development Bank), projects "were required to comply with environmental and social safeguards as well as sustainable forest management plans" (CIF, 2021: 21). The Mexican Fund for the conservation of Nature (CANFOR) "mainstreamed the World Bank's environmental and social safeguards within its own operating rules" (ibid.: 21).

Green Climate Fund (GCF)

For the GCF RBPs pilot programme, in addition to meeting the UNFCCC Warsaw Framework requirements for REDD+ safeguards, countries were also asked to demonstrate compliance with Green Climate Fund safeguards and policies, as well as the safeguards and policies of the 'Accredited Entities' (AE) to the GCF (Green Climate Fund website). The GCF adopted the International Finance Corporation (IFC) Performance Standards as its interim safeguards, and has also developed a series of Fund-specific policies and guidance, such as on gender and on prohibited practices. This has

meant that in many cases, countries have had to demonstrate compliance with three separate safeguards frameworks (the UNFCCC, the GCF and the AE). As well as complying with GCF's interim Environmental and Social Safeguards (ESS), countries have had to carry out detailed evaluations through Environmental and Social Assessments (ESA) about how social and environmental risks were managed during the implementation of activities that enabled RBPs to be obtained *(ex post*). They have also had to develop Environmental and Social Management Frameworks (ESMF) to identify social and environmental risks, as well as the application of safeguards policies and standards in the implementation of activities (*ex ante*) associated with the use of the proceeds of payments for results.

In addition, 'Gender Assessments' and 'Gender Action Plans' had to be submitted with proposals, in line with the GCF Gender Policy. Indeed, the GCF is "the first climate finance mechanism to mainstream gender perspectives from the outset of its operations as an essential decision-making element for the deployment of its resources." (GCF, 2019: 7).

However, a review of the GCF's safeguard policies in the context of RBPs found that these policies present challenges to countries, and indeed "by requiring countries to demonstrate conformance with its interim safeguards in the context of REDD+ results-based finance, the GCF's pilot programme poses a significant burden to countries' abilities to access results-based financing" (Rey Christen et al., 2020: 1). As GCF requires conformance with their policies and frameworks as well as the Cancún safeguards, countries face an added technical and financial burden, which creates additional barriers for accessing results-based finance (Rey Christen et al., 2020). This review suggests that the GCF assessment of how the Cancún safeguards were addressed and respected by countries was inhibited by its use of a quantitative and 'pass/fail' approach – rather than a qualitative one. They note that addressing the Cancún safeguards is "a complex issue that has not been captured in the GCF's pilot programme scorecard" (Rey Christen et al., 2020: 9). These lessons are applicable more widely as they highlight the complexity of meeting and assessing safeguard requirements, as well as how these requirements create further barriers to accessing finance in an already-complex financial landscape.

Bilateral agreements

There have been a series of performance-based agreements between REDD+ donors and countries, which often entail additional safeguards requirements beyond those of the UNFCCC. This is representative of some wider financing trends that "international funding [for REDD+] now comes primarily from bilateral and multilateral development aid budgets, not carbon markets" (Angelsen, 2017: 238). In practice, this has meant that individual countries or groups of countries as donors have been able to set agendas as well as the rules of the game regarding safeguards. Norway, as the single largest REDD+ donor, providing more than 40% of international funding (Norman and Nakhooda, 2014 in Angelsen, 2017: 239) has bilateral agreements with a number of countries, including Brazil, Guyana, Indonesia and Tanzania, as well as a number of other joint agreements, such as a partnership with the UK to support the Congo Basin Forest Fund, and a pledge with a number of governments to support Peru in its emissions reductions efforts. Norway is also the largest donor of the UN-REDD Programme, and channels significant funding through the World Bank's FCPF, the FIP and the Bio Carbon Fund. Its International Climate and Forest Initiative provides significant support to civil society, including large international NGOs active in the REDD+ arena (Angelsen, 2017).

Depending on the national context, these agreements usually include specific safeguards provisions beyond those of the UNFCCC. For example, the bilateral agreement with Guyana specified a set of "enabling activities," including safeguards to protect the rights of Indigenous Peoples (Angelsen, 2017). The Joint Declaration of Intent, signed in 2014 between the governments of Germany, Norway and Peru for "Cooperation on reducing greenhouse gas emissions from deforestation and forest degradation (REDD+) and promote sustainable development in Peru", included a clause that "reporting on how safeguards are being addressed and respected, consistent with the relevant UNFCCC decisions, will be a prerequisite for payments, as well as adherence to the requisites of the relevant UNFCCC decisions" (NICFI, 2014: 6). A safeguards roadmap (MINAM, 2017) which was prepared by the government of Peru to provide more detail on the activities to be developed included objectives related not just to UNFCCC decisions, but also to FCPF processes such as the SESA and ESMF. In May 2021, the agreement was extended, with the United States and the United Kingdom entering the

collaboration, to support Peru's efforts with up to NOK 1,800 million (more than USD 200 million). Of this total amount, up to NOK 1,500 million are payments for reduced deforestation, which will be certified by ART, with a guaranteed USD 10 floor price per tonne of reduced emissions (BMU website). In practice, this means that Peru will need to meet safeguards requirements not just of the UNFCCC and FCPF, but also ART / TREES (see next section).

Market-based initiatives

Verra's JNR and the Tropical Forest Standard

Verra's Jurisdictional and Nested REDD+ (JNR) standard applies to three crediting scenarios dependent on the governance structure of the REDD+ programme and the level at which crediting takes place. To comply with this standard, countries must adhere with all UNFCCC requirements (including developing an SIS and periodically submitting summaries of information (SOI)), but may also apply additional standards to demonstrate compliance, allowing flexible reporting.

The Tropical Forest Standard (TFS) was approved in 2019 by the California Air Resources Board (CARB). Although allowing inclusion of tropical forest initiatives into the state's programmes, it does not signify automatic inclusion into their Cap-and-Trade system. There is no explicit requirement for an SIS or SOI (although information must be publicly accessible through a webpage). To demonstrate compliance with the Cancún safeguards, countries must identify principles, criteria and indicators that conform with REDD+ SES, but can also use other standards to demonstrate consistency.

ART / TREES

The Architecture for REDD+ Transactions' (ART) independent REDD+ Environmental Excellence Standard (TREES) allows countries to access large-scale market-based finance for results, including through the LEAF Coalition (Leaf Coalition website) and through CORSIA (ART, 2020) (Section 2.2.3.2). TREES includes a series of safeguards requirements for ART participants, focusing on consistency with the UNFCCC REDD+ safeguards, as well as demonstrating conformance with 44 structure, process and outcome indicators which "unpacked the Cancún Safeguards into 16 key thematic areas to streamline operationalization and reporting with existing UN requirements and ensure consistency of implementation and reporting across all ART Participants" (ART, 2021b: 24). These indicators, while based in the Cancún safeguards, also include aspects which are not explicitly mentioned in UNFCCC text, such as grievance redress mechanisms and benefits distribution systems. Countries must also demonstrate that they have an SIS (either online or an analogue version) in place and have submitted summaries of information covering all of the years (and scales) for the results for which payment is being sought. TREES explicitly requires that "a Participant must be a national government or a sub-national government with national government approval", which maintains a focus on country submissions or jurisdictions, which would respond to earlier stated challenges regarding scope and scale of REDD+. In the version 2 of TREES, participants will have five years to demonstrate conformance with outcome indicators and have the ability to provide 'plans for conformance' in the interim. The updated TREES 2.0 creates a new opportunity for Indigenous Peoples to contribute to and benefit from large-scale programmes to protect and restore forests (ART, 2021).

The government of Indonesia, a major REDD+ actor, has openly criticised ART / TREES and LEAF. The reasons provided include concerns over carbon pricing trends, uncertainties, leakage, transaction costs and other requirements as well as alignment with elements of the national legal framework, and the need to self-finance the proposal and preparatory phases in advance of LEAF implementation (Foresthints.news, 2021).

As part of the LEAF call for proposals process, suppliers have to carry out estimates of capacity needs in order to meet ART / TREES safeguards requirements, as well as progress toward showing conformance with ART / TREES safeguards indicators. Significant efforts may be needed for some countries to ensure their SIS are fully operational, their SOI is updated, and they are able to demonstrate conformance (or plans for conformance) for ART / TREES indicators.

2.2.4.2. Political ecology of REDD+ safeguards

Results-based finance has often applied to results achieved in the past, before a country's safeguards approach was fully defined and consolidated.

At times, and particularly at the stage of demonstrating safeguards compliance or performance to external funders, important gaps have been identified concerning:

- respect for the rights of Indigenous Peoples and local communities, and the protection of *traditional knowledge*;

- access to dispute resolution mechanisms, at the appropriate scale of REDD+ actions;
- land tenure rights;
- benefit-sharing mechanisms that cover different populations;
- factors needed to promote and demonstrate enhancement of environmental and social benefits.

In addition to these safeguards 'readiness' elements, in terms of safeguards application, there is limited evidence of current progress in ensuring the rights of communities are respected and improved.

Despite the important role of Indigenous Peoples and local communities (IPLCs) in sustainably managing forests and tackling climate change (Croft-Cusworth, 2017), stronger protections may be needed for the rights of IPLCs (Dehm, 2016), as well as increased investment in and support for land tenure rights, traditional knowledge and indigenous and tribal organisations, particularly in the face of increasing threats to forests and the *livelihoods* of those who depend on them (FAO and FILAC, 2021). A recent report by the Rights and Resources Initiative (RRI, 2021) found that there has been limited progress in defining some key institutional and legal aspects related to REDD+. It found that 4 of the 31 countries analysed had legal frameworks regulating carbon transactions; 5 had developed benefit-sharing mechanisms; and 17 had feedback and grievance redress mechanisms in place. The authors argue that the limited legal recognition of IPLC rights to carbon as well as defined benefit-sharing arrangements suggest that more work needs to be done to ensure that the conditions for fair, effective and transparent transactions for REDD+ are in place (RRI, 2021). However, certain benefits have been identified in having more flexible frameworks for carbon rights. An analysis of transforming safeguards into legal frameworks in Mexico found that the lack of definition of carbon rights can be beneficial by shifting the focus from rights over carbon to rights over natural resources, and to rights to equitable benefit-sharing (Ituarte-Lima and McDermott, 2017).

Discussions on carbon, land and rights are often situated within wider debates on tenure security, which has been found to be essential in ensuring positive impacts of REDD+ (Larson, 2011; Larson et al., 2013). Indeed, greater tenure security can enhance REDD+ outcomes, underpin custodianship incentives, contribute to the equitable distribution of RBPs, and provide co-benefits including forest cover stabilisation, reduced emissions and increased *carbon sequestration* (Sunderlin et al., 2018; UN-REDD Programme, 2020). Case studies from Indonesia show that insecure tenure can exacerbate distrust between resource users and the government, and can push local people into finding new sources of income, which could lead to leakage (Felker et al., 2017). Evidence from Latin America and the Caribbean suggests that deforestation is lower in areas where Indigenous and Tribal Peoples' collective land rights are recognised (FAO and FILAC, 2021). However, there has often been limited practical clarification and strengthening of land tenure through REDD+ initiatives, particularly as the complex governance, finance and safeguards landscapes interact. Barriers to land tenure clarification include state and corporate actors favouring *conversion*, weak governance and corruption, reduced funding, unspecific goals and challenges in translating national-level issues in addressing local-level problems (Sunderlin et al., 2018). The importance of tenure security highlights the need for REDD+ to actively focus on rights improvements rather than a 'do no harm' approach in order for REDD+ to mutually benefit local communities, forests and other *ecosystems*.

Access to grievance redress, and functional feedback and grievance redress mechanisms (FGRMs) are important tools to promote transparency and to handle feedback or complaints of those who are involved in or affected by REDD+ actions. A well-established FGRM can accomplish several objectives, including timely and cost-effective identification and resolution of implementation problems, identification of systemic issues, enhancement of positive REDD+ outcomes and promotion of accountability (FCPF and UN-REDD, 2015). Although a 2013 review of 32 REDD+ readiness plans found that 63% of REDD+ countries had identified the need for conflict resolution mechanisms within REDD+ (Williams, 2013), their establishment within countries' REDD+ architecture has been more incipient (Williams and de Koning, 2016). The UNFCCC does not specifically require FGRM for REDD+, but they are required by the World Bank and other REDD+ funders. In many cases, countries have investigated how to make best use of existing systems and processes as related to forest and land-use governance, rather than developing novel systems for REDD+.

Guidance on FGRMs has highlighted that they are intended to be "accessible, collaborative, expeditious, and effective in resolving concerns through dialogue, joint factfinding, negotiation, and problem solving" (FCPF and UN-REDD, 2015). However, in countries with existing FGRM strategies and frameworks for REDD+, some operational issues have been identified, such as in Sudan (Agro

Community of forest-dependent people in Lao PDR
Photo © Nelson Grima

Consult and Services, 2018). Concerns include: inadequate funding and capacity to handle redress, and subsequent poor-quality resolutions; lack of relevant skills, knowledge and training to administer redress and resolution at different levels; and gaps in dissemination of information between sectors and government levels.

REDD+ can serve as a key tool to ensure that Indigenous Peoples, *forest-dependent communities* and other stakeholders are "fairly rewarded for their role in forest conservation and sustainable land management" (UN-REDD website), however, defining benefit-sharing mechanisms (BSMs) and plans has presented considerable challenges for countries. An analysis of practical and operational approaches of 13 large-scale, long-term programmes that involve benefit sharing or incentive allocation for forests, land use, natural resources, and climate change has found that "governance arrangements are crucial for equity and inclusiveness" and that arrangements are most effective when "institutions and beneficiaries have adequate capacity and are operating under clear institutional, financial and governance arrangements" (World Bank Group, 2019: 10). In addition, "benefit-sharing mechanisms should have clear, accessible, impartial, culturally appropriate, easy-to-understand grievance and redress mechanisms that operate in a timely manner" (World Bank Group, 2019: 11).

A consistent narrative throughout the evolution of REDD+ is that a benefit-sharing approach should focus on poor and marginal households and communities (Wong et al., 2019). A study of 11 BSMs found that perceptions of *equity* and participation are increased when they are flexible and reflexive, but the wider rights and responsibilities as well as the underlying social structures must be taken into account if safeguards and BSMs are to succeed (Wong et al., 2019). An analysis of REDD+ benefit-sharing in the Amazon suggested that "an equitable benefit-sharing mechanism is, by far, the main challenge faced by jurisdictions" (Guerra and

Moutinho, 2020: 1) and that Acre and Matto Grosso still needed to improve their institutional capacities and invest in resources and capacity building (Guerra and Moutinho, 2020). REDD+ can create benefits upfront if BSMs focus less on performance incentives and more on wider benefits and ensure that they are targeted, tailored, legitimate and financially supported (Myers Madeira et al., 2013).

These issues help to illustrate some of the contested spaces in REDD+. While these new and evolving safeguards and frameworks of REDD+ donors and collaborators presumably aim to incentivise the consolidation and strengthening of national safeguards processes, they generate additional challenges through the proliferation and layering of overlapping, competing and conflicting safeguards-related requirements. Safeguards in national and local contexts are further explored in the following Section 2.3.2.

2.3. National, Jurisdictional and Local Governance

2.3.1. National approaches to REDD+ carbon accounting, and the nesting of jurisdictional and project-level efforts

There is a diverse landscape of REDD+ approaches adopted by different countries, sub-national governments and private organisations. The requirements for designing an initiative and claiming REDD+ payments vary according to different funding sources and actors involved in the initiatives, resulting in a patchwork of standards and approaches that are not always compatible, but that nonetheless currently fall under the umbrella term of REDD+.

Countries engaged in REDD+ within the UNFCCC should undertake REDD+ activities following three phases: (1) Phase I or readiness phase, "beginning with the development of national strategies or action plans, policies and measures, and capacity-building"; (2) Phase II, with "the implementation of national policies and measures and national strategies or action plans that could involve further capacity-building, technology development and transfer and results-based demonstration activities"; and (3) Phase III, "evolving into results-based actions that should be fully measured, reported and verified" (UNFCCC Decision 1/CP.16, paragraph 73). During these three phases, countries are expected to develop four mandatory elements to operationalise REDD+ nationally: (1) a National REDD+ Strategy or Action Plan; (2) a National Forest Monitoring System (NFMS); (3) Forest Reference Emission Levels (FREL) or Forest Reference Levels (FRL), FREL referring to gross emissions from deforestation and forest degradation, and FRL referring to net emissions from deforestation and forest degradation (i.e., including both emissions by sources and removals by sinks); and (4) a Safeguards Information System (SIS) (UNFCCC Decision CP.16/1/Add. 1, paragraph 71). In practice, countries have taken different pathways towards designing and implementing their approaches to REDD+, and the three phases of the Warsaw Framework have usually not been navigated in a linear fashion (Brockhaus et al., 2017; Korhonen-Kurki et al., 2019)

Considering that the national implementation of REDD+ is context-specific, depending on each country's resources and capabilities, the Warsaw Framework allows countries a lot of flexibility in choosing different data sources and methodologies to organise their NFMS and construct their FREL/FRL. The Framework suggests that countries use methodologies that have been recommended by the Intergovernmental Panel on Climate Change (IPCC) (since 1995, the IPCC has published the methodological guidance that countries have agreed to use in estimating anthropogenic GHG emissions and removals and reporting within the national GHG inventories to the UNFCCC), but it does not require the adoption of any particular approach for estimating forest-related GHG emissions and removals, forest *carbon stocks* and changes, and forest area changes. The Warsaw Framework only established a few general requirements for how these metrics should be accounted for and reported, such as that FREL/FRL be consistent with national GHG inventories submitted to the UNFCCC, that results from FREL/FRL and claimed emissions reductions be expressed in tonnes of carbon dioxide equivalent per year, that the GHGs accounting be done at the national level or at the sub-national level as an interim step, and that results should be reported through Biennial Update Reports (BURs).

Accordingly, countries have adopted a wide variety of approaches in choosing which REDD+ activities (reducing emissions from deforestation, reducing emissions from forest degradation, conservation of forest carbon stocks, sustainable management of forests, and enhancement of forest carbon stocks), carbon pools (*above-ground biomass, below-ground biomass*, dead wood, litter, and soil carbon), GHGs (carbon dioxide (CO_2), carbon monoxide (CO), methane (CH_4), nitrous oxide (N_2O)), and historical reference periods to use when constructing their FREL/FRL for submission to the UNFCCC (FAO, 2018). To date, 17 countries have reported results in their BURs submitted to

the UNFCCC: Argentina, Belize, Brazil, Cambodia, Chile, Colombia, Costa Rica, Ecuador, Honduras, Indonesia, Lao PDR, Malaysia, Papua New Guinea, Paraguay, Uganda, Viet Nam and Gabon (see Table 3.1. in Chapter 3).

Funders have the power to determine how FRELs are calculated, and can limit the ability of countries to choose more financially advantageous but less environmentally robust methodologies. Reporting carbon emissions reductions to the UNFCCC reflects national mitigation efforts aiming at receiving RBPs, especially from the Green Climate Fund, which is the main REDD+ financing mechanism linked to the UNFCCC. Different reporting streams linked to various multilateral and bilateral donors often have preferred FREL methodologies, which are usually stricter than the approaches accepted under the UNFCCC. The Forest Carbon Partnership Facility's (FCPF) Carbon Fund and the BioCarbon Fund's Initiative for International Sustainable Forest Landscapes set various limits on how countries can calculate their baselines (FCPF, 2020).

The different requirements and dynamics of the various standards, sources of funding, and sets of actors involved in different forest carbon transactions and agreements, as well as broader forest governance trends, have influenced how REDD+ operationalisation unfolds. As discussed above, a wide range of private standards and verification systems have been variously applied to private carbon projects and/or jurisdictional initiatives involving government actors. These two approaches – project and jurisdictional REDD+ – clash when trying to account for emissions reductions consistently and avoid 'double counting'. Projects and jurisdictions may use different methodologies to estimate their FREL/FRL, and projects can sell carbon credits that jurisdictions may later also claim as reductions. Since it would not be appropriate for donors to pay twice for the same emissions reductions, many carbon accounting frameworks – including the UNFCCC and CORSIA – require countries to subtract credits sold by projects from their carbon accounting. However, voluntary carbon markets currently exist in a 'limbo' where credits can sometimes still be sold even if they were accounted for in national or sub-national inventories.

One solution created to address this problem has been to 'nest' projects within jurisdictional schemes. Nesting allows for reference levels to be adjusted and double counting to be avoided by creating a legal framework where projects: (1) operate within a jurisdictional REDD+ programme with no separate crediting, in exchange for participating in some benefit-sharing mechanism; (2) operate within a jurisdictional accounting framework with limited crediting options; or (3) operate within a jurisdictional framework with independent crediting, directly selling their offsets in carbon markets (Hamrick et al., 2021). Most nesting approaches are still theoretical, but guidelines have been emerging. The VCS-JNR has options to operationalise project nesting within jurisdictional initiatives, while ART-TREES does not stipulate a specific nesting approach but allows jurisdictions to explore various arrangements.

A recent development in the scope of jurisdictional schemes has been an effort to offer preferential market access to products from jurisdictions that are able to prove reduced deforestation, reflecting a convergence between REDD+ and several broader trends in forest governance, namely legality verification and supply chain commitments. An example of this trend is the Commodities/Jurisdictions Approach (CJA), an initiative that identifies sustainable jurisdictions for companies to increase preferential commodity sourcing, purchasing more from areas that are taking effective steps towards reducing deforestation at scale. The creation of the CJA was propelled by Unilever and Marks and Spencer's commitments to prioritise commodity sourcing from sustainable jurisdictions and it was articulated by the World Wide Fund for Nature (WWF), and consultancy organisations The Meridian Institute and Climate Focus. To include jurisdictional programmes in its scheme, CJA uses a standardised assessment, but it also considers jurisdictional programmes approved by the FCPF's Carbon Fund or ART-TREES to be pre-qualified to join the initiative (The Commodities and Jurisdictions Approach website). The Tropical Forest Alliance has launched its Jurisdictional Approaches Resource Hub, compiling resources for companies interested in engaging with preferential sourcing from sustainable jurisdictions (Jurisdictional Approaches website).

2.3.2. Safeguards in national and local contexts

A growing number of countries have carried out detailed assessments of REDD+ safeguards within their national contexts (e.g., Rey et al., 2013; UN-REDD Programme, 2016a; 2016b), including analysing compatibility and complementarity of REDD+ actions with national legal and institutional frameworks, and international agreements and commitments. Indeed, Cancún safeguard a) requires REDD+ actions to be consistent with "relevant international conventions and agreements" (for broader review of these see, e.g.,

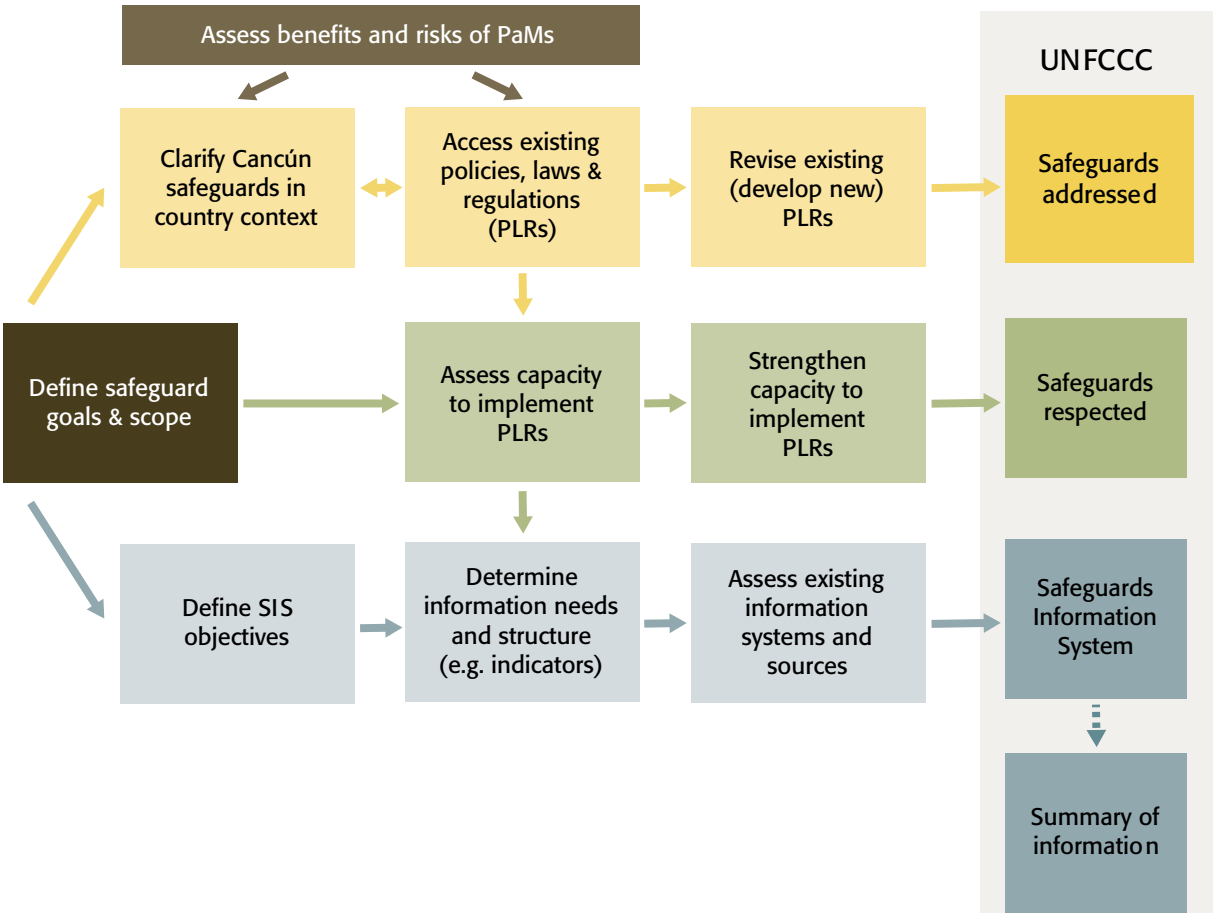
McDermott et al., 2012). These assessments have helped countries to respond to UNFCCC requirements on safeguards, and to transparently share wider social and environmental governance aspects with donors and funders.

These assessments of REDD+ safeguards within their national contexts – often called "national safeguards interpretations or clarifications" – have formed part of "national safeguards approaches" or "country approaches to safeguards" (CAS), which countries have used to help build on existing governance arrangements and processes to meet UNFCCC and other requirements. For example, minority groups are recognised differently in different contexts: Mexico's legal framework recognises Indigenous Peoples, ejidos and communities as the three main stakeholder groups while Papua New Guinea uses the term "customary landowner" instead of "Indigenous People" in its constitution and policies, laws and regulations (Rey et al., 2016).

These approaches have usually included three core elements: the identification and assessment of governance arrangements related to REDD+, including PLRs to help address safeguards; institutional mandates, procedures and capacities to ensure safeguards are being respected; and information systems and sources to report on how REDD+ safeguards are being addressed and respected, including information on compliance (such as grievance and redress mechanisms, among others) (see, for example, Rey et al., 2016; UN-REDD Programme, 2015a). In addition, stakeholder engagement, capacity building and dissemination activities have been key cross-cutting activities (UN-REDD Programme, 2015a).

Figure **2.3**

Indicative elements of a country approach to safeguards



A country approach to safeguards may address potential benefits and risks of REDD+ policies and measures (PAMs) through defining a set of PLRs (yellow), implementing those PLRs (green) and providing information on the process and outcomes (blue).
Source: UN-REDD Programme, 2015a

Emerging lessons learned, systematised in 2015 during the early stages of many countries' safeguards processes, argued that a "country approach to safeguards is emerging as a practical, cost-effective, and strategic model for meeting UNFCCC (and other relevant) REDD+ safeguards requirements, as well as supporting all-important country ownership and relevance" (UN-REDD Programme, 2015a: 5). It was suggested that building on existing governance arrangements, systems and approaches could allow countries to respond to safeguards commitments in a rigorous yet flexible manner, capitalising on synergies to meet multiple safeguards requirements through single, unified processes (UN-REDD Programme, 2015a), and helping to increase the confidence of investors and stakeholders (Rey et al., 2016).

In fact, the World Bank's 'Common Approach to Environmental and Social Safeguards for Multiple Delivery Partners' ('Common Approach') sought to lessen the burden on countries by providing a "common platform for risk management and quality assurance in the REDD+ readiness preparation process" (FCPF, n.d.: 1). This approach aimed to use the SESA and ESMF processes of the World Bank as tools to help ensure compliance with relevant REDD+ safeguards and processes. In addition, frameworks such as the REDD+ Social and Environmental Standards Initiative (REDD+ SES) emerged, seeking to become "a leading safeguards initiative for REDD+ and low-emissions land use" (REDD+ SES website), promoting the use of detailed standardised principles, criteria and indicators for REDD+ safeguards that required countries to engage in lengthy stakeholder engagement processes to develop comprehensive indicator sets for SIS.

However, recent country experiences have shown that efforts to standardise and integrate safeguards requirements and processes, particularly amid the new and additional safeguards requirements related to the evolving international finance landscape, have faced significant challenges. Joint planning for country safeguards activities that has taken account of objectives related to multiple funding streams (e.g., UN-REDD and FCPF) has often been postponed or had to be reworked, due to implementation and funding delays, causing ensuing set-backs in safeguards progress in-country. For example, initial planning for REDD+ safeguards in Argentina took account of activities and funding streams from both UN-REDD and FCPF, as indicated in a 2015 FCPF progress report which highlighted how a UN-REDD grant "will be complemented with FCPF resources to adequately implement and manage both programs through a single roadmap of activities under [Secretariat of Environment and Sustainable Development] leadership" (SADSN, 2015: 1). Despite this detailed joint planning, while the UN-REDD National Joint Programme in Argentina kicked off in July 2015, FCPF inception in-country did not happen until December 2017 and progress reports mention "implementation delays". Similar situations have occurred in Costa Rica and Peru, among other countries.

Indicator sets developed through REDD+ SES processes have often been deemed too complicated and costly to implement and monitor, and related participation processes have been seen to lead to stakeholder fatigue and unrealistic expectations related to REDD+ (also see Chapter 5). Indeed, the long time scale of stakeholder engagement processes – up to three years in some cases – has meant that, for example in Indonesia, communities were approached about REDD+ several years before any results were seen, resulting in stakeholder fatigue (Enrici and Hubacek, 2018; 2019). Similarly, in Tanzania, the long timescales were seen to increase villager expectations (Massarella et al., 2018). The high technical demands for complying with REDD+ SES, with a focus on indicators, methodologies and frameworks were seen to shift the focus away from the broader social intent of the safeguards, to a more narrow focus on demonstrating compliance (Milne et al., 2019).

In general, the broad ambition of the Cancún safeguards, coupled with a lack of guidance on how to interpret them, has made it challenging for some countries to develop their SIS (UN-REDD Programme, 2015a; Rey et al., 2016). Indeed, safeguards and SIS have been identified as some of the most complex pieces of REDD+ architecture to develop and implement (UN-REDD Programme, 2015b), and countries have often left these elements last in the development of Warsaw Framework pillars. Opportunities to promote synergies between safeguards frameworks and requirements have often failed to materialise or work in practice, and instead countries have needed to meet ever more and changing safeguards requirements as new RBP opportunities arise.

However, progress in meeting safeguards requirements under the UNFCCC has been considerably more rapid over the past two years when opportunities for RBPs (particularly under the GCF) have been presented, encouraging countries to consolidate and finalise processes that have often been many years in development, in order to comply with basic requirements related to SIS and summaries of information. In fact, after a little more than a decade (2008-2020) of implementing initiatives focused on REDD+ readiness,

information collated by the UN-REDD Programme shows that 15 countries have put their SIS online (Argentina, Brazil, Chile, Costa Rica, Ecuador, Ghana, Indonesia, Liberia, Madagascar (currently undergoing offline updates), Mexico, Pakistan (currently undergoing changes), Paraguay, Philippines, Suriname and Viet Nam). In addition, 17 countries have submitted one or more summaries of information to the UNFCCC (Argentina, Brazil, Cambodia, Chile, Colombia, Costa Rica, Côte d'Ivoire, Ecuador, Ghana, Indonesia, Malaysia, Mexico, Myanmar, Paraguay, Peru, Viet Nam and Zambia). Eight countries have met safeguards and other requirements to access RBPs through the Green Climate Fund (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Indonesia and Paraguay) (see Table 2.2 for more information) (UN-REDD Programme, 2021b).

2.3.3. Case studies

The following three case studies, in Brazil, Ghana and Indonesia, serve to illustrate the wide diversity of contexts within which REDD+ is being applied, and a corresponding diversity of governance strategies. They were chosen to represent a geographic spread across Latin America, Africa and Asia, respectively. Indonesia was selected as an example of a large country with a high rate of deforestation in recent decades, whose government hosted the UNFCCC COP13 in Bali in 2007 and whose former president demonstrated strong commitment to REDD+. Brazil was chosen as another large, federated country that was initially a leading global source of deforestation, then a world leader in reducing deforestation, and is now experiencing rising deforestation once again. While Brazil's federal government played a key role in these swings in deforestation rates, the Brazilian states have played an important role in experimenting with REDD+ RBPs through various sub-national REDD+ programmes. Finally, Ghana is a relatively small country where deforestation has been strongly linked to the production of cocoa for export. Ghana is pioneering a 'commodity-driven' REDD+ strategy that aims to complement REDD+ RBPs for forest carbon with private sector investments in 'climate smart cocoa'.

2.3.3.1. Brazil: a hesitant federal government and the emergence of sub-national jurisdictional approaches

As a strong advocate of the common but differentiated responsibilities and sovereignty principles, the Brazilian federal government has historically been against including forest emissions in the climate regime (Seymour and Busch, 2016). During the negotiations of the *Kyoto Protocol* and the Clean Development Mechanism from the late 1990s to the early 2000s, Brazil's position had been that it would be inequitable for Annex I countries – historically the biggest contributors to climate change – to be allowed to offset emissions with carbon credits generated by preserving non-Annex I countries' forests (Seymour and Busch, 2016). Brazil was also concerned that heightened international oversight of deforestation could be a threat to Brazilian sovereignty over the Amazon region and its resources (Viana, 2011), and that international funding would come with conditionalities imposed on how it would be able to use its forest resources (Abranches, 2014).

After REDD+ emerged as a mitigation option within the UNFCCC in 2005, Brazil was able to achieve significant reductions in deforestation rates from 2004. This made the prospects of receiving payments more realistic, and the country began to adopt a more nuanced position. Brazil then accepted the idea of being compensated for reductions in forest emissions as long as the transaction did not result in an offset (Seymour and Busch, 2016). A pivotal moment in the evolution of Brazil's engagement with REDD+ was the creation of the Amazon Fund. Brazil signed a bilateral agreement with Norway in 2008, creating a mechanism through which it would have received up to USD 1 billion for reducing emissions from deforestation and forest degradation. This mechanism became the main pathway through which REDD+ funds flowed to Brazil with the sanction of the federal government.

After the official change in position and the creation of the Amazon Fund, the Brazilian federal government became a more cooperative actor in the international REDD+ discussions and it actively participated in the debates that culminated in the adoption of the 2013 Warsaw Framework (Recio, 2014). It was the first country to submit its forest reference levels to the UNFCCC in 2014 and to provide information on its progress on reducing forest emissions (Hargita et al., 2016). In 2015, the country presented a report on how the Cancún safeguards for REDD+ were being implemented and the Brazilian Ministry of the Environment launched a National REDD+ Strategy. After completing all of the Warsaw Framework requirements in 2018, Brazil became the first country to be awarded RBPs from the GCF's pilot programme for REDD+ in 2019 (UN Climate Change News, 2019).

During the years when the federal government was hesitant about whether and how to support REDD+, the states comprising the Brazilian Ama-

zon were eager to seize the opportunities provided by the mechanism. In 2008, the governors of Mato Grosso, Amazonas, Pará and Amapá participated in the Governors' Global Climate Summit in Los Angeles, organised by the then Governor of California Arnold Schwarzenegger, which resulted in the foundation of the 'Governor's Climate and Forests Task Force' (GCF Task Force), a transnational network of sub-national jurisdictions created to further the development of jurisdictional REDD+ approaches. Propelled by their participation in the GCF Task Force, the Brazilian states formed a coalition to pressure the federal government into accepting offsets in the climate regime in addition to payments for results.

The coalition of Amazonian Governors was not able to change the position of the federal government on offsets, and the states moved forward with their own REDD+ strategies and projects as they continued to articulate their united position. Three of the nine states that comprise the Brazilian Amazon took the lead in developing state-level REDD+ policies. Amazonas created its Forest Allowance (*Bolsa Floresta*) programme in 2007 (May et al., 2011), Acre enacted its State System of Incentives for Environmental Services programme in 2011, and Mato Grosso created its State System for REDD+ in 2013 (Sills et al., 2014). The other Amazonian states (Pará, Amapá, Maranhão, Tocantins, Roraima and Rondônia) do not currently have a specific REDD+ policy in place, but many have been discussing the possibility of adopting one and have experimented with pilot projects. The states of Acre and Mato Grosso were able to close independent agreements to receive payments for results from the German Development Bank (KfW), after joining the bank's REDD+ Early Movers programme (KfW website)

Although Brazil has engaged in the UNFCCC and in bilateral agreements to support REDD+, the federal government has not yet pursued a legislated domestic REDD+ policy, and it issued its National REDD+ Policy through an administrative act of the Ministry of the Environment. The absence of a federal REDD+ legislation and the potential for accessing REDD+ financing directly from transnational sources, created an opportunity for Brazilian states to pursue their own initiatives. The institutional environment of Brazilian federalism, where states have the competence to legislate in environmental matters as long as their legislation does not conflict with federal environmental laws, gave states enough autonomy to pursue jurisdictional REDD+ policies. Considering the current federal administration has paralysed disbursements from the Amazon Fund and that Norway has halted further donations due to an increase in deforestation in the Amazon region (Boffey, 2021), the Amazonian states' jurisdictional efforts became the main avenues for the pursuit of REDD+ in Brazil.

2.3.3.2. Learning lessons slowly: The 'world's first commodity-driven REDD+' in Ghana

Ghana is the world's second-largest producer of cocoa, a crop that is both crucial to rural livelihoods and a major driver of deforestation (Kroeger et al., 2017; Brobbey et al., 2020). About 620,000 people own cocoa farms in Ghana (GSS, 2020) and shaded-cocoa farms account for a significant portion of the country's remaining tree cover (Dawoe et al., 2016). Speaking to cocoa's central environmental and socio-economic importance, Ghana has pioneered a 'commodity-driven', 'landscape approach' to REDD+ based on the production of 'Climate Smart Cocoa' (CSC) (den Besten et al., 2019; NCRC, 2020). Several features of this strategy are notable considering REDD+ governance and finance trends pointed out in earlier sections of this chapter.

Firstly, Ghana's Cocoa Forest REDD+ Programme (GCFRP) emphasises local and multi-stakeholder governance in line with international norms of inclusive decision-making.

Secondly, interventions are focused on ecologically defined 'landscapes', known as 'Hotspot Intervention Areas' (HIAs). Each HIA consists of sub-HIAs, comprising multiple community resource management areas (CREMAs). Within the sub-HIAs, governance structures are nested, from the local level Community Resource Management Committees made up of representatives from all demographic groups (age, gender, religions, ethnic groups, natural resource/cocoa related livelihoods) up to the sub-HIA Executive Committees. The sub-HIAs are to be brought together under an overarching HIA management board that includes sub-HIA Executives. A consortium of cocoa-buying companies, NGOs and state agencies work in parallel with the HIAs, to coordinate investments and activities across the landscape (NCRC, 2020).

Thirdly, the strategy is strongly driven by the private sector and market-based. And fourthly, finance and incentives are not reliant on carbon payments but rather come from private and public investment in sustainable commodities (World Bank, 2019). Specifically, large national and multinational cocoa companies, in concert with existing certification schemes (e.g., the Rainforest Alliance and Verra) or emerging landscape standards (e.g., LandScale) are invited to focus their efforts on increasing the market value of cocoa while conserving tree cover and *carbon storage*. Core measures to

achieve this include improving cocoa yields, enhancing the integration of trees in cocoa through agroforestry, working with local governing boards to develop locally defined rules and regulations and MRV systems for forests and CSC, and marketing the resulting CSC as 'sustainable' cocoa (World Bank, 2019; NCRC, 2020).

When the GCFRP emission reductions programme document was first agreed, nine HIAs were proposed (FCPF website) of which six were adopted. Two HIAs are being fully implemented (i.e., the Juabeso and Kakum HIAs for a total of 456,423 ha) and work has been initiated or is being negotiated through memoranda of understanding and other partnerships to implement CSC activities and build governance structures in the remaining four HIAs (World Bank, 2019). However, there is as yet limited research available to assess the political ecology of how GCFRP is actually unfolding. The little evidence available indicates that government agencies and cocoa companies support farmers to integrate more trees on their cocoa farms with the hope of achieving a triple dividend, i.e., better and sustained yields, halt deforestation and improve carbon sequestration (World Bank, 2019; Nasser et al., 2020).

Yet, studies question the feasibility of achieving these outcomes without substantial and holistic governance reforms. For example, Ghana's legal framework governing timber rights denies farmers legal rights to naturally regenerated timber trees on their cocoa farms and instead allocates those rights through contracts with timber companies. Decades of efforts to reform these laws have yet to resolve the issue. Currently there is an initiative underway to use tree registration to transfer rights to trees on farms (FCPF, 2021). Meanwhile international efforts to eliminate 'illegal logging' have served to criminalise farmers for cutting trees they have allowed to grow on their farms (Hirons et al., 2018; Nasser et al., 2020). Other studies have noted discrepancies between farm-level interventions promoted by government and private companies and the actual practices required to sustain cocoa yields and improve carbon storage (Blaser et al., 2018; Uribe-Leitz and Ruf, 2019).

Despite the decentralised local governance promoted under GCFRP, cocoa farmers and other grassroots actors, notably most small-scale loggers (who are *de facto* 'illegal' due to the above-mentioned legal framework), subsistence farmers in forest-fringe communities (legislation prohibits farming in forest reserves) and miners (whose activities are also largely illegal), remain far from influencing decision-making in the cocoa and forest sectors because of limited recognition and parity in GCFRP agenda setting (Baruah, 2017; den Besten et al., 2019; Kumeh et al., 2022). In practice, Asiyanbi and Lund (2020) observe that local-global intermediaries, cocoa companies and government agencies dominate decision-making spaces due to unequal material and discursive power relations. As a result of these symmetries in participation, deliberations among upstream actors neglect the evolving realities in HIAs. For example, seasonal food insecurity and illegal artisanal and small-scale mining are emerging as the newest threats that imperil the success of the GCFRP, especially within the Juabeso HIA (Abbiw, 2020; Boeckx et al., 2020; Brobbey et al., 2020; Amfo et al., 2021; Kumeh et al., 2021). However, both issues have seldom garnered adequate attention among upstream REDD+ actors (Tropenbos International and Tropenbos Ghana, 2019; Kumeh et al., 2022).

On the positive side, other authors have argued that the GCFRP has helped bridge institutional barriers among essential government agencies, especially the Forestry Commission and the Ghana Cocoa Board and rapidly transformed collaborations between local-global intermediaries, cocoa companies and government (den Besten et al., 2019; Carodenuto, 2019). It remains an open question whether this redistribution of power will be restricted to higher and mid-level actors or ultimately promote inclusive local livelihoods and resilient ecologies. Achieving the latter, which is the stated ambition of the GCFRP, rests heavily on boosting investments to expand grassroots actors' participation and addressing the needs of downstream actors, especially cocoa farmers. A lot can also be learned from the factors that have improved collaborations between upstream actors (Carodenuto, 2019; Ollivier de Leth and Ros-Tonen, 2021).

2.3.3.3. REDD+ and the politics of the (im)possible in Indonesia

The evolution of the REDD+ policy arena in Indonesia has taken many turns over time, with politics and power struggles across and within different levels of governance and government. Since its inception at the COP in Bali (Indonesia) in 2007, deforestation has continued – at times at higher, and more recently at slightly lower, rates. The current decline in the rate of forest loss is attributed to a number of government policies, e.g., moratoria for new oil palm *plantations* or for peat conversion, yet it also coincides with a lower palm oil price, a global pandemic leading to reduced economic activity, and less dry conditions with fewer fires (Mongabay, 2021). According to the Ministry of Environment and Forestry (MoEF) recent reductions in forest

loss have been initially acknowledged by the Norwegian government (Republic of Indonesia, 2020a), Green Climate Fund (Republic of Indonesia, 2020b) and World Bank Forest Carbon Partnership Facility (Republic of Indonesia, 2020c) and triggered an agreement for RBPs in 2020. In 2021, Indonesia withdrew from the Letter of Intent with Norway and pointed to the absence of actual payments for the results of 2016/17 as a cause. The country also submitted an updated NDC and Long-Term Strategy for Low Carbon and Climate Resilience (LTS-LCCR) 2050 prior to the UNFCCC COP26 in Glasgow, however, without changes in the earlier provided targets. In the near term, it remains to be seen whether the current high level of demand for post-pandemic economic stimuli, and the recent peaking of palm oil prices, will drive calls for a reduction in environmental regulation. The following multi-scale examination of past and current Indonesian REDD+ politics provides important context for understanding how REDD+ might continue to evolve in the future.

Initially, Indonesia was one of the countries most actively promoting REDD+ under the UNFCCC. Under the leadership of President Susilo Bambang Yudhoyono, the contributing role of Indonesian forests to a global climate goal was high on the domestic political agenda, and hence Indonesia was among the leading nations in the policy diffusion of REDD+. Under Yudhoyono, Indonesia took a leadership role on climate change issues in different international events to show its commitment to tackling climate change, bringing 120 million hectares of forest area to the table, e.g., at COP13 in Bali in 2007 and the G20 leaders' summit in 2009. In response to these efforts, most notably, the Norwegian government set up a bilateral agreement through a Letter of Intent with a total proposed disbursement of USD 1 billion for emission reduction from deforestation and forest degradation (REDD+).

Meanwhile, within Indonesia, there was a horizontal power struggle over the leadership of the REDD+ agenda (Brockhaus and Di Gregorio, 2014). The Ministry of Forestry (MoF) has long dominated forest governance in Indonesia, and has struggled from the outset for control over REDD+. President Yudhoyono, however, aimed to shift the power balance over forests, and strengthen climate action (Luttrell et al., 2014) by establishing a new REDD+ Task Force under the President's Unit for Development Control and Monitoring and a national climate change council (*Dewan Nasional Perubahan Iklim* or DNPI). These new institutions symbolised the intent that REDD+ would challenge and change the business-as-usual bureaucracy power that had been long attributed to the Ministry of Forestry since Suharto's presidency (Wibowo and Giessen, 2015). Furthermore, Indonesia quickly designed a multistakeholder process for its REDD+ national strategy and a presidential decree for a moratorium on issuing new licences for concessions on forestland. The Ministry of Development and National Planning also followed up the President's vision by taking the lead in the national and regional action plans for GHG emissions (Wibowo and Giessen, 2015). These efforts by different agencies represented a challenge to the MoF's established role of having overriding power over forestland. However, by the end of Yudhoyono's administration, and in the political turmoil of the next election cycle, power relations began to shift once again.

Interest politics challenging and undermining the larger transformational REDD+ agenda became more visible and louder – in print and social media – again in 2015 after the elections (Enrici and Hubacek, 2016; Dwisatrio et al., 2021). The new President Joko Widodo or 'Jokowi' responded to the political contestation that was happening between MoF and its competing ministries. Under the flag of bureaucracy reform, a once independent body designated for Indonesia REDD+ policy (Governments of Norway and Indonesia, 2010), was absorbed along with DNPI into the newly merged Ministry of Environment and Forestry (MoEF). Meanwhile, more and more 'businessmen' were joining the executive sides and representing economic interests within the government (Hendrawan et al., 2021) – with palm oil, pulp, paper, and *biomass* for energy production among the commodities of interest (Astuti, 2021). As Moeliono et al. (2020) argue, the REDD+ agenda was converted to a less ambitious development project logic rather than used as a catalyst for larger change away from business-as-usual of deforestation and forest degradation. REDD+ assimilated back into the traditional ministerial sub-structures which turned the larger REDD+ idea into a sector activity focused mostly on setting technical rules (e.g., as reflected in the REDD+ policy regulation (GOI, 2017). REDD+ was thus framed through a narrow technical and 'apolitical' lens that by-passed the need for deeper procedural reforms (Myers et al., 2018). Policy initiatives and REDD+ demonstration activities have also slowed down since 2015 according to Setyowati (2020) and remain largely invisible in MoEF's Directorate-General.

In parallel with these horizontal power struggles at the national level, forest governance in Indonesia was also fraught with tensions between national and district-level control over forest

resources (Barr et al., 2006). Within this context, scholars raised early concerns that the central government would employ REDD+ as means to further centralise control (Phelps et al., 2010). Recently, this recentralisation seems to materialise more visibly. For example, the Indonesian government's rejection of international standards and initiatives such as LEAF or ART-TREES, was not only an assertion of its sovereign authority on the international stage, but also an affirmation of its own national standards. These standards, unlike LEAF and ART-TREES, exclude sub-national financing arrangements. In this way, the central government strengthened its claims over the REDD+ narrative and the related material aspects, including financial flows for REDD+ within the country. The accompanying government's forest and environment narratives and its REDD+ discourse is shared domestically and internationally, for example by employing an English-language digital media portal 'Forest Hints' as a strategic tool, tasked with reporting about authorities' efforts and stances regarding forest and peatlands since January 2016.

Financing agencies, NGOs, academics and actors working in voluntary carbon offsets are some of the actors who experienced contestation with the ministry. For example, the MoEF took actions to constrain the activities of NGOs, the private sector and other actors working on voluntary carbon offsets by circulating letters to restrict direct contracting for carbon trading to the holder of the licences for utilisation of timber in 2017 (Republic of Indonesia, 2017) and social forestry licence holders in 2021 (Republic of Indonesia, 2021). Earlier in January 2020, MoEF terminated its contract agreement with Yayasan WWF Indonesia – one of the oldest conservation NGO working in Indonesia since 1998 – due allegedly to the violation of four points in its agreement, including running an unverified social media campaign. Meanwhile, academics were also part of the power play when a French researcher published an estimate of Indonesia's 2019 wildfire damage that far exceeded the government's official numbers, and was given government orders to leave the country (Rochmyaningsih, 2020).

These processes and power demonstrations highlight the growing strength of the Indonesian state to push back on donor demands, the volatility of a REDD+ agenda that aims at larger transformational change, and the persistence or stickiness of existing and deeply entrenched power structures. In such a climate, and in light of the upcoming challenges of a post-pandemic time, results can be short-lived. To ensure an effective, efficient and equitable REDD+, multiple avenues are needed, including ongoing governmental efforts to keep trees and forests standing to the benefit of local people and jurisdictions, and the interjection of the international community when forest-related commitments in the Indonesian NDC are jeopardised.

2.3.3.4 Key lessons from the case studies

Despite the diverse trajectories of REDD+ in Brazil, Ghana and Indonesia, there are some general lessons that can be drawn from all three case studies. First, they emphasise the highly political and dynamic nature of REDD+ and the importance of country context in shaping domestic REDD+ actions. Second, and related, they illustrate how these REDD+ actions are situated in much broader geopolitical and economic contexts and agendas that extend well beyond the scope of climate governance and carbon payments, and involve power struggles between international, national, sub-national and local actors. Brazil and Indonesia, in particular, are large countries with major economies that are fully capable of resisting international pressure if it is deemed to conflict with national interest. At the same time, and as illustrated in pre-Bolsonaro Brazil, these countries hold considerable capacity to reduce deforestation relatively independently of foreign funding. The cases of both Brazil and Ghana illustrate the important role that actors outside the central state may play in shaping REDD+, such as sub-national state actors or private companies trading in forest risk commodities like cocoa. But perhaps the key take home message from all of these findings is that REDD+, as an international UNFCCC mechanism, has limited power, by itself, to steer action on the ground. However, it may be harnessed in various ways, at various scales, to serve a diversity of agendas.

2.4. Emerging Trends and the Evolving Role of Finance

This chapter began by reflecting on how REDD+ sits within a broader socio-political landscape that drives land use change. Within that landscape, governance and finance mechanisms that support or promote deforestation exist in tension with a complex array of 'REDD+-relevant' efforts to reduce deforestation. While the 'official' rules for REDD+ within the UNFCCC have been largely completed, the landscape of REDD+-related financial instruments has continued to expand and grow in complexity, as has the associated plethora

Conversion from forest to agriculture in Guatemala
Photo © Nelson Grima

of safeguard frameworks and requirements aiming at (and claiming) to ensure that REDD+ and its finance deliver for forests and people.

A number of key trends emerged from this analysis. We found that REDD+ rules, norms and knowledge claims at the international level are well aligned with the transfer of power to govern land use, forests and trees to donors and private sector actors. While this shift comes with an expectation of increased finance and private sector engagement for sustainability – for example that companies responsible for deforestation will rid deforestation from their supply chains in exchange for greater market share – it raises questions about who holds power to write the rules of this game, who benefits, who is accountable to whom and how the interests of the wider society will be protected.

The multitude of financing avenues opened through public and private funding, voluntary carbon markets and other diverse mechanisms under the Paris Agreement, have made navigating and monitoring this complex assemblage a major challenge. Meanwhile, technical and institutional path dependencies have discouraged critical examination of the assumptions behind the design and choice of these instruments. Even more fundamental – but perhaps necessary – discussions, for example of the ethics (and effectiveness) of carbon offsetting, have been somewhat silenced within the wider REDD+ policy arena.

Just as the REDD+ governance architecture has aimed to incentivise private sector engagement, our exploration of the evolving safeguards frameworks and requirements for REDD+ reveal the transfer of considerable rule-making authority to REDD+ funders and investors. While this could facilitate efforts to raise the 'safeguards bar', for example via state-driven but market-based initiatives like ART-TREES, it also raises concerns about when and how local rights and preferences will be heard and accommodated. Now that RBPs are being made, and these payments are presumably contingent on safeguard reporting, there is a strik-

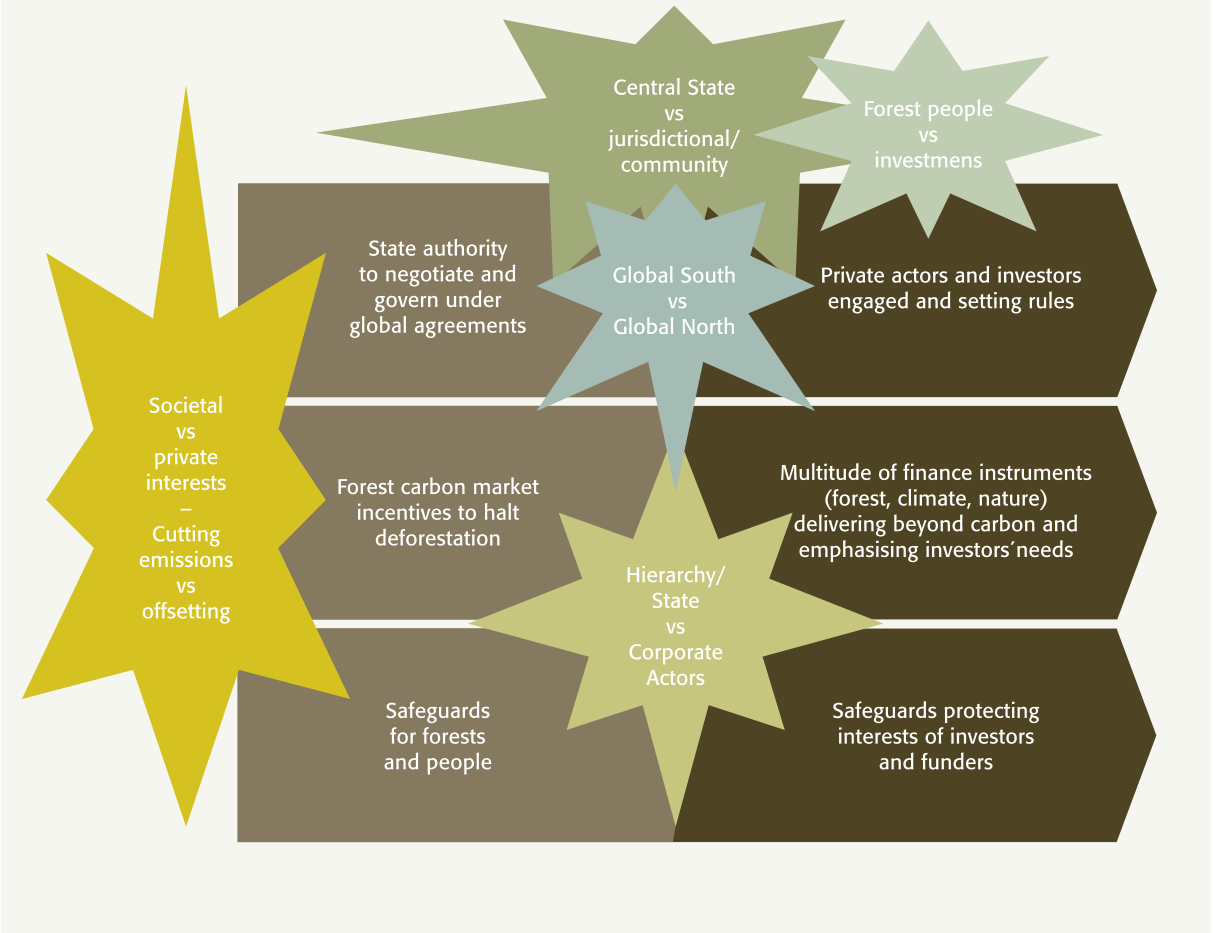
ing lack of evidence that these reports are being read and challenged by local rights-holders or their advocates. Indeed, there is very limited understanding of the extent to which safeguards are actually being applied on the ground, as opposed to simply being outlined in reports to meet the requirements for results-based finance (Rey Christen et al., 2020).

The above dynamics and shifts we observed at a global scale also interact with the translation of REDD+ into national, jurisdictional and local realities. Politics come to the forefront mainly in two intersections: firstly, when national governments negotiate with international REDD+ funders and investors, or in discussions over reference level setting and questions of permanence of results. Here, power positions within the overall REDD+ governance are challenged, for example, when rules and standards are perceived as incompatible with national frameworks and ambitions. In the case of large and relatively well-resourced countries like Brazil and Indonesia, the tables may be turned if the world needs Brazilian and Indonesian forests more than these countries need REDD+ finance. Secondly within REDD+ countries, central governments may leverage their 'nationally-driven' authority under the UNFCCC to maintain or retake control over forest resources from sub-national jurisdictions or community-based REDD+ initiatives.

Figure 2.4 below summarises these findings and highlights shifts in forest governance and REDD+ that we observed since the first GFEP assessment on the subject (Parrotta et al., 2012). The star shapes illustrate tensions as they have emerged over the years of REDD+ development. The arrows moving from left to right show how these tensions have been playing out from the initial framing of REDD+ objectives, to subsequent trends in practice.

Figure **2.4**

Shifts in the evolution of REDD+ and forest governance features over time, with six underlying power relations and politics producing new, and maintaining existing, tensions among actors and interests



Initially, with countries engaging under a global agreement and with major investments in increasing capacities in monitoring and enhanced transparency, power and politics seemed to have shifted in favour of a relatively clear framework of accountability for delivering REDD+ objectives. This could be seen as having positive implications for social and environmental justice. Yet, recent shifts give more cause for concern, with private sector interests defining rules, an increasingly complex menu of financing opportunities with different ambitions and restriction levels that might lead to a 'race to the bottom', and a rhetoric being more and more openly concerned about safeguarding investors and 'deal-making' (as outcomes of the Glasgow COP26 suggest) rather than the protection of forests and forest stewards.

2.5. Conclusions

REDD+ emerged as a seemingly simple and elegant solution to global forest loss. As a voluntary, 'nationally-driven' mechanism for developed countries to pay developing countries for reduced forest emissions, it offered to redress developed countries' outsized role in driving climate change, while respecting national sovereignty in developing countries. In reality, the political ecology of REDD+ is shaped by ongoing tensions – between global, national and locally-driven environment and development agendas, and between the need to rein in the global finance and commodities sectors as drivers of deforestation, while also courting them as critical sources of REDD+ funding. The result is an increasingly complex landscape of REDD+-related governance and finance, where boundaries between what is, and isn't, REDD+ remain unclear and contested, and rules and safeguards vary by institution. Accountability in such a context, becomes challenging despite, or even owing to, the growing availability of data and expert knowledge. This explosion of data and expertise may offer transparency to only a small population of experts able to decipher it.

This chapter follows on McDermott et al. (2012) to continue to trace the power dynamics of REDD+, across scales, and between public, private and civil society actors, as critical for tracking who is being included or excluded from its processes, costs and benefits. At the international level, there have been several key developments over the last ten years. Firstly, a growing number of countries have reached the final 'Phase 3' of REDD+, entailing RBPs. This is changing REDD+ dynamics by, *inter alia*, empowering financial actors to write the rules for both carbon accounting and the dominance of 'safeguards' as a frame to address non-carbon values. It also creates tensions between policy-centric, fragmented rule-making and pressures for 'harmonisation' and potential consolidation of power (as is happening within the financial sector itself). At the same time, the growing political and economic power of developing countries is changing the global geopolitical landscape, enabling some REDD+ countries to reject the requirements of external donors when they are deemed counter to national interests.

There has also been an expanding suite of efforts, both within and outside the REDD+ umbrella, to look beyond forest carbon and associated payments to national governments, to finance REDD+. In particular, various forms of supply chain governance aim to provide financial incentives (e.g., individual and jurisdictional certification, 'deforestation-free' supply chains and 'green finance') or focus on sanctions and divestments from commodities tied to forest loss (e.g., through government mandated import restrictions and financial due diligence requirements).

Across all of these efforts, there has been an underlying conflict between more inclusive, participatory approaches to REDD+ and the logics of market-based governance based on commodification, standardisation and profit accumulation. As illustrated in Figure 2.4 above, we suggest that market-based logics have been dominating the international agenda, to the detriment of environmental and social values.

Meanwhile deforestation, as well as biodiversity loss, inequitable benefit sharing, human rights abuses and poor performance on other values captured in the REDD+ safeguards, continue in forest landscapes. For some, this suggests an urgent need to 'scale up' current REDD+ strategies and do more of the same only harder and faster (i.e., move more countries into Phase III RPBs and make REDD+ more attractive to the private sector). For others, it suggests REDD+ has failed, and should be replaced by (presumably) more effective alternatives. We would argue that neither of these 'solutions' is particularly realistic, or necessarily desirable. Firstly, REDD+ is but one mechanism within a global political and financial system driving deforestation. We cannot expect 'success' from any single mechanism without addressing the need for changes to the broader system. Secondly, complexity and contestation are better 'embraced' (Rayner et al., 2010) as essential to diversity, than rejected as signs of failure. Rather than seek the elusive 'silver bullet', perhaps more can be achieved by monitoring and contesting the distribution of power in existing governance efforts, in the search for more equitable, inclusive and effective global forest governance.

2.6. References

1t.org website. A platform for the trillion tree community. Available at: https://www.1t.org/ [Accessed on 4 February 2022].

Abbiw E. (2020). Small-Scale Gold Mining and Livelihood Vulnerability: A Case Study of Juaboso District, Ghana. Ohio University. Ohio, USA. pp. 145.

Abranches S. (2014). The Political Economy of Deforestation in Brazil and Payment-for-Performance Finance. Center for Global Development: Washington, DC.

AFR100 website. Available at: https://afr100.org/ [Accessed on 4 February 2022].

Agro Consult and Services (2018). Developing Feedback and Grievance Redress Mechanism (FRGM). Sudan REDD+ Readiness Program. Agro Consult and Services: Khartoum.

Allen M., Axelsson K., Caldecott B., Hale T., Hepburn C., Mitchell-Larson E., Malhi Y., Otto F., and Seddon N. (2020). The Oxford Principles for Net Zero Aligned Carbon Offsetting 2020. University of Oxford: Oxford, UK.

Amazon website. The Climate Pledge. Available at: https://www.aboutamazon.com/planet/climate-pledge [Accessed on 4 February 2022].

Amfo B., Aidoo R., and Mensah J.O. (2021). Food coping strategies among migrant labourers on cocoa farms in southern Ghana. Food Security: The Science, Sociology and Economics of Food Production and Access to Food, 13, 4, 875–894.

Angelsen A. (2017). REDD+ as Result-based Aid: General Lessons and Bilateral Agreements of Norway. Review of Development Economics, 21, 2, 237–264.

Angelsen A., Hermansen E.A.T., Rajão R., and van der Hoff R. (2018). Results-based payment: Who should be paid, and for what? In: Transforming REDD+: Lessons and New Directions. (Eds.) A. Angelsen, C. Martius, et al. Center for International Forestry Research (CIFOR): Bogor, Indonesia, pp. 18. ISBN: 978-602-387-079-0.

ART (2020). ART Approved to Supply Credits for Global Aviation's Carbon Market. ART: Arlington, VA.

ART (2021). Indigenous Peoples in ART Primer and Frequently Asked Questions. ART Secretariat: Washington, D.C.

ART (2021b). Executive Summary: The REDD+ Environmental Excellence Standard (TREES), Version 2.0. ART Secretariat Winrock International: Arlington, VA.

Arts B., Ingram V., and Brockhaus M. (2019). The Performance of REDD+: From Global Governance to Local Practices. Forests, 10, 10, 837.

Asiyanbi A. and Lund J.F. (2020). Policy persistence: REDD+ between stabilization and contestation. Journal of Political Ecology, 27, 1.

Astuti R. (2021). Governing the ungovernable: The politics of disciplining pulpwood and palm oil plantations in Indonesia's tropical peatland. Geoforum, 124, 381–391.

Atmadja S.S., Arwida S., Martius C., and Thuy P.T. (2018). Financing REDD+. A transaction among equals, or an uneven playing field? In: Transforming REDD+: Lessons and New Directions. (Eds.) A. Angelsen, C. Martius, et al. Center for International Forestry Research (CIFOR): Bogor, Indonesia., pp. 16. ISBN: 978-602-387-079-0.

Barr C., Resosudarmo I.A.P., Dermawan A., McCarthy J., Moeliono M., and Setiono B. (2006). Decentralization of forest administration in Indonesia: Implications for forest sustainability, economic development and community livelihoods. Center for International Forestry Research (CIFOR): Bogor, Indonesia.

Baruah, M., (2017). Facipulation and elite formation: Community resource management in Southwestern Ghana. Conservation and society, 15, 4, 371-383.

den Besten J.W., Arts B., and Behagel J. (2019). Spiders in the Web: Understanding the Evolution of REDD+ in Southwest Ghana. Forests, 10, 2, 117.

Blaser W.J., Oppong J., Hart S.P., Landolt J., Yeboah E., and Six J. (2018). Climate-smart sustainable agriculture in low-to-intermediate shade agroforests. Nature Sustainability, 1, 5, 234–239.

BMU website. Peru strengthens powerful partnership in its fight to preserve the Amazon rainforest. Available at: https://www.bmuv.de/en/pressrelease/peru-strengthens-powerful-partnership-in-its-fight-to-preserve-the-amazon-rainforest [Accessed on 4 February 2022].

Boeckx P., Bauters M., and Dewettinck K. (2020). Poverty and climate change challenges for sustainable intensification of cocoa systems. Current Opinion in Environmental Sustainability, 47, 106–111.

Boffey, D. (2021). Norway halts Amazon fund donation in dispute with Brazil: International concerns grow over deforestation surge since Jair Bolsonaro took power. The Guardian. Available at: https://www.theguardian.com/world/2019/aug/16/norway-halts-amazon-fund-donation-dispute-brazil-deforestation-jair-bolsonaro [Accessed on 08 February 2022].

Bonn Challenge website. The Bonn Challenge. Available at: https://www.bonnchallenge.org/ [Accessed on 26 January 2022].

Brobbey L.K., Agyei F.K., and Osei-Tutu P. (2020). Drivers of cocoa encroachment into protected forests: the case of three forest reserves in Ghana. International Forestry Review, 22, 4, 425–437.

Brockhaus M. and Di Gregorio M. (2014). National REDD+ policy networks: from cooperation to conflict. Ecology and Society, 19, 4.

Brockhaus M., Korhonen-Kurki K., Sehring J., Di Gregorio M., Assembe-Mvondo S., Babon A., Bekele M., Gebara M.F., Khatri D.B., Kambire H., et al. (2017). REDD+, transformational change and the promise of performance-based payments: a qualitative comparative analysis. Climate Policy, 17, 6, 708–730.

Busch J. and Mukherjee A. (2018). Encouraging State Governments to Protect and Restore Forests Using Ecological Fiscal Transfers: India's Tax Revenue Distribution Reform. Conservation Letters, 11, 2, e12416.

Carodenuto S. (2019). Governance of zero deforestation cocoa in West Africa: New forms of public–private interaction. Environmental Policy and Governance, 29, 1, 55–66.

Choi J., Macquarie R., Naran B., and Falconer A. (2020). IDFC Green Finance Mapping Report 2020. International Development Finance Club.

CIF (2021). Mexico: The contribution of the forest investment program to forest and climate goals. Transformation Change Case Study. Available at: https://climateinvestmentfunds.org/sites/cif_enc/files/knowledge-documents/mexico_tc.pdf [Accessed on 1 March 2022].

CIF (Climate Investment Funds) (n.d.). CIF's Programs. Climate Investment Funds. Available at: https://www.climateinvestmentfunds.org/cif-programs [Accessed on 24 August 2021].

Climate Funds Update (n.d.). Forest Investment Program. Available at: https://climatefundsupdate.org/the-funds/forest-investment-program/ [Accessed on 24 August 2021].

Climate Funds Update website. How much finance is flowing through the multilateral climate funds? Available at: https://climatefundsupdate.org/ [Accessed on 4 February 2022].

CONAF (2018). Primer Resumen de Información. Abordaje, Respeto y Cumplimiento de las Salvaguardas para la Formulación de le Estrategia Nacional de Cambio Climático y Recursos Vegetacionales (ENCCRV) de Chile. Corporación Nacional Forestal: Santiago, Chile.

COP26 Presidency (2021). Priorities for Public Climate Finance in the Year Ahead. COP26 Presidency.

COP26 website. Finance. Available at: https://ukcop26.org/cop26-goals/finance/ [Accessed on 4 February 2022].

Croft-Cusworth C. (2017). Why indigenous rights matter for REDD+. Interview with Stephen Leonard.

van Dam C. (2020). The Economics of Climate Change Mitigation in Indigenous Territories. Forest Trends: Washington, DC.

Dawoe E., Asante W., Acheampong E., and Bosu P. (2016). Shade tree diversity and aboveground carbon stocks in Theobroma cacao agroforestry systems: implications for REDD+ implementation in a West African cacao landscape. Carbon Balance and Management, 11, 1, 17.

Dehm J. (2016). Indigenous peoples and REDD+ safeguards: rights as resistance or as disciplinary inclusion in the green economy? Journal of Human Rights and the Environment, 7, 2, 170–217.

Deutz A., Heal G.M., Niu R., Swanson E., Townshend T., Li Z., Delmar A., Meghji A., Sethi S.A., and Tobin-de la Puente J. (2020). Financing Nature Conservation: Closing the Global Biodiversity Financing Gap. The Paulson Institute, The Nature Conservancy, and the Cornell Atkinson Center for Sustainability.

Donofrio S., Maguire P., Zwick S., Merry W., Wildish J., and Myers K. (2020a). State of the Voluntary Carbon Markets 2020: The Only Constant is Change. Forest Trends: Washington, DC.

Donofrio S., Maguire P., Zwick S., and Merry W. (2020b). Voluntary Carbon and the Post-Pandemic Recovery. Forest Trends' Ecosystem Marketplace: Washington D.C.

Donofrio S., Maguire P., and Myers K. (2021). Buyers of Voluntary Carbon Offsets, a Regional Analysis. Forest Trends: Washington, DC.

Dwisatrio B., Said Z., Permatasari A.P., Maharani C., Moeliono M., Wijaya A., Lestari A.A., Yuwono J., and Pham T.T. (2021). The context of REDD+ in Indonesia: Drivers, agents and institutions [Update edition]. Center for International Forestry Research (CIFOR): Bogor, Indonesia.

Ecosystem Marketplace (2021). A Green Growth Spurt: State of Forest Carbon Finance 2021. Forest Trends.

Edwards R. (2021). The Net Zero Transition and Offsetting of Carbon Intensity in Retail Investment Portfolios. Forest Trends: Washington, DC.

Enrici A. and Hubacek K. (2016). Business as usual in Indonesia: governance factors effecting the acceleration of the deforestation rate after the introduction of REDD+. Energy, Ecology and Environment, 1, 4, 183–196.

Enrici A. and Hubacek K. (2018). Challenges for REDD+ in Indonesia: a case study of three project sites. Ecology and Society, 23, 2, 7.

Enrici A. and Hubacek K. (2019). A Crisis of Confidence: Stakeholder Experiences of REDD+ in Indonesia. Human Ecology, 47, 1, 39–50.

European Commission (2018a). Communication from the Commission to the European Parliament, The European Council, The Council, The European Central Bank, The European Economic and Social Committee and The Committee of the Regions. Action Plan: Financing Sustainable Growth. European Commission: Brussels.

European Commission (2018b). Study on EU Financing of REDD+ Related Activities, and Results-Based Payments Pre and Post 2020: Sources, Cost-Effectiveness and Fair Allocation of Incentives. European Union: Luxembourg.

European Commission (2019). Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and The Committee of The Regions. Stepping up EU Action to Protect and Restore the World's Forests. European Commission: Brussels.

FAO (2018). From reference levels to results reporting: REDD+ under the UNFCCC: 2018 update. FAO: Rome, Italy. pp. 52. ISBN: 978-92-5-130749-6.

FAO and FILAC (2021). Forest governance by indigenous and tribal peoples. An opportunity for climate action in Latin America and the Caribbean. FAO: Santiago. pp. 170.

FCPF (2016). Carbon Fund Methodological Framework. Forest Carbon Partnership Facility.

FCPF (2020). Choices in Quantifying Carbon for Jurisdictional REDD+: Overview from the Forest Carbon Partnership Facility. Washington, DC: Forest Carbon Partnership Facility (FCPF), The World Bank.

FCPF (2021). ER Monitoring Report (Ghana). Forest Carbon Partnership Facility: Washington, DC.

FCPF (n.d.). Common Approach to Environmental and Social Safeguards for Multiple Delivery Partners. Forest Carbon Partnership Facility: Washington, DC.

FCPF and UN-REDD (2015). Establishing and Strengthening Grievance Redress Mechanisms. Forest Carbon Partnership Facility / UN-REDD Programme: Washington, DC.

FCPF website. Overview of Ghana's ERPD: Ghana cocoa forest REDD+ Programme. Available at: https://www.forestcarbonpartnership.org/system/files/documents/1b.%20Ghana%20overview.pdf [Accessed on 4 February 2022].

Felker M.E., Bong I.W., DePuy W.H., and Jihadah L.F. (2017). Considering land tenure in REDD+ participatory measurement, reporting, and verification: A case study from Indonesia. PLOS ONE, 12, 4, e0167943.

Fleischman F., Basant S., Fischer H., Gupta D., Garcia Lopez G., Kashwan P., Powers J.S., Ramprasad V., Rana P., Rastogi A., et al. (2021). How politics shapes the outcomes of forest carbon finance. Current Opinion in Environmental Sustainability, 51, 7–14.

Foresthints.news (2021). Indonesia's national focal point to UNFCCC takes stance on the LEAF Coalition. Available at: https://foresthints.news/indonesia-national-focal-point-to-unfccc-takes-stance-on-the-leaf-coalition/ [Accessed on 4 February 2022].

Forsyth T. (2008). Political ecology and the epistemology of social justice. Geoforum, 39, 2, 756–764.

FSC website. Forest Stewardship Council. Available at: https://fsc.org/en [Accessed on 4 February 2022].

GCF (2017). Terms of reference for the pilot programme for REDD+ results-based payments. Green Climate Fund: Republic of Korea.

GCF (2019). Accelerating REDD+ Implementation. Green Climate Fund: Republic of Korea.

GCF (2021a). Green Climate Fund. Available at: https://www.greenclimate.fund/ [Accessed on 26 January 2022].

GCF (2021b). Status of the GCF pipeline, including the status of Project Preparation Facility requests. Green Climate Fund.

GCF (n.d.). Terms of reference for the pilot programme for REDD+ results-based payments. Green Climate Fund.

GOI (2017). Peraturan Menteri Lingkungan Hidup Dan Kehutanan Republik Indonesia. P.70/MenLHK/Setjen/Kum.1/12/2017

Governments of Norway and Indonesia (2010). Letter of Intent between the Government of the Kingdom of Norway and the Government of the Republic of Indonesia on Cooperation on reducing greenhouse gas emissions from deforestation and forest degradation. The Government of the Kingdom of Norway & the Government of the Republic of Indonesia: Oslo, Norway.

Granziera B., Hamrick K., and Comstock M. (2021). Eligibility Requirements for REDD+ Standards and Financing - May 2021. The Nature Conservancy: Arlington, VA.

Green Climate Fund website. Available at: https://www.greenclimate.fund/about/partners/ae [Accessed on 4 February 2022].

Green Gigaton Challenge website. Available at: https://www.greengigaton.com/ [Accessed on 4 February 2022].

GSS (2020). 2017/2018 Ghana Census of Agriculture: National Report. Ghana Statistical Service (GSS). Accra.

Guerra R. and Moutinho P. (2020). Challenges of Sharing REDD+ Benefits in the Amazon Region. Forests, 11, 9, 1012.

Gupta A., Vijge M.J., Turnhout E., and Pistorius T. (2014). Making REDD+ Transparent: The Politics of Measuring, Reporting, and Verification Systems. In: Transparency in Global Environmental Governance: Critical Perspectives. (Eds.) A. Gupta and M. Mason. The MIT Press, pp. 181–202.

Hamrick K., Webb C., and Ellis R. (2021). Nesting REDD+. Pathways to Bridge Project and Jurisdictional Programs. The Nature Conservancy: Arlington, VA.

Hargita Y., Günter S., and Köthke M. (2016). Brazil submitted the first REDD+ reference level to the UNFCCC—Implications regarding climate effectiveness and cost-efficiency. Land Use Policy, 55, 340–347.

Hendrawan A., Berenschot W., and Aspinall E. (2021). Parties as pay-off seekers: Pre-electoral coalitions in a patronage democracy. Electoral Studies, 69, 102238.

Hirons M., McDermott C., Asare R., Morel A., Robinson E., Mason J., Boyd E., Malhi Y., and Norris K. (2018). Illegality and inequity in Ghana's cocoa-forest landscape: How formalization can undermine farmers control and benefits from trees on their farms. Land Use Policy, 76, 405–413.

IDB (2014). Independent Evaluation of the Climate Investment Funds. Inter-American Development Bank: Washington D.C.

IMF (2021). World Economic Outlook Update: Policy Support and Vaccines Expected to Lift Activity. International Monetary Fund: Washington, DC.

Ituarte-Lima, C. and McDermott. C.L. (2017). Are More Prescriptive Laws Better? Transforming REDD+ Safeguards into National Legislation Journal of Environmental Law 29, 3, 505-536.

Jurisdictional Approaches website. Jurisdictional Approaches Resource Hub. Available at: https://jaresourcehub.org/about/ [Accessed on 4 February 2022].

KfW website. KfW Development Bank, REDD Early Movers (REM) Programme. Available at: https://www.kfw-entwicklungsbank.de/International-financing/KfW-Development-Bank/Topics/Climate/REDD/ [Accessed on 1 March 2022].

Kleinschmit D., Mansourian S., Wildburger C., and Purret A. (2016). Illegal logging and related timber trade - Dimensions, drivers, impacts and responses. International Union of Forest Research Organizations (IUFRO): Vienna, Austria.

Korhonen-Kurki K., Brockhaus M., Sehring J., Di Gregorio M., Assembe-Mvondo S., Babon A., Bekele M., Benn V., Gebara M.F., Kambire H.W., et al. (2019). What drives policy change for REDD+? A qualitative comparative analysis of the interplay between institutional and policy arena factors. Climate Policy, 19, 3, 315–328.

Kroeger A., Bakhtary H., Haupt F., and Streck C. (2017). Eliminating Deforestation from the Cocoa Supply Chain. World Bank: Washington, D.C.

Kumeh E.M., Kyereh B., Birkenberg A., and Birner R. (2021). Customary power, farmer strategies and the dynamics of access to protected forestlands for farming: Implications for Ghana's forest bioeconomy. Forest Policy and Economics, 133, 102597.

Kumeh E.M., Bieling C., and Birner R. (2022). Food-security corridors: A crucial but missing link in tackling deforestation in Southwestern Ghana. Land Use Policy, 112, 105862.

Larson A.M. (2011). Forest tenure reform in the age of climate change: Lessons for REDD+. Global Environmental Change, 21, 2, 540–549.

Larson A.M., Brockhaus M., Sunderlin W.D., Duchelle A., Babon A., Dokken T., Pham T.T., Resosudarmo I.A.P., Selaya G., Awono A., et al. (2013). Land tenure and REDD+: The good, the bad and the ugly. Global Environmental Change, 23, 3, 678–689.

LEAF Coalition website. Lowering Emissions by Accelerating Forest finance (LEAF). Available at: https://leafcoalition.org/ [Accessed on 31 August 2021].

Luttrell C., Resosudarmo I.A.P., Muharrom E., Brockhaus M., and Seymour F. (2014). The political context of REDD+ in Indonesia: Constituencies for change. Environmental Science & Policy, 35, 67–75.

Macquarie R., Naran B., Rosane P., Solomon M., Wetherbee C., and Buchner B. (2020). Updated View on the Global Landscape of Climate Finance 2019. Climate Policy Initiative: Washington, DC.

Massarella K., Sallu S.M., Ensor J.E., and Marchant R. (2018). REDD+, hype, hope and disappointment: The dynamics of expectations in conservation and development pilot projects. World Development, 109, 375–385.

May P.H., Millikan B., and Gebara M.F. (2011). The context of REDD+ in Brazil: Drivers, agents and institutions. Center for International Forestry Research (CIFOR): Bogor, Indonesia.

McDermott C.L. (2014). REDDuced: From sustainability to legality to units of carbon—The search for common interests in international forest governance. Environmental Science & Policy, 35, 12–19.

McDermott C., Acheampong E., Arora-Jonsson S., Asare R.A., de Jong W., Hirons M., Khatun K., Menton M., Nunan F., Poudyal M., et al. (2019). SDG 16: Peace, justice and strong institutions – a political ecology perspective. In: Sustainable Development Goals: Their Impacts on Forests and People. (Eds.) P. Katila, C.J. Pierce Colfer, et al. Cambridge University Press: Cambridge, UK., pp. 654. ISBN: 978-1-108-76501-5.

McDermott, C. L., van Asselt, H., Streck, C., Assembe-Mvondo, S., Duchelle, A. E., Haug, C., Humphreys, D. et al. (2012). Governance for REDD+, forest management and biodiversity: existing approaches and future options. In: Understanding Relationships between Biodiversity, Carbon, Forests and People: The Key to Achieving REDD+ Objectives. A Global Assessment Report. (p. 115). International Union of Forest Research Organisations (IUFRO): Vienna, Austria.

Microsoft website. Microsoft will be carbon negative by 2030. Available at: https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/ [Accessed on 4 February 2022].

Milne S., Mahanty S., To P., Dressler W., Kanowski P., and Thavat M. (2019). Learning From 'Actually Existing' REDD+: A Synthesis of Ethnographic Findings. Conservation and Society, 17, 1, 84–95.

MINAE (2018). Emission Reductions Program to the FCPF Carbon Fund. Government of Costa Rica: San José, Costa Rica.

MINAM (2017). Hoja de ruta de salvaguardas para REDD+. Ministerio del Ambiente de Perú: Lima, Peru.

Moeliono M., Brockhaus M., Gallemore C., Dwisatrio B., Maharani C.D., Muharrom E., and Pham T.T. (2020). REDD+ in Indonesia: A new mode of governance or just another project? Forest Policy and Economics, 121, 102316.

Mongabay (2021). Deforestation in Indonesia hits record low, but experts fear a rebound. Available at: https://news.mongabay.com/2021/03/2021-deforestation-in-indonesia-hits-record-low-but-experts-fear-a-rebound/ [Accessed on 2 September 2021].

Myers R., Larson A.M., Ravikumar A., Kowler L.F., Yang A., and Trench T. (2018). Messiness of forest governance: How technical approaches suppress politics in REDD+ and conservation projects. Global Environmental Change, 50, 314–324.

Myers Madeira E., Kelley L., Blockhus J., Ganz D., Cortez R., and Fishbein G. (2013). Sharing the Benefits of REDD+: Lessons from the Field. The Nature Conservancy: Arlington, VA.

Nasser F., Maguire-Rajpaul V.A., Dumenu W.K., and Wong G.Y. (2020). Climate-Smart Cocoa in Ghana: How Ecological Modernisation Discourse Risks Side-Lining Cocoa Smallholders. Frontiers in Sustainable Food Systems, 4.

NCRC (2020). Learning About Cocoa Landscape Approaches: Ghana Guidance Document & Toolbox. Nature Conservation Research Centre: Accra, Ghana.

NICFI (2014). Joint Declaration of Intent between the Government of the Republic of Peru, the Government of the Kingdom of Norway and the Government of the Federal Republic of Germany on "Cooperation on reducing greenhouse gas emissions from deforestation and forest degradation (REDD+1) and promote sustainable development in Peru. New York, USA.

NYDF Assessment Partners (2019). Protecting and Restoring Forests: A story of large commitments yet limited progress. New York Declaration on Forests Five-Year Assessment Report. Climate Focus (coordinator and editor): Washington, DC.

NYDF Assessment Partners (2020). Balancing Forests and Development: Addressing Infrastructure and Extractive Industries, Promoting Sustainable Livelihoods. Climate Focus (Coordinator and Editor): Washington, DC.

O'Callaghan B.J. and Murdock E. (2021). Are we building Back Better? Evidence from 2020 and Pathways to Inclusive Green Recovery Spending. United Nations Environment Programme.

Ollivier de Leth D. and Ros-Tonen M.A.F. (2021). Creating Shared Value Through an Inclusive Development Lens: A Case Study of a CSV Strategy in Ghana's Cocoa Sector. Journal of Business Ethics.

Parrotta J.A., Wildburger C., and Mansourian S. (2012). Understanding relationships between biodiversity, carbon, forests and people: the key to achieving REDD+ objectives. A global assessment report. International Union of Forest Research Organizations (IUFRO): Vienna, Austria. pp. 161. ISBN: 978-3-902762-17-7.

PEFC website. Programme for the Endorsement of Forest Certification. Available at: https://www.pefc.co.uk/ [Accessed on 4 February 2022].

Phelps J., Webb E.L., and Agrawal A. (2010). Does REDD+ Threaten to Recentralize Forest Governance? Science, 328, 5976, 312-313.

Pinko N., Ortega Pastor A., and Tonkonogy B. (2021). Framework for Sustainable Finance Integrity. Climate Policy Initiative: Washington, DC.

Ravikumar A., Larson A.M., Myers R., and Trench T. (2018). Inter-sectoral and multilevel coordination alone do not reduce deforestation and advance environmental justice: Why bold contestation works when collaboration fails. Environment and Planning C: Politics and Space, 36, 8, 1437–1457.

Rayner J., Buck A., and Katila P. (2010). Embracing complexity: Meeting the challenges of international forest governance. International Union of Forest Research Organizations (IUFRO): Vienna, Austria.

Recio M.E. (2014). The Warsaw Framework and the Future of REDD+. Yearbook of International Environmental Law, 24, 1, 37–69.

REDD+ SES website. REDD+ Social & Environmental Standards. Available at: https://www.redd-standards.org/ [Accessed on 20 August 2021].

Republic of Indonesia (2017). Restriction of direct contract on carbon trading. Ministry of Environment and Forestry: Jakarta, Indonesia.

Republic of Indonesia (2020a). Successfully reducing deforestation, Indonesia receives fund from Norway. Available at: https://www.menlhk.go.id/site/single_post/2938/berhasil-tekan-deforestasi-indonesia-terima-dana-dari-norwegia [Accessed on 20 August 2021].

Republic of Indonesia (2020b). Deforestation drops, Indonesia receives USD 103.8 Million from GCF. Available at: http://ppid.menlhk.go.id/siaran_pers/browse/2627 [Accessed on 20 August 2021].

Republic of Indonesia (2020c). Indonesia and World Bank sign agreement on payment for carbon emission reductions. Available at: http://ppid.menlhk.go.id/siaran_pers/browse/2764 [Accessed on 20 August 2021].

Republic of Indonesia (2021). Circulate Letter 10 May 2021. No: S.91/PSKL/SET/REKI.315/2021 on Social forestry cooperation arrangements on carbon. Directorate General of Social Forestry and Environmental Partnership: Jakarta, Indonesia.

Rey D., Roberts J., Korwin S., Rivera L., Ribet U., and Ferro P. (2013). A Guide for Consistent Implementation of REDD+ Safeguards. ClientEarth: London, UK.

Rey D., Korwin S., Ribet U., and Rivera L. (2016). Best Practices and Considerations for the Development of REDD+ Country Approaches to Safeguards and Design of Safeguard Information Systems. CLP and SNV: London, UK.

Rey Christen D., García Espinosa M., Reumann A., and Puri J. (2020). Results Based Payments for REDD+ under the Green Climate Fund: Lessons Learned on Social, Environmental and Governance Safeguards. Forests, 11, 12, 1350.

Rochmyaningsih D. (2020). Scientists in Indonesia fear political interference. Science (New York, N.Y.), 367, 6479, 722–723.

RRI (2021) Status of Legal Recognition of Indigenous Peoples', Local Communities' and Afro-descendant Peoples' Rights to Carbon Stored in Tropical Lands and Forests. Policy Brief, Rights and Resources Initiative, May 2021. Available at: https://rightsandresources.org/wp-content/uploads/Carbon-Rights-Brief-6-pager-v8.pdf [Accessed on 1 March 2022].

RSPO website. Roundtable on Sustainable Palm Oil. Available at: https://www.rspo.org/ [Accessed on 4 February 2022].

RTRS website. Round Table on Responsible Soy. Available at: https://responsiblesoy.org/?lang=en [Accessed on 4 February 2022].

Rutt R.L., Myers R., Ramcilovic-Suominen S., and McDermott C. (2018). FLEGT: Another 'forestry fad'? Environmental Science & Policy, 89, 266–272.

SADSN (2015). REDD Readiness Progress Fact Sheet: Argentina. Buenos Aires: Secretaría de Ambiente y Desarrollo Sustentable de la Nación. Jefatura de Gabinete de Ministros, Argentina.

Schwab K. and Malleret T. (2020). COVID-19: The Great Reset. ISBN Agentur Schweiz: Cologny/Geneva. pp. 280. ISBN: 978-2-940631-12-4.

Seddon N., Smith A., Smith P., Key I., Chausson A., Girardin C., House J., Srivastava S., and Turner B. (2021). Getting the message right on nature-based solutions to climate change. Global Change Biology, 27, 8, 1518–1546.

Setyowati A.B. (2020). Governing the ungovernable: contesting and reworking REDD+ in Indonesia. Journal of Political Ecology, 27, 1.

Seymour F. and Busch J. (2016). Why Forests? Why Now? The Science, Economics and Politics of Tropical Forests and Climate Change. Center for Global Development: Washington, D.C. pp. 450. ISBN: 978-1-933286-85-3.

Sills E.O., Atmadja S.S., de Sassi C., Duchelle A.E., Kweka D., Resosudarmo I.A.P., and Sunderlin W.D. (2014). REDD+ on the ground: A case book of subnational initiatives across the globe. Center for International Forestry Research (CIFOR): Bogor, Indonesia.

Singer, B. and Giessen, L. (2017). Towards a Donut Regime? Domestic Actors, Climatization, and the Hollowing-out of the International Forests Regime in the Anthropocene. Forest Policy and Economics 79, 69–79.

Stern N. (2006). Stern Review: The Economics of Climate Change. Cambridge University Press: Cambridge, UK.

Streck C. (2016). Mobilizing Finance for redd+ After Paris. Journal for European Environmental & Planning Law, 13, 2, 146–166.

Streck C. (2020). Who Owns REDD+? Carbon Markets, Carbon Rights and Entitlements to REDD+ Finance. Forests, 11, 9, 959.

Sunderlin W.D., Larson A.M. and Barletti J.P.S. (2018). Land and carbon tenure. In: Transforming REDD+: Lessons and New Directions. (Eds.) A. Angelsen, C. Martius, et al. Center for International Forestry Research (CIFOR): Bogor, Indonesia., pp. 93. ISBN: 978-602-387-079-0.

TCFD website. Task Force on Climate-related Financial Disclosures. Available at: https://www.fsb-tcfd.org/ [Accessed on 4 February 2022].

The Commodities and Jurisdictions Approach website. Methodology. Available at: https://commoditiesjurisdictions.org/methodology/ [Accessed on 4 February 2022].

Thomson E. (2020). Time for change: Delivering deforestation-free supply chains. Global Canopy: Oxford, UK.

TNFD website. Taskforce on Nature-related Financial Disclosures. Available at: https://tnfd.global/ [Accessed on 4 February 2022].

Trillion Trees website. Forests are our greatest hope. Available at: https://trilliontrees.org/ [Accessed on 4 February 2022].

Tropenbos International and Tropenbos Ghana (2019). Drastic changes are needed in the cocoa sector to halt deforestation in Ghana. Tropenbos International and Tropenbos Ghana: Wageningen, the Netherlands.

UN Decade website. Preventing, halting and reversing the degradation of ecosystems worldwide. Available at: https://www.decadeonrestoration.org/ [Accessed on 26 January 2022].

UN. 2021. Glasgow Leaders' Declaration on Forests and Land Use - UN Climate Change Conference (COP26) at the SEC – Glasgow 2021.

UN Climate Change News (2019). Forest Protection in Brazil Boosted through REDD-plus, 5 March 2019. Available at https://unfccc.int/news/forest-protection-in-brazil-boosted-through-redd-plus [Accessed on 6 May 2021].

UNEP (2021). State of Finance for Nature. Tripling investments in nature-based solutions by 2030. United Nations Environment Programme: Nairobi, Kenia.

UNFCCC (2014). Report of the Conference of the Parties on its nineteenth session, held in Warsaw from 11 to 23 November 2013. United Nations: New York, NY.

United Nations (2015). Paris Agreement. United Nations: Paris, France.

UN-REDD Programme (2015a). Country Approaches to REDD+ Safeguards. A Global Review of Initial Experiences and Emerging Lessons. UN-REDD Programme Secretariat: Geneva, Switzerland.

UN-REDD Programme (2015b). REDD+ Safeguards Information Systems. Practical Design Considerations. UN-REDD Programme Secretariat: Geneva, Switzerland.

UN-REDD Programme (2016a). Conceptual framework for country approaches to safeguards. UN-REDD Programme Secretariat: Geneva, Switzerland.

UN-REDD Programme (2016b). Country Approach to Safeguards: Framework for Clarifying the Cancun Safeguards. UN-REDD Programme Secretariat: Geneva, Switzerland.

UN-REDD Programme (2020). 11th Consolidated annual progress report of the UN-REDD Programme Fund. UN-REDD Programme Secretariat: Geneva, Switzerland.

UN-REDD Programme (2021a). Land-use planning and integrated approaches to reducing emissions from deforestation and forest degradation. UN-REDD Programme: Geneva, Switzerland.

UN-REDD Programme (2021b). Safeguarding People and Nature in REDD+: Meeting the Safeguards Requirements Under the United Nations Framework Convention on Climate Change. UN-REDD Programme Secretariat: Geneva, Switzerland.

UN-REDD website. Available at: https://www.un-redd.org/news/guest-blog-reaping-rewards-well-designed-benefit-sharing-arrangements [Accessed on 21 February 2022]

Uribe-Leitz E. and Ruf F.O. (2019). Cocoa Certification in West Africa: The Need for Change. Natural Resource Management in Transition.

Viana V. (2011). A Amazônia e o interesse nacional. Política Externa, 19, 4.

Watson C. and Schalatek L. (2021). Climate Finance Thematic Briefing: REDD+ Finance, Climate Finance Fundamentals 5. Heinrich Böll Stiftung Washington, DC & Overseas Development Institute, London. Additional data from Climate Funds Data Dashboard (https://climatefundsupdate.org/data-dashboard/).

Wibowo A. and Giessen L. (2015). Absolute and relative power gains among state agencies in forest-related land use politics: The Ministry of Forestry and its competitors in the REDD+ Programme and the One Map Policy in Indonesia. Land Use Policy, 49, 131–141.

Williams L.G. (2013). Putting the Pieces Together for Good Governance of REDD+: An Analysis of 32 REDD+ Country Readiness Proposals. World Resources Institute: Washington, D.C.

Williams L.G. and de Koning F. (2016). Putting accountability into practice in REDD+ programs. World Resources Institute: Washington, D.C.

Wong G., Luttrell C., Loft L., Yang A., Thuy P., Naito D., Assembe-Mvondo S., and Brockhaus M. (2019). Narratives in REDD+ benefit sharing: examining evidence within and beyond the forest sector. Climate Policy, 19, 8, 1–14.

Women's Environment and Developing Organization (2020). Engagement of Women and Gender-related groups in the Climate Investment Funds: An Assessment. Available at: https://www.climateinvestmentfunds.org/cif_enc/sites/cif_enc/files/knowledge-documents/wedo_final_report_7april2020.pdf [Accessed on 1 March 2022].

World Bank (2019). Ghana Signs Landmark Deal with World Bank to Cut Carbon Emissions and Reduce Deforestation. Available at: https://www.worldbank.org/en/news/press-release/2019/07/09/ghana-signs-landmark-deal-with-world-bank-to-cut-carbon-emissions-and-reduce-deforestation [Accessed on 31 August 2021].

World Bank Group (2019). Benefit sharing at scale: Good practices for results-based land use programs. International Bank for Reconstruction and Development / The World Bank: Washington, D.C.

Wunder S., Kaimowitz D., Jensen S., and Feder S. (2021). Coronavirus, macroeconomy, and forests: What likely impacts? Forest Policy and Economics, 131, 102536.

Chapter 3

Outcomes and Influences of REDD+ Implementation on Carbon

Lead authors: Emily Donegan and Marieke Sandker
Contributing authors: Frédéric Achard, Christelle Vancutsem, Anssi Pekkarinen, Örjan Jonsson, Julian Fox

TABLE OF CONTENTS

Abstract

Forests play an important role in the global carbon cycle, absorbing approximately 11 $GtCO_2$/year as they grow, which is equivalent to 29% of annual anthropogenic CO_2 emissions. Yet forests also emit an estimated 4 $GtCO_2$/year through deforestation and forest degradation, or 10% of the annual anthropogenic CO_2 emissions. Assessments in the literature of the mitigation potential of reducing deforestation and forest degradation vary widely from 0.4 – 5.8 $GtCO_2$eq/year. This chapter seeks to assess the impact REDD+ has had on carbon to date, and to assess its climate change mitigation potential.

By 1 January 2022, 17 countries had reported a combined amount of 11.4 $GtCO_2$eq REDD+ results (emission reductions and removal increases) achieved over the period 2006–2020, or an annual average of 0.8 $GtCO_2$eq.

This estimate is likely to be incomplete as not all countries have reported REDD+ results and countries with increasing emissions would likely not report to the UNFCCC. This chapter assesses global deforestation as reported by countries and by global Earth observation. The assessment suggests deforestation, though continuing at approximately 10 million ha/year, has been slowing globally. The findings suggest REDD+ has played a role in this reduction but to what extent, remains unclear. Country data is improving: the last decade has seen tremendous progress in measuring, reporting and verification of REDD+. The use of remote sensing observations to assess forest area change has advanced significantly: satellite imagery has become increasingly available, quality of imagery has improved over time, and countries have increased their capacities to analyse this imagery.

The literature suggests that, over the next decade, the largest mitigation potential from REDD+ is in reducing deforestation, while in the longer term, enhancing forest carbon through afforestation/reforestation will gain in importance. This chapter underscores the important role forests play in climate change mitigation and meeting the goals set in the Paris Agreement, yet stresses that the prime focus should remain to reduce fossil fuel emissions.

3.1. Introduction

In this chapter we attempt to assess the effect of REDD+ implementation to date on forest carbon. Despite the implementation of REDD+ and of other international agreements that seek to limit *forest*[1] loss, *deforestation* continues globally with an estimated area of 10 million hectares lost annually between 2015 and 2020 (FAO, 2020). The Glasgow Leaders' Declaration on Forests and Land Use, signed at the 26th Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC COP 26) in November 2021, is the latest such pledge, which aims at zero deforestation by 2030 and has been endorsed by 141 countries. Based on a literature review and global datasets, we evaluate recent patterns of deforestation and whether and to what extent any reductions in deforestation are attributable to REDD+. The first section (3.2) starts with an overview of REDD+ results and *emissions* reductions that have so far been reported to and verified by the UNFCCC. The following section (3.3) shows global deforestation from different datasets. Section 3.4. explores the *mitigation* potential of REDD+. The next section (3.5) looks at the progress made in measuring, reporting and verifying REDD+. In the next section (3.6) we then look at the impact of REDD+ on deforestation. Section 3.7 reviews the literature assessing local level impacts of REDD+ implementation on carbon, Section 3.8. discusses the role of REDD+ in meeting the temperature goal of the *Paris Agreement*, and overall conclusions are summarised in Section 3.9.

3.2. Reported REDD+ Outcomes

To evaluate the impact REDD+ has had on carbon we first look at what countries have reported to the UNFCCC. Yet, this estimate is likely to be incomplete as not all countries have reported REDD+ results, and countries with increasing emissions would likely not report on REDD+ to the UNFCCC. Therefore, in subsequent sections we broaden the scope and look beyond REDD+ reporting to the UNFCCC.

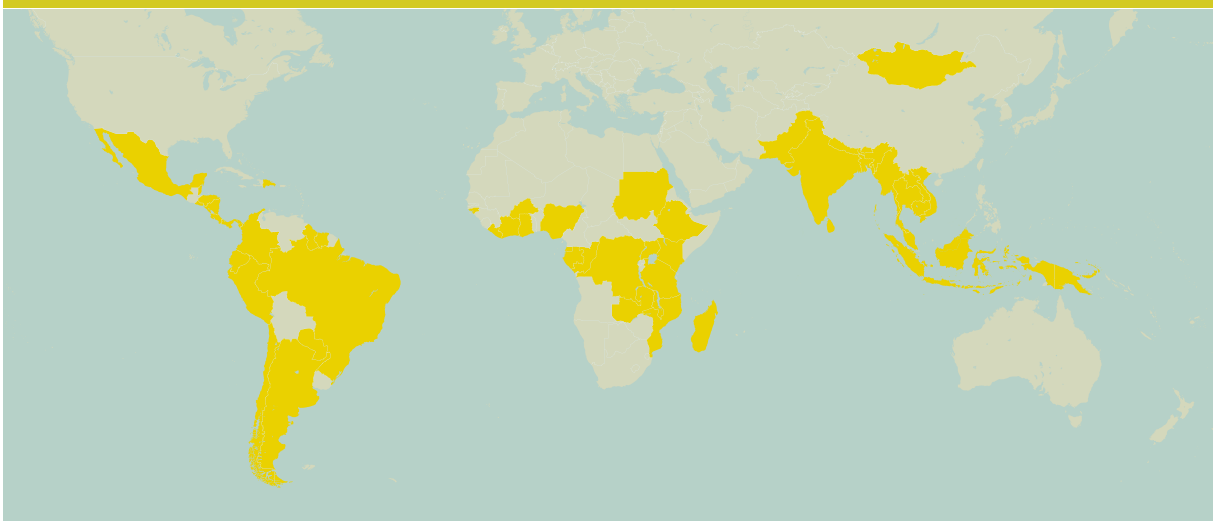
One of the four elements that countries need to develop in order to participate in REDD+ is a

1 All terms that are defined in the glossary of this report (Appendix 1) appear in italics the first time they are mentioned in a chapter.

forest reference emission level and/or forest reference level (hereafter referred to as 'reference level' see Chapter 2, Section 2.3.1), a REDD+ performance benchmark against which countries can report their achieved emission reductions and/or removal increases (UNFCCC COP 16, Decision 1). In June 2014 Brazil became the first country to submit a reference level to the UNFCCC for its Amazon biome, and as of December 2021, 54 countries had submitted 69 reference levels to the UNFCCC (see Figure 3.1.).

Figure **3.1**

A map showing countries (in yellow) that have submitted reference levels to the UNFCCC as of December 2021: 18 in Latin America, 16 in Asia and 20 in Africa



Source: UNFCCC (2021a)

As of 1 January 2022, 17 countries had also submitted REDD+ results (emission reductions and/or removal increases) to the UNFCCC assessed against their reference levels (UNFCCC, 2022). The submitted REDD+ results add up to 11.4 $GtCO_2$ over the period 2006–2020. Figure 3.2. shows the years for which the reported results have been achieved and shows large differences in volumes reported by countries. Over 80% of the total reported emission reductions come from Brazil. Regional differences are also remarkable: 86% of results reported come from Latin America, 12% from Asia and only 1.7% from Africa. So far, only Brazil and Indonesia have reported REDD+ results for as recent as 2019 and 2020. More countries may report results for these years in the near future.

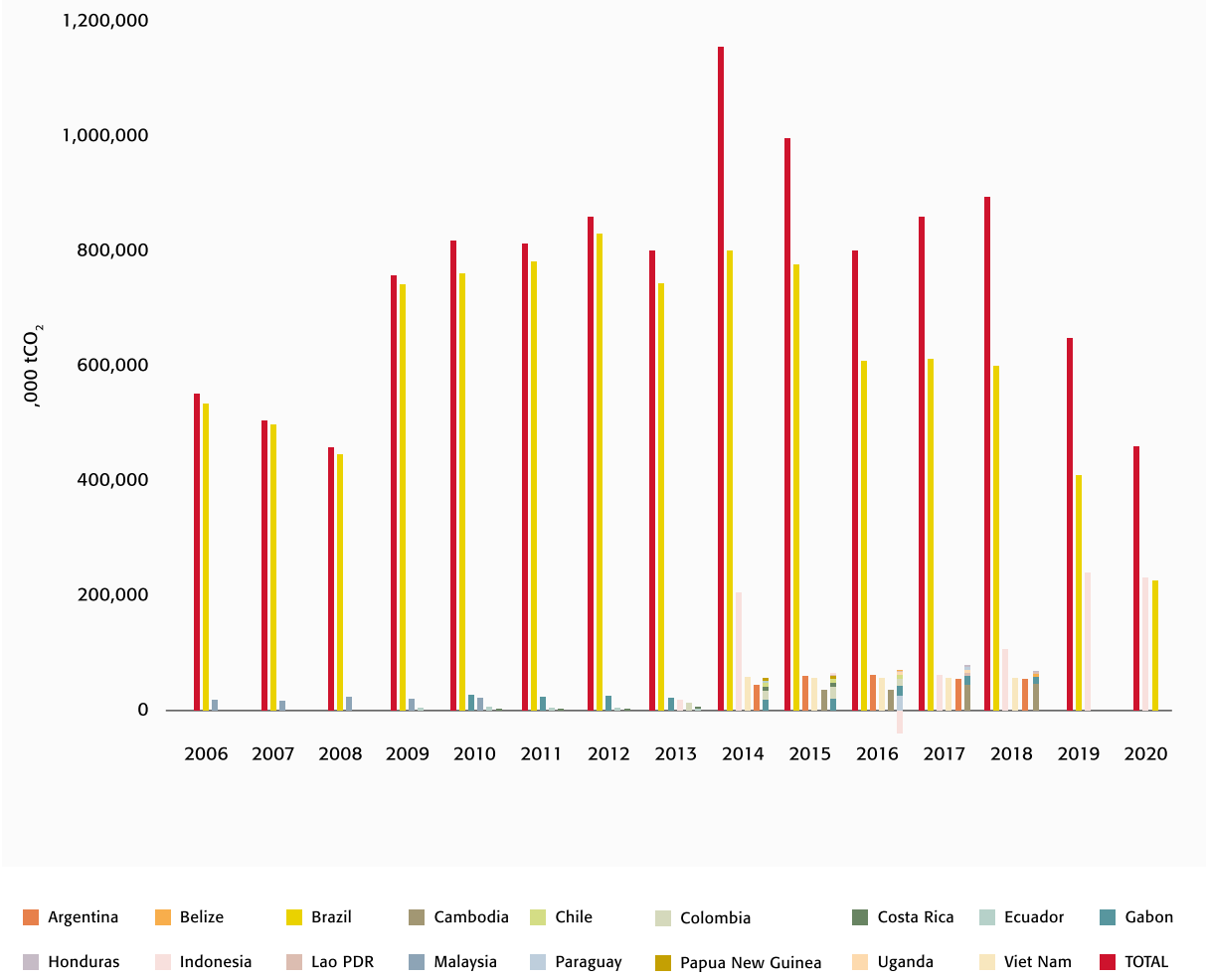
As the UNFCCC process of measuring, reporting and verification of results takes a considerable amount of time, delays are expected between achieving results and reporting them. The decline in Brazil's results reported for 2019 and 2020 is due to rising deforestation in recent years (Silva Junior et al., 2021).

Eight of the 17 countries (i.e., Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Indonesia and Paraguay) that submitted REDD+ results received results-based payments from the Green Climate Fund (GCF) as of December 2021 for a total of 100–130 $MtCO_2eq$[2] (0.1 $GtCO_2eq$) (see Chapter 2, Table 2.2). It has been suggested that these GCF payments mark the beginning of REDD+ implementation (Pearson, 2021). Chapter 2 provides detail on both jurisdictional and project-level finance.

2 The range corresponds to the amount of tCO_2eq offered to the GCF and the amount for which payments are offered (the difference being the scorecard deduction)

Figure **3.2**

Emission reductions (REDD+ results) reported to the UNFCCC by countries (as of 1 January 2022) – assessed against their reference levels



Source: UNFCCC (2022)

Activities under REDD+

Deforestation is the most frequently included activity in reference levels out of the five REDD+ activities (see Table 3.1). Of the reported REDD+ results, > 95% is derived from reducing emissions from deforestation and *forest degradation*, and < 5% comes from "plus" activities, i.e., conservation, sustainable management of forests and enhancement of forest *carbon stocks*.

Table **3.1**

REDD+ results reported to the UNFCCC as of 1 January 2022

Submission year	Submission	Results ('000 tCO_2) reported to UNFCCC	Results period (years)	Length of results	REDD+ activity
2014	BRAZIL (AMAZON)	2,971,022	2006–2010	5	Reduced deforestation
2016	COLOMBIA	28,984	2013–2014	2	Reduced deforestation
2016	ECUADOR	28,990	2009–2014	6	Reduced deforestation
2016	MALAYSIA	97,470	2006–2010	5	Sustainable management of forests
2017	BRAZIL (AMAZON)	3,154,502	2011–2015	5	Reduced deforestation
2018	CHILE	19,362	2014–2016	3	Reduced deforestation, Reduced forest degradation, Enhancement, Conservation
2018	COLOMBIA	31,475	2015–2016	2	Reduced deforestation
2018	INDONESIA	244,892	2013–2017	5	Reduced deforestation, Reduced forest degradation
2018	PARAGUAY	26,793	2016–2017	2	Reduced deforestation
2019	BRAZIL (AMAZON)	769,001	2016–2017	2	Reduced deforestation
2019	BRAZIL (CERRADO)	1,237,996	2011–2017	7	Reduced deforestation
2019	PAPUA NEW GUINEA	9,003	2014–2015	2	Reduced deforestation, Reduced forest degradation, Enhancement
2019	ARGENTINA	165,173	2014–2016	3	Reduced deforestation
2019	COSTA RICA	26,351	2010–2015	5	Reduced deforestation, Enhancement
2020	UGANDA	8,071	2016–2017	2	Reduced deforestation
2020	LAO PEOPLE'S DEMOCRATIC REPUBLIC	14,679	2015–2018	4	Reduced deforestation, Reduced forest degradation, Enhancement
2020	CAMBODIA	163,166	2015–2018	4	Reduced deforestation, Reduced forest degradation, Enhancement
2021	HONDURAS	1,766	2017–2018	2	Reduced deforestation
2021	BRAZIL (AMAZON)	546,506	2018–2019	2	Reduced deforestation
2021	BRAZIL (CERRADO)	697,486	2018–2020	3	Reduced deforestation
2021	VIET NAM	283,996	2014–2018	5	Reduced deforestation, Reduced forest degradation, Enhancement
2021	BELIZE	5,603	2016–2018	3	Reduced deforestation, Reduced forest degradation, Enhancement, Conservation

2021	INDONESIA	577,449	2018–2020	3	Reduced deforestation, Reduced forest degradation
2021	GABON	187,104	2010–2018	9	Reduced deforestation, Reduced forest degradation, Sustainable management of forests, Conservation, Enhancement
2021	ARGENTINA	109,459	2017–2018	2	Reduced deforestation
TOTAL		**11,406,299**			

Source: UNFCCC (2022)

Though the REDD+ results reported to the UNFCCC by 17 countries are encouraging, 37 countries that submitted a REDD+ reference level to the UNFCCC have yet to report results. It is possible that these countries are still assessing their emission reductions and will report REDD+ results at a later stage, but it is also possible that in some of these countries emissions from forests are increasing above their reference level. Only considering the countries that report emission reductions without considering those with emission increases would, at a global level, present a biased picture of REDD+. To assess whether REDD+ is having a positive impact on global deforestation it is useful to look beyond UNFCCC-reported REDD+ results, and to consider all countries. The following section looks at deforestation in all countries from different sources, and how deforestation is evolving over time.

3.3. The Global Evolution of Deforestation

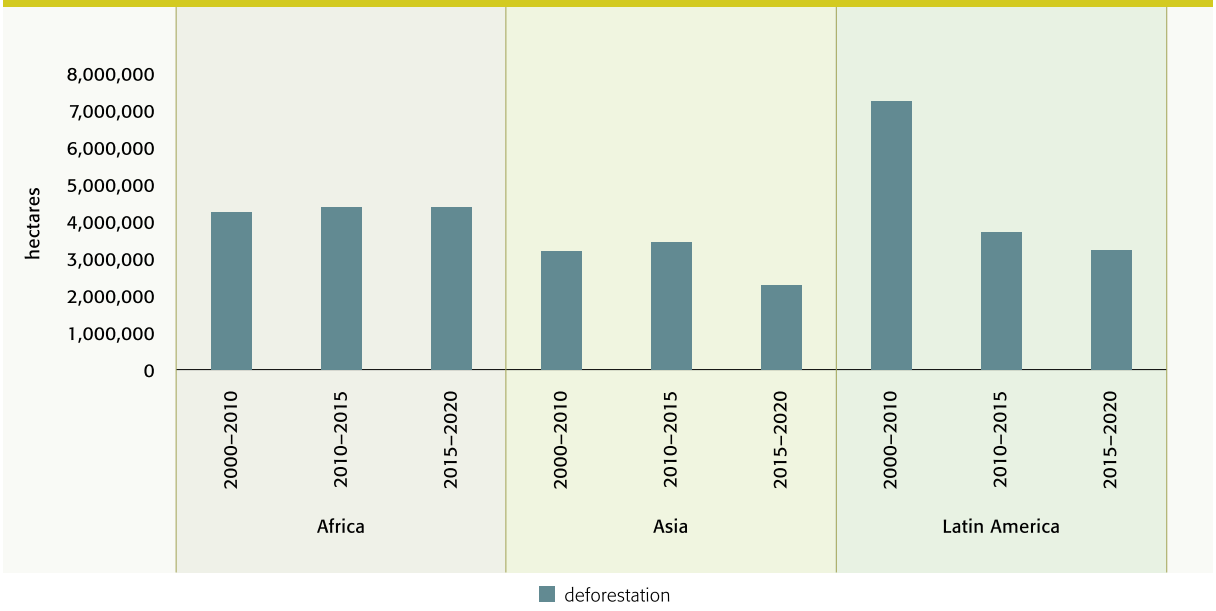
In this section we look at the latest estimates of deforestation. We first look at the data reported under the 2020 Global Forest Resources Assessment or FRA2020 (FAO, 2020) (national datasets). We then look at data as assessed through global Earth observation (satellite datasets) after which we compare them.

National datasets

Of the 236 countries and territories for which FRA2020 data is available, 123 (52%) reported on deforestation for the last decade. For those countries that did not report deforestation, the net forest area change was calculated and, if negative, was used to approximate deforestation. Hereafter, we refer to the combination of reported deforestation and negative net forest area change as 'deforestation'. According to FRA2020 reported data, an estimated 420 million hectares of forest were lost between 1990 and 2020, with more than 90% occurring in the tropics. Globally, while forest loss continues, the rate of deforestation is falling, i.e., forest loss is slowing. Broken down by region (see Figure 3.3), the deforestation rate in Africa has remained roughly unaltered or increased slightly since 2000, Asia shows a strong decrease in recent deforestation (2015–2020), and in Latin America deforestation rates have dropped steeply over the last decade (2010–2020) compared to the preceding decade (2000–2010). According to the FRA data, all countries in the Latin America and Caribbean region (hereafter referred to as Latin America) which have submitted a reference level to the UNFCCC (see Chapter 2, Section 2.3.1) have declining forest areas over the past 30 years, except for Chile, Costa Rica and the Dominican Republic. The same pattern of ongoing but slowing deforestation can be seen amongst the reference level submitting countries of Africa and Asia with few exceptions.

Figure **3.3**

Average annual deforestation in Africa, Asia and Latin America between 2000 and 2020



Source: FRA2020 – FAO, 2020

Satellite datasets

It is important to note that data used for the FRA (and UNFCCC) is reported by countries. The quality and methods used varies between countries. To control for this we also look at tree cover loss patterns over time in the three regions (Africa, Asia and Latin America) with independent satellite data – the Global Forest Change (GFC) dataset (Hansen et al., 2013) and the Tropical Moist Forest (TMF) dataset (Vancutsem et al., 2020). Both datasets (GFC and TMF) are based on the analysis of Landsat imagery, with a few differences as outlined in Box 3.1.

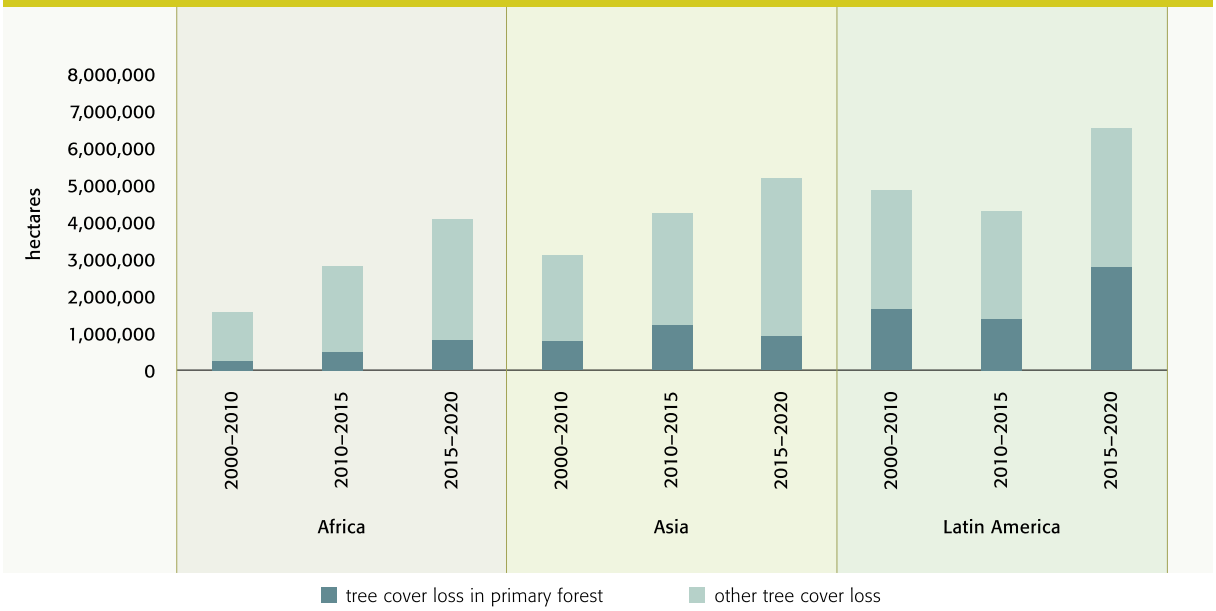
Box **3.1**

Comparing Global Forest Change (GFC) data and Tropical Moist Forest (TMF) data

The Global Forest Change dataset (GFC – Hansen et al., 2013) and the Tropical Moist Forests (TMF – Vancutsem et al., 2020) dataset are both wall-to-wall, Landsat imagery-based, tree cover assessments at 0.9 hectare resolution. GFC assesses a 20-year period while the TMF covers a 30-year period, and GFC is global while TMF covers the moist tropics. Both products depict disturbances (natural and anthropogenic). TMF also provides post-deforestation recovery per year, filtering out some temporary tree cover loss. GFC has been available since 2013, while TMF was released in 2021. TMF maps forest degradation for the first time at the pantropical scale and annually, in addition to deforestation. Another innovation of TMF is its characterisation of the sequential dynamics of forest changes by providing transition stages from the initial observation period – i.e. undisturbed forest, degraded forest, forest regrowth, deforested land, conversion to plantations, conversion to water, *afforestation*, as well as the timing (dates and duration) and intensity of each disturbance – which reduces the likelihood of double counting but also stresses the importance of considering forest degradation as a risk factor for subsequent deforestation (Vancutsem et al., 2020).

Figure **3.4**

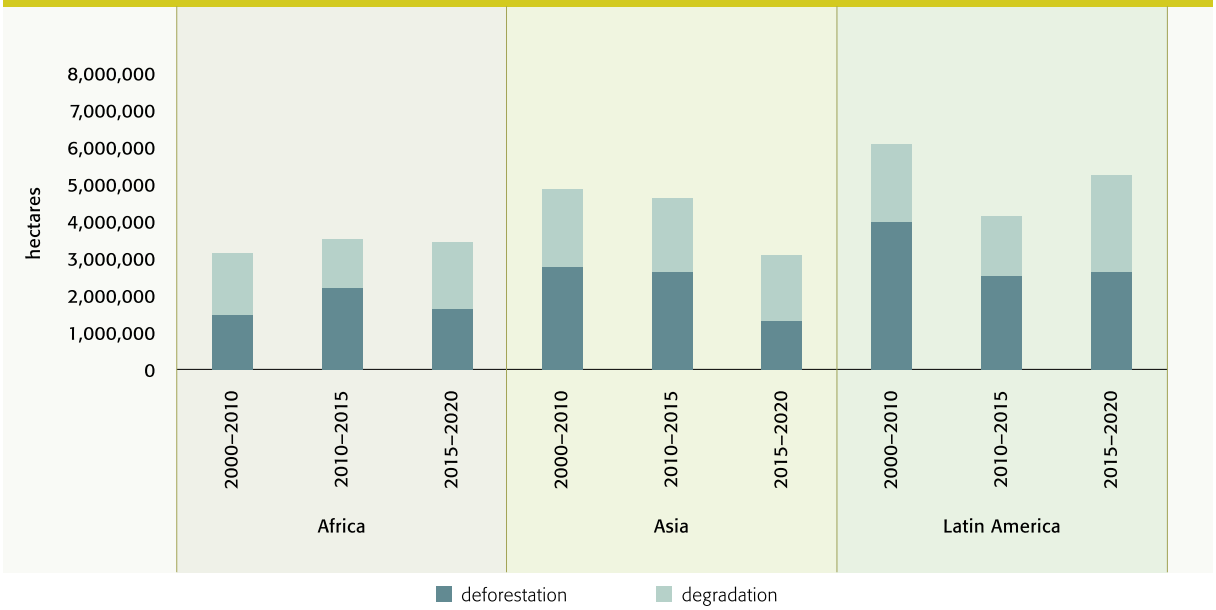
Average annual tree cover loss in Africa, Asia and Latin America between 2000 and 2020



Source: Global Forest Change dataset (Hansen et al., 2013)

Figure **3.5**

Average annual deforestation and forest degradation of Tropical Moist Forest in Africa, Asia and Latin America between 2000 and 2020



Source: Vancutsem et al., 2020, 2021 update

Comparison across datasets

Considering the data presented in Figures 3.3–3.5, different patterns in annual deforestation rates can be observed depending on the dataset used. Africa shows an almost constant rate of deforestation over the past 20 years according to the FRA2020 and TMF data, albeit with the TMF data estimating a rate about half that of FRA2020, due at least in part to its scope being limited to tropical moist forest only (indeed the lower TMF estimate is a feature common to all regions, consistent with this dataset's more limited scope). Asia and Latin America present overall decreases in deforestation over the past 20 years according to both FRA2020 and TMF data, albeit with different patterns. In contrast, the GFC data show increasing rates of tree cover loss across all three regions over the past 20 years.

The upwards trend in the GFC data, especially for 2015–2020, is not reflected in either the FRA2020 or the TMF data. However, when also considering the forest degradation estimates from the TMF dataset, the 2015–2020 rates are higher than 2010–2015 rates for Latin America, therefore part of the explanation of the upwards trend in GFC data may lie in degradation events that were included in the tree cover loss assessment, and in particular fires that occurred during the very strong El Niño-Southern Oscillation event of 2015–2016. Since tree cover does not always correspond to forest cover, differences between tree cover loss and deforestation can also be substantial, especially in countries with high tree crop dynamics where harvesting of tree crops will be included in the tree cover loss assessment (Sandker et al., 2021).

The higher estimates for 2015–2020 may also partially be an artefact as GFC data from 2013 onwards are based on an enhanced processing algorithm that has "resulted in enhanced detection of loss — particularly from 2015 onwards" (Global Forest Watch, 2021: para. 4). The Landsat 8 satellite has an improved sensor that may have resulted in better detections of tree cover loss smaller than an individual pixel (e.g., selective logging) since 2013 (Global Forest Watch, 2021). And finally, the number of Landsat images available per year has generally increased over time, which may result in increased detection of loss (Hojas-Gascon et al., 2015), especially in areas that are frequently cloud covered. Galiatsatos et al. (2020) found an overestimation of loss for 2016–2017 by GFC in Guyana, and Beuchle et al. (2020) found a similar overestimation for 2016–2017 in the Brazilian Amazon by GFC, which they attribute to the change in GFC's image processing method. Breidenbach et al. (2022) compared sample plots from the Finnish and Swedish national forest inventories with GFC data, and found GFC's ability to detect harvested areas to increase abruptly after 2015. These factors could mean that the upwards trend in GFC data does not correspond to actual increased deforestation on the ground but rather is an artefact of methodological improvements. For this reason, our further analysis in Section 3.6 considers only the FRA2020 and TMF data.

While the regional patterns of slowing deforestation in Asia and Latin America based on FRA2020 and TMF data might suggest progress in terms of halting deforestation, it is difficult to establish a causal relationship with REDD+ since we do not know how deforestation would have evolved in its absence. Section 3.6 explores this causal relationship.

3.4. What is the Mitigation Potential of REDD+?

While the impact that REDD+ has had so far on forest carbon remains to be further evaluated, it is still important to consider the theoretical potential of REDD+ for *climate change* mitigation. As described in Chapter 1, the five activities included in the UNFCCC's 2010 Cancún decision on REDD+ are: a) reducing emissions from deforestation, b) reducing emissions from forest degradation, c) conservation of forest carbon stocks, d) sustainable management of forests, and e) enhancement of forest carbon stocks (UNFCCC, 2011). REDD+ is intended to be a means of reducing emissions of *greenhouse gases*, particularly carbon dioxide, from forests, and of sequestering carbon dioxide from the atmosphere in forests.

If REDD+ implementation were to reduce emissions from deforestation and forest degradation to zero, then theoretically the mitigation potential of REDD+ would equal the mitigation potential of stopping deforestation and forest degradation, plus the potential of *sequestration* by enhancing forest carbon through "plus" activities (Box 3.2). Avoiding deforestation and forest degradation and enhancing the *carbon storage* capacity of forests have together been estimated to have the potential to contribute significantly to the mitigation required to keep global warming to < 2°C, i.e., one of the goals of the Paris Agreement. However, calculating these two halves of REDD+ mitigation potential – preventing emissions and enhancing the *sink* – is challenging, as this section will reveal.

Forests and global carbon fluxes

Terrestrial *ecosystems* (predominantly forests) can act as both *carbon sinks* and *sources*. The net terrestrial or land flux is the net of CO_2 emissions (from for example, deforestation and forest degradation) and CO_2 removals from forests and other vegetation as they convert atmospheric CO_2 to *biomass* through photosynthesis. Over the past decade (2011–2020) land use, land-use change and forestry (LULUCF) emissions (mostly resulting from deforestation and forest degradation) were 4.1 ± 2.6 $GtCO_2$/year, which is 10% of the total anthropogenic CO_2 emissions of 38.9 $GtCO_2$/year (Friedlingstein et al., preprint). However, the terrestrial sink (mostly growing forests absorbing CO_2) has been significantly larger than the emissions from land use change (IPCC, 2014) sequestering 11.4 ± 2.2 $GtCO_2$/year, which is as much as 29% of annual anthropogenic CO_2 emissions between 2011 and 2020 (Friedlingstein et al., preprint). Considering the net of LULUCF emissions and removals by the terrestrial sink, the land flux sequesters about 21% of annual fossil fuel emissions (ibid.)

Box **3.2**

Global Carbon Budget

Scientists from 70 institutions worldwide summarise the global carbon budget (GCB) (Friedlingstein et al., preprint). These GCB estimates for LULUCF are the main reference used in the IPCC's Special Report on Climate Change and Land (IPCC, 2019) and the 6th Assessment Report Working Group 1 (IPCC, 2021). The GCB 2021 saw a strong revision compared to the GCB 2020 (Friedlingstein et al., 2020). For example, LULUCF emissions were 6.6 $GtCO_2$ for the year 2019 in GCB 2020 and 3.8 $GtCO_2$ for the same year in GCB 2021, and the LULUCF emission trend went from slightly upwards to slightly downwards. These changes were mostly due to a change in one of the bookkeeping models.

The land-use change and terrestrial sink fluxes remain the most uncertain components of the global carbon cycle (Houghton et al., 2012; Harris et al., 2021; Friedlingstein et al., preprint). Estimates in the scientific literature of net emissions from deforestation range from 2.9 to 5.0 $GtCO_2$/yr (Pan et al., 2011; Achard et al., 2014; IPCC, 2014; Baccini et al., 2017; Houghton and Nassikas, 2018; Gasser et al., 2020; Friedlingstein et al., preprint; Tubiello et al., 2021). These estimates are difficult to compare directly because of different definitions, periods covered, scopes and methodologies used. Estimates of the sink function of forests (excluding regrowth estimates subsumed in net deforestation) comprise an even wider range from -8.8 to -16 $GtCO_2$/yr (Pan et al., 2011; IPCC, 2014; Houghton and Nassikas, 2018; Harris at al., 2021). Some authors estimate that tropical forests are a net source (Pan et al., 2011; Baccini et al., 2017), while others (Harris et al., 2021) calculate a net sink.

The GCB does not provide non-CO_2 LULUCF emissions or total GHG emissions. In contrast, the IPCC (2019) provides total CO_2 and GHG emissions, with total anthropogenic CO_2 emissions estimated at 39.1 $GtCO_2$/yr and total anthropogenic GHG emissions estimated at 52.0 $GtCO_2$eq/yr (2007-2016 averages). Emissions from deforestation and forest degradation in the text refer to LULUCF also known as forestry and other land use (FOLU). Agriculture contributes non-CO_2 emissions such as methane and AFOLU (agriculture, forestry and other land use) is responsible for 23% of anthropogenic GHG emissions (IPCC, 2019).

Globally, vegetation is estimated to store between 381 and 860 GtC (Pan et al., 2011; Erb et al., 2018; Friedlingstein et al., 2020; Xu et al., 2021), equivalent to 1,650 and 3,150 $GtCO_2$ respectively, underscoring the importance of conserving and protecting forests. Forests are currently an important sink. Over the past 300 years, global forest area has decreased by about 40% (Newton, 2021) meaning that for three centuries, the land flux was positive (i.e., net emissions) or close to zero. This trend reversed during the second part of the 20th century (IPCC, 2021) and in recent decades, the land flux is an important sink that has been growing between 1960 and 2010. There are several explanations for this growing land sink. The first is legacy removals in regrowing vegetation, because per hectare carbon uptake in secondary forest is higher than primary forest (Houghton and Nassikas, 2018). For example, as European forests have been recovering in area and growing stock since the 1950s and as forest management practices have improved, they have been a consistent and increasing carbon sink for decades (Nabuurs et al., 2013). The second explanation is CO_2 fertilisation: higher CO_2 concentrations in the atmosphere are resulting in increased photosynthesis (Gifford, 1994; Houghton and Nassikas, 2018). Many studies find intact forests to be important carbon sinks (Carey et al., 2001; Zhou et al., 2006; Lewis et al., 2009; Luyssaert et al., 2008; Tan et al., 2011) which could be explained by CO_2 fertilisation. Hubau et al. (2020) compiled and analysed plot measurements in structurally intact old growth forest in Africa revealing a consistent large sink for three decades up to 2015. Other factors that may have contributed to the increasing sink function are the lengthening of the growing season in northern temperate and boreal areas as a result of climate change (Friedlingstein et al., 2020) and a decline in burned area over the past decades (Forkel et al., 2019; Jia et al., 2019). However, this decline in global burned area is mostly from grasslands and coincides with a small increase in burned forest area and resulting forest fire emissions (Zheng et al., 2021), offsetting (part of) the increased sink function of grasslands.

Nevertheless, several studies suggest the sink function of forests is reaching saturation. Nabuurs et al. (2013) found early signs of saturation in European forests, as they are increasingly mature, with older age classes and lower per hectare growth and CO_2 uptake. Hubau et al. (2020) suggested the sink function of intact pan-*tropical forests* as a result of CO_2 fertilisation is likely saturated and may have peaked in the 1990s. Likewise, Gatti et al. (2021) found the Amazonian forest carbon sink to be in decline as a result of deforestation and increased tree mortality caused by climate change. We may be at a turning point where the trend in the terrestrial sink function is inverted, at least in standing forest. As such, future mitigation potential from forests may need to be found in afforestation, *reforestation* and *restoration*, which would correspond to (part of) the plus in REDD+.

Mitigation potential of REDD+ activities

Looking to the potential future role of forests and other land uses in *climate* mitigation, Roe et al. (2021) estimated the land-based mitigation potential for the period 2020–2050 at 8–13.8 $GtCO_2eq$/year. Of this, approximately 3.5–6.6 $GtCO_2eq$/year is the mitigation potential of protecting, managing and restoring forests and other ecosystems (the remaining mitigation potential being mostly from agriculture). The range is reduced to approximately 3–5.6 $GtCO_2eq$/year if developed countries[3] are excluded. The mitigation potential from REDD+ would be slightly smaller than this range since it is limited to developing countries participating in REDD+ and excludes the mitigation potential in non-*forest ecosystems*. Other studies (Griscom et al., 2017; Roe et al., 2019) found somewhat higher land-based mitigation potentials.

Halting deforestation is believed to be the land-based activity with the largest mitigation potential in the short term (i.e., the next decade - Roe et al., 2017; 2021). Roe et al. (2021) estimated the cost-effective mitigation potential of reducing deforestation at 3.7 $GtCO_2eq$/year (entirely from developing countries), with a range of 1.6 – 5.6 $GtCO_2eq$/year. Earlier estimates suggested a wider range of 0.4 – 5.8 $GtCO_2eq$/year (Roe et al., 2017; Jia et al., 2019). The current combined reference level values (considering only emissions from deforestation) add up to 3.6 $GtCO_2$ for the year 2017. Since reference levels are the benchmark for performance, 3.6 $GtCO_2$ can therefore be seen as the maximum achievable annual emissions reduction from reducing deforestation for the area covered. This estimate is incomplete since not all countries have submitted a reference level to the UNFCCC, yet the countries in this estimate cover approximately 70% of global deforestation (FAO, 2020). Recent global estimates of net emissions from deforestation range from 2.9 to 5.0 $GtCO_2$/year. Reducing deforestation

3 In this report, the terms "developed" and "developing" countries are used, in line with UNFCCC terminology.

and forest degradation to zero (i.e., a mitigation potential of 2.9–5.0 $GtCO_2eq$/year) in practical terms is challenging. Globally, the main driver of deforestation is agriculture through cropland and pasture expansion (Hosonuma et al., 2012; Busch and Ferretti-Gallon, 2017; Sandker et al., 2017; Pendrill et al., 2019; FAO, 2021). FAO projects that land area under cropland will expand by 70 million hectares by 2050, mostly in countries of sub-Saharan Africa and Latin America (Alexandratos and Bruinsma, 2012). As such, a delicate balance may exist between reducing deforestation significantly while safeguarding food security.

In the longer term, afforestation/reforestation (A/R) is believed to have the largest mitigation potential (only part of which would be under REDD+) (Roe et al., 2017). Roe et al. (2021) valued 'cost effective' mitigation at USD 100/tCO_2eq. Using this figure, they estimated the cost-effective mitigation potential of A/R at 1.2 $GtCO_2eq$/year, which is starkly lower than its estimated technical potential of 8.5 $GtCO_2eq$/year. This large difference may explain the strongly diverging estimates of A/R mitigation potential by different sources. Of this mitigation potential of 1.2 $GtCO_2eq$/year globally, 0.9 $GtCO_2eq$/year is from *low- and middle-income countries* (which in part could be covered under REDD+) and 0.3 $GtCO_2eq$/year is from *high-income countries*. The IPCC estimated that an additional 1 billion hectares of forest will be needed to limit global warming to 1.5 °C by 2050 (IPCC, 2019).

Roe et al. (2021) estimated the cost-effective mitigation potential of forest management at 0.9 $GtCO_2eq$/year, which is reduced to 0.6 $GtCO_2eq$/year if high-income countries are excluded from the estimate. The combined cost-effective mitigation potential of reducing deforestation, of afforestation/reforestation and of forest management in low- and middle-income countries is 5.0 $GtCO_2eq$/year (Roe et al., 2021).

Finally, REDD+ may have some overlap with reducing and reversing peatland degradation and mangrove loss. These activities have a combined cost-effective mitigation potential of 0.5 $GtCO_2eq$/year (in low- and middle-income countries only) according to Roe et al. (2021).

Equating the mitigation potential of REDD+ to the emissions from deforestation and degradation and potential carbon enhancement ignores the practicalities of actually implementing REDD+. Section 3.7 reviews literature of more local scale assessments of the impact of REDD+ implementation.

Taman Negara (Malaysia), one of the oldest forests in the world
Photo © Nelson Grima

3.5. Progress in Measuring, Reporting and Verification for REDD+

National forest monitoring has seen great progress over the past 15 years (FAO, 2018; Neeff and Piazza, 2019; Nesha et al., 2021; Sandker and Neeff, 2021). Nesha et al. (2021) found that the number of countries monitoring forest area using remote sensing at good to very good capacities increased from 55 in 2005 to 99 in 2020. Likewise, the number of countries with good to very good national forest inventory (NFI) capacities increased from 48 in 2005 to 102 in 2020 (Nesha et al., 2021). Capacity improvements were found to be more widespread in the tropics, which can be linked to international investments for forest monitoring in the context of REDD+ (Nesha et al., 2021; Sandker et al., 2021). Neeff and Piazza (2019) found more pronounced progress in satellite land monitoring compared to forest inventories.

The use of remote sensing observations to assess forest area change has advanced significantly in recent years, with increases in quality, availability and abundance of remote sensing data (in particular free access to the Landsat archive and Sentinel satellite data). Countries' capacities to access and analyse satellite imagery to create land cover (change) maps and collect sample data greatly improved with newly developed open source software and platforms (Bey et al., 2016; SEPAL, 2022; Tzamtzis et al., 2019).

The science around remote sensing-based forest area estimation has also advanced, providing recommendations for robust area estimations (Olofsson et al., 2013; 2014; Stehman, 2014; GFOI, 2020). One important recommendation is the use of sample-based estimates rather than pixel counts (map area statistics) (Olofsson et al., 2014; Achard and House, 2015; Tyukavina et al., 2015; GFOI, 2020), which is especially useful where change maps are created through post-classification, an approach that is prone to escalation of errors (Tewkesbury et al., 2015). While pixel counts were the predominant method for assessing deforestation areas in the early years of reference level reporting to the UNFCCC (2014–2016), countries have gradually shifted towards the use of sample-based area estimates for deforestation (FAO, 2019) and in 2021 all reference levels submitted to the UNFCCC used sample-based assessments for estimating deforestation area (UNFCCC, 2021a). Sandker et al. (2021) analysed a few countries where pixel counts were replaced with sample-based area estimates resulting in a downwards revision of deforestation estimates in two cases by a factor of 3 and 15 respectively. This finding indicates that care should be taken in comparing older data with more recent estimates.

The increased satellite image availability coupled with advances in (cloud) computing also enabled consistent and systematic land monitoring at the global level, from the early 1990s to present, resulting in freely available global maps of tree cover: the Global Forest Change data (Hansen et al., 2013) and Tropical Moist Forest data (Vancutsem et al., 2020). Several countries have made use of these global products, in particular of the Global Forest Change product (Hansen et al., 2013), as an interim step in their forest area change assessments, i.e., by 'translating' it into a forest area change map used for stratification of their sample-based assessment (Sandker et al., 2021).

At present, the main source of independent information for assessing forest cover change especially in tropical countries is Earth observation data from various satellites. In the technical assessment of forest reference levels and the technical analysis of REDD+ results, occasionally comparisons are made with the GFC data (TMF data may be used for this purpose as well in the future) as part of verification. Countries are occasionally asked to explain differences with these products. Yet, global products may not always perform accurately at national scale as illustrated by the discrepancies between nationally-generated estimates of forest cover and the estimate of global assessments such as the Global Forest Change assessment (Melo et al., 2018; Harris et al., 2018; Sandker et al., 2021). For example, identification of trees in drylands and distinguishing tree-crops from forest trees are two activities that are improved by the engagement of interpreters that have local field knowledge of an area/country (Sandker et al., 2021).

Challenges and knowledge gaps

Despite the advances made in monitoring, reporting and verification of REDD+, many knowledge gaps remain. Knowledge gaps relating to 'measuring' aspects include uncertainty of estimates, exclusion of certain carbon pools such as soil, deadwood or litter, exclusion of certain activities such as degradation, or exclusion of gases other than CO_2.

Degradation is more difficult to monitor than deforestation. Global emissions from forest degradation estimates vary widely from 25% (Pearson

et al., 2017) to over 65% (Baccini et al., 2017) of total forest-related emissions. FAO (2020) found 34% of emissions in UNFCCC reference levels to come from forest degradation. Little more than half the countries submitting a reference level include forest degradation (FAO, 2020). Monitoring of forest degradation often requires high-resolution satellite imagery and sufficiently dense time series to distinguish it from deforestation and natural disturbances. Countries are faced with many challenges around the 'plus' in REDD+ as discussed in Lee et al. (2018). Little more than half of the countries submitting a reference level include one of the plus activities (FAO, 2020). Soil carbon is also difficult and costly to measure – requiring field sampling and with a currently limited role for remote sensing. Peat forests, such as those recently discovered in the Amazon and Congo basins (Draper et al., 2014; Dargie et al., 2017; Mitchard, 2018) and those already degraded in southeast Asia, have the potential to release large quantities of emissions from the organic soil following deforestation events, fires and climate change. Restoration of peatlands has a significant potential to halt and reverse emissions from organic soils (Roe et al., 2021). The exclusion of below ground carbon from estimates of emissions from deforestation overlooks the large potential of peat in particular.

Countries are increasingly calculating the uncertainty of their estimates; however, frequently these estimates are missing in reference level submissions or they have been incorrectly calculated (FAO, 2020; Yanai et al., 2020). Neeff (2021) discusses the risk of over-estimating emissions (reductions) if biases in data are not properly addressed. Reporting on uncertainty is essential for the credibility of estimates of forest *carbon emission* reductions, and therefore for eventual payments for the same (Birigazzi et al., 2019), as well as to enable comparisons to be made between estimates (Federici et al., 2017).

3.6. The Impact to Date of REDD+ on Deforestation

To determine whether the decrease in deforestation might be attributed to REDD+, we compare deforestation trends in developing countries that have engaged in REDD+ with those that have not, using the proxy of whether or not a country has submitted a reference level to the UNFCCC. Those that have submitted a reference level are labelled as 'REDD+ countries', those that have not, are labelled 'non-REDD+ countries', and these labels are used to filter the data. We compare differences in how deforestation has evolved for REDD+ and non-REDD+ countries using FRA2020 and TMF data. It should be noted however, that the proxy of REDD+ countries is imperfect as it excludes countries that are engaging in REDD+ (for example through the Forest Carbon Partnership Facility) but have not submitted a reference level to the UNFCCC, while some countries that have submitted a reference level to the UNFCCC may not have made progress yet on actual REDD+ implementation. For the analysis with TMF data, only countries with an undisturbed forest area > 1 Mha in 1990 were included. The analysis includes 51 countries and covers 43% of the forest area and 61% of the deforestation in developing countries.

Of the REDD+ countries, 46% reported a reduction in deforestation in FRA2020 over the past decade (i.e., 2015–2020 deforestation rates were lower than 2010–2015 deforestation rates) while only 16% of non-REDD+ countries reported a reduction in deforestation over the same period (Table 3.2). Of the REDD+ countries that did not report lower deforestation in the most recent 5-year period, 15% were HFLD (high forest, low deforestation) countries, which typically employ a reference level that is above historical average emissions. For those countries, deforestation might still have been reduced against projected rates. In addition, looking only at the countries that achieved a reduction in deforestation, this reduction was on average larger for REDD+ countries (15%) than for non-REDD+ countries (9%) (Table 3.2).

Making the same comparison using TMF data suggests larger reductions for both, with as many as 85% of REDD+ countries seeing a reduction in their deforestation, against 33% of non-REDD+ countries. However, of those countries that achieved a reduction, the average reduction was smaller for REDD+ countries compared to non-REDD+ countries with a 31% versus 43% reduction (Table 3.2).

Table **3.2**

Comparison of the evolution of deforestation over the last 10 years in REDD+ and non-REDD+ countries (i.e., comparing 2015-2020 against 2010-2015)

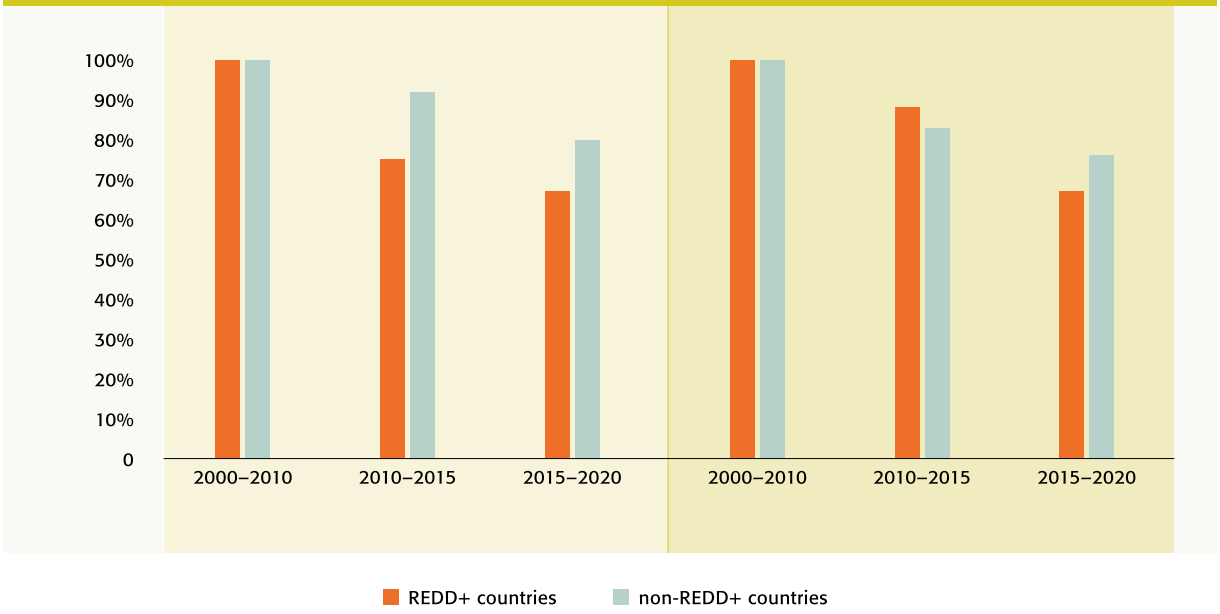
	Total number of developing countries (n)		Share of countries with reduced deforestation over the last 5 years		Average reduction (%)	
	REDD+ countries	non-REDD+ countries	REDD+ countries	non-REDD+ countries	REDD+ countries	non-REDD+ countries
FRA2020	54	92	46%	16%	-15%	-9%
TMF	40	12	85%	33%	-31%	-43%

Table 3.2 gives percentages of countries that saw deforestation reductions but we can also sum all deforestation areas (i.e., perform a weighted analysis). Summing all average annual deforestation areas in all REDD+ and non-REDD+ countries respectively gives different results depending on whether FRA2020 or TMF data are used, and the time period evaluated (see Figure 3.6). Any assessment of reduction of deforestation is strongly dependent on the reference period chosen: comparing the most recent 10-year period against the preceding 10-year period shows a strong decline in both FRA2020 and TMF data (29% and 22% reductions in REDD+ countries respectively). Instead, comparing the most recent 5-year period against the preceding 5-year period (as done in Table 3.2) using FRA2020 data, shows that the reduction in deforestation in REDD+ countries is much smaller (only 10%) and that there are no large differences in achieved reduction between REDD+ and non-REDD+ countries. The limited deforestation reduction in FRA2020 data may (partially) be due to early performance (pre-2010) of some large REDD+ countries, notably Brazil. Another factor affecting the results could be that FRA 2020 data are partially forecasts based on past trends and values, as most of the data were collected in 2018. In contrast, TMF data shows a relatively large decline in deforestation (25%) for the most recent 5-year period and suggests a large difference between REDD+ and non-REDD+ countries, with a larger share of REDD+ countries reducing deforestation than non-REDD+ countries.

Perhaps the most striking feature revealed by Figure 3.6. is the overall downwards trend in deforestation for both REDD+ and non-REDD+ countries. Although REDD+ countries seem to perform slightly better in reducing deforestation, their contribution to the downwards global trend discussed in the next section appears to be modest. While REDD+ was first detailed in UNFCCC negotiations texts at COP 15 and COP 16 in 2009 and 2010, its full implementation only began in the past two years with results submissions by just 17 countries to date and the first GCF results-based payments agreed only in 2019 (FAO, 2019). It may therefore, still be too early to assess jurisdictional REDD+ performance for most countries.

Figure **3.6**

Average annual deforestation in REDD+ (red) versus non-REDD+ (blue) countries as assessed with FRA2020 data (left) and TMF data (right)



Source: FRA2020 data (left) and TMF data (right). The annual average values have been standardised to the annual average loss in 2000-2010 (set to equal 100% for both datasets) to facilitate comparison.

3.7. Other Studies Evaluating the Carbon Impact of (Project-level) REDD+

Little research has been published that tries to quantify the impacts of existing REDD+ implementation, particularly on deforestation rates or emissions. Most existing studies focus on REDD+ projects, not on jurisdictional scale REDD+ (Duchelle et al., 2018; Roopsind et al., 2019; Demarchi et al., 2021).

Though not strictly related to REDD+, Jayachandran et al. (2017) evaluated the effect in terms of tree cover loss of a *payment for ecosystem services* scheme in Uganda whereby randomly selected participants received payments for not cutting down trees. Simonet et al. (2019) attempted to evaluate the impact of a sub-national REDD+ project in Brazil, compared to what would have happened had the programme not taken place (the counterfactual), and Roopsind et al. (2019) attempted to evaluate the impact of a national REDD+ programme in Guyana using the synthetic control method. All three sets of studies find that rates of tree cover loss decreased during REDD+ implementation. However, Roopsind et al. (2019) found that rates of forest loss increased again after project end, exemplifying one of the major criticisms of REDD+ (van Oosterzee et al., 2012): the issue of the permanence of emissions reductions. A similar lack of permanence has also been reported post-REDD+ projects in Brazil (Demarchi et al., 2021). Furthermore, Roopsind et al. (2019) found evidence of (international) *leakage* – another of the major criticisms of REDD+ – with increased rates of forest loss across the border in neighbouring Suriname. Roopsind et al.'s (2019) study provides evidence of the problems of permanence and leakage in a national REDD+ programme, as well as providing evidence that REDD+ results can be both tangible – with reductions in forest loss – and additional, representing a departure from business as usual.

Additionality is the third of the major criticisms of REDD+, due to the uncertainty around whether REDD+ results can really be judged to be additional, or whether they would have happened in the absence of REDD+ activities. Ellis et al. (2020) carried out a similar synthetic control analysis of villages engaging in REDD+ in Mexico and found that evidence of reduction in forest loss was less clear cut, with at least half of the villages showing no impact of REDD+ on forest loss. Villages where

REDD+ interventions had no impact were associated with factors such as poor *governance* and presence of competing land uses (cattle farming and commercial agriculture), highlighting the importance of governance in effective implementation of REDD+ (see Chapter 2). Bos et al. (2017) using similar methods to Ellis et al. (2020) ('Before-After-Control-Intervention') found minimal impact of REDD+ on tree cover loss rates in sub-national projects in six countries. These studies are among the first of their kind, in attempting to model the counterfactual of REDD+. Some of their conclusions may be associated with project-level implementation and could differ with jurisdictional REDD+. Further research is needed to evaluate the impact of REDD+ on carbon, particularly now that payments for results are beginning to be disbursed at the national level.

3.8. How Crucial is REDD+ to meet the Paris Agreement?

The goal of the Paris Agreement is to limit global warming "to well below 2°C above pre-industrial levels" and to pursue "efforts to limit the temperature increase to 1.5°C above pre-industrial levels" (United Nations, 2015). So far, human activity is estimated to have caused between 0.8 and 1.2°C of warming compared to pre-industrial levels (IPCC, 2018). A number of studies have pointed to the importance of protecting and enhancing the carbon sink of forests as part of climate change mitigation, and specifically as part of modelled pathways to remain within the Paris Agreement temperature rise of 1.5 or 2°C (Canadell and Raupach, 2008; Humpenöder et al., 2014; Griscom et al., 2017; IPCC, 2018). The IPCC assessed pathways that are projected to limit warming to 1.5°C or well below 2°C and stated with high confidence that they all require land-based mitigation and land-use change, with most including different combinations of reforestation, afforestation, reduced deforestation and bioenergy (IPCC, 2019).

Grassi et al. (2017) calculated that if all intended nationally-determined contributions (INDCs) under the UNFCCC were fully implemented, forests would become a net sink of carbon by 2030, providing a quarter of countries' intended emissions reductions. Similarly Roe et al. (2019) estimated that in all nationally determined contributions (NDCs) submitted so far the land sector contributes 10–30% of all planned emissions reductions by 2030. Roe et al. (2019) reviewed 1.5 °C scenarios and associated mitigation pathways for the Agriculture, Forestry and Other Land Use (AFOLU) sector. They also emphasised that submitted NDCs are not yet enough to limit warming to 1.5 °C and would lead instead to warming of 2.5 to 3 °C.

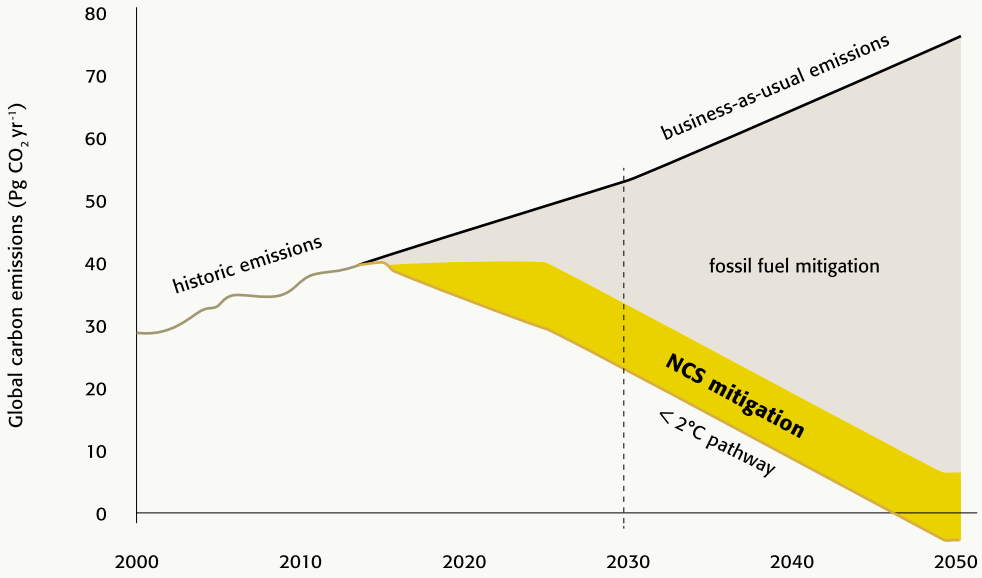
Similarly, in its 2021 NDC synthesis report, the UNFCCC noted that achievement of current NDCs will result in a 15% increase in total emissions by 2030 compared to 2010, when a 45% decrease in emissions is what is needed to keep temperature rise to 1.5 °C (UNFCCC, 2021b). Early action (i.e., in the next decade) is essential to achieve the Paris Agreement targets, particularly the 1.5 °C target. Across all 1.5 °C scenarios modelled by Roe et al. (2019), net zero emissions are achieved in the LULUCF sector by 2030. Carbon dioxide emissions from deforestation decreased by 40% to 1.6–2.9 $GtCO_2$/yr (compared with 2.5–5.4 under 'Business as Usual') by 2050 in all 1.5 °C scenarios they analysed. They also estimated that a 95% reduction compared to 2018 in deforestation and degradation is needed by 2050 in order to remain below the 1.5 °C limit of the Paris Agreement.

Griscom et al. (2017) pointed out that 'natural climate solutions' (i.e., protecting and enhancing the land sink and avoiding/reducing emissions from AFOLU), including reducing deforestation and enhancing reforestation, are particularly important in the near-term – between now and 2030 – to keep temperature increases below 2 °C. They also emphasised that immediate action on natural climate solutions should not limit action to cut fossil fuel use (Figure 3.7).

According to the roadmap to 1.5 °C for the land sector developed by Roe et al. (2019) there is a large gap between progress so far and what is needed to reduce temperature rise to below 1.5 °C. Though the rate is decreasing, deforestation has continued, despite the urgent need for it to decline by 70% by 2030 and by 95% by 2050 to remain below 1.5 °C. Commitments to restore ecosystems have increased, for example under the Bonn Challenge, however Roe et al. pointed out that only 20% of forest restoration pledges included in NDCs contain quantifiable targets and estimated that commitments fall 280 Mha short of what is needed in terms of afforestation/restoration. The foremost criticism of REDD+ so far is that not enough is being done.

Figure **3.7**

Projected potential contribution of natural climate solutions to reduce warming below 2 °C over the next 30 years



Source: Griscom et al. (2017)

3.9. Conclusions

The importance of preserving forests for climate change mitigation is clear, and REDD+ has the potential to play a significant role to promote forest protection and sink enhancement. In this chapter we reviewed reported REDD+ results, attempted to assess the impact of REDD+ on global deforestation, reviewed estimates of REDD+ mitigation potential, discussed the progress of REDD+ monitoring, reporting and verification, reviewed studies that attempted to assess local level REDD+ impacts, and finally we discussed barriers and knowledge gaps that need to be addressed. While REDD+ has been on the international agenda for over 10 years, only more recently have results been reported and studies published that attempt to verify results. These are steps in the right direction, but it is still too early to fully assess the impact of REDD+ on forest carbon.

However, time is not on our side, as the negative effects of climate change are already being felt around the world. Anthropogenic greenhouse gas emissions continue to rise. The 2007/2008 economic crisis and the COVID-19 pandemic (2019-present) only temporarily reduced emissions. It is calculated that in order to limit warming to 1.5 °C and avoid the worst effects of climate change, the current decade is critical. 2020–2030 is the necessary ramp-up period or rapidly closing window of opportunity for action to protect and conserve forest ecosystems and limit climate change (Griscom et al., 2020). Deforestation needs to be limited. As deforestation continues, the capacity of forests to act as sinks is ever diminishing. Fire, drought, storms and disease exacerbated under climate change may further erode forest area, and a tipping point may be reached beyond which forests will not recover, and will instead become large sources of emissions (Mitchard, 2018). There is preliminary evidence that payments for ecosystem services such as REDD+ hold the potential to stop deforestation, as well as enforcing forest protection laws and supporting management by *Indigenous Peoples* and local communities (Busch and Ferretti-Gallon, 2017).

REDD+ is just one vehicle for climate change mitigation from forests. Though undoubtedly, nature is part of the solution and setting ambitious goals is needed, nature should not become a distraction to progress on other fronts to combat climate change. Over-estimating the realistically achievable mitigation potential from nature may fuel this distraction. The focus of mitigation efforts globally needs to remain firmly on industrialised countries and cuts from the fos-

sil fuel sector, rather than shifted to developing countries and the forest sector. The importance of reducing emissions across all sectors must be emphasised. Considering the high uncertainties highlighted in the previous sections around the realistic mitigation potential from nature-based climate solutions, the role of forests should not be emphasised at the expense of reducing fossil fuel consumption.

REDD+ should be seen as contributing to sustainable development. Forest conservation for climate change mitigation, as well as the other multiple benefits and ecosystem services provided by forests, represents one part of the actions taken in the forest sector, to be considered alongside deep emission cuts in other emitting sectors.

3.10. References

Achard F., Beuchle R., Mayaux P., Stibig H. J., Bodart C., Brink A., Carboni S., Desclée B., Donnay F., Eva H.D., and Lupi A. (2014). Determination of tropical deforestation rates and related carbon losses from 1990 to 2010. Global Change Biology, 20, 8, 2540-2554.

Achard F. and House J.I. (2015). Reporting carbon losses from tropical deforestation with Pan-tropical biomass maps. Environmental Research Letters, 10, 101002.

Alexandratos N. and Bruinsma J. (2012). World Agriculture towards 2030/2050: the 2012 revision. ESA Working Paper 12-03. Food and Agriculture Organization: Rome.

Baccini A., Walker W., Carvalho L., Farina M., Sulla-Menashe D., and Houghton R.A. (2017). Tropical forests are a net carbon source based on aboveground measurements of gain and loss. Science, 358, 6360, 230-234.

Beuchle R., Achard F., Bourgoin C., Vancutsem C., Eva H., and Follador M. (2020). Deforestation and forest degradation in the Amazon: Status and trends up to year 2020. Publications Office of the European Union: Luxembourg.

Bey A., Sánchez-Paus Díaz A., Maniatis D., Marchi G., Mollicone D., Ricci S., Bastin J.-F., Moore R., Federici S., Rezende M., et al. (2016). Collect Earth: Land Use and Land Cover Assessment through Augmented Visual Interpretation. Remote Sensing, 8, 10, 807.

Birigazzi L., Gregoire T.G., Finegold Y., Cóndor Golec R.D., Sandker M., Donegan E., and Gamarra J.G.P. (2019). Data quality reporting: Good practice for transparent estimates from forest and land cover surveys. Environmental Science & Policy, 96, 85–94.

Bos A.B., Duchelle A.E., Angelsen A., Avitabile V., Sy V.D., Herold M., Joseph S., Sassi C. de, Sills E.O., Sunderlin W.D., et al. (2017). Comparing methods for assessing the effectiveness of subnational REDD+ initiatives. Environmental Research Letters, 12, 7, 074007.

Breidenbach J., Ellison D., Petersson H., Korhonen K.T., Henttonen H.M., Wallerman J., Fridman J., et al. (2022). Harvested area did not increase abruptly—how advancements in satellite-based mapping led to erroneous conclusions. Annals of Forest Science, 79, 2.

Busch J. and Ferretti-Gallon K. (2017). What Drives Deforestation and What Stops It? A Meta-Analysis. Review of Environmental Economics and Policy, 11, 1, 3–23.

Canadell J.G. and Raupach M.R. (2008). Managing Forests for Climate Change Mitigation. Science, 320, 5882, 1456–1457.

Carey E.V., Sala A., Keane R., and Callaway R.M. (2001). Are old forests underestimated as global carbon sinks? Global Change Biology, 7, 4, 339–344.

Dargie G.C., Lewis S.L., Lawson I.T., Mitchard E.T.A., Page S.E., Bocko Y.E., and Ifo S.A. (2017). Age, extent and carbon storage of the central Congo Basin peatland complex. Nature, 542, 7639, 86–90.

Demarchi G., Subervie J., Catry T., and Tritsch I. (2021). Using publicly available remote sensing products to evaluate REDD+ projects in Brazil. Center for Environmental Economics: Montpellier, France.

Draper F.C., Roucoux K.H., Lawson I.T., Mitchard E.T.A., Coronado E.N.H., Lähteenoja O., Montenegro L.T., Sandoval E.V., Zaráte R., and Baker T.R. (2014). The distribution and amount of carbon in the largest peatland complex in Amazonia. Environmental Research Letters, 9, 12, 124017.

Duchelle A.E., Simonet G., Sunderlin W.D., and Wunder S. (2018). What is REDD+ achieving on the ground? Current Opinion in Environmental Sustainability, 32, 134–140.

Ellis E.A., Sierra-Huelsz J.A., Ceballos G.C.O., Binnqüist C.L., and Cerdán C.R. (2020). Mixed Effectiveness of REDD+ Subnational Initiatives after 10 Years of Interventions on the Yucatan Peninsula, Mexico. Forests, 11, 9, 1005.

Erb K.H., Kastner T., Plutzar C., Bais A.L.S., Carvalhais N., Fetzel T., Gingrich S., Haberl H., Lauk C., Niedertscheider M., et al. (2018). Unexpectedly large impact of forest management and grazing on global vegetation biomass. Nature, 553, 7686, 73–76.

FAO (2018). Strengthening National Forest Monitoring Systems for REDD+. Food and Agriculture Organization of the United Nations: Rome, Italy.

FAO (2019). From reference levels to results reporting: REDD+ under the United Nations Framework Convention on Climate Change. 2019 update. Rome, Italy.

FAO (2020). Global Forest Resources Assessment 2020: Main report. Food and Agriculture Organization of the United Nations: Rome, Italy.

FAO (2021). FAO Remote Sensing Survey reveals tropical rainforests under pressure as agricultural expansion drives global deforestation. Food and Agriculture Organization of the United Nations: Rome, Italy.

Federici S., Grassi G., Harris N., Lee D., Neeff T., Penman J., Sanz M.J., and Wolosin M. (2017). GHG fluxes from forests: An assessment of national reporting and independent science in the context of the Paris Agreement. Climate and Land Use Alliance: San Francisco, CA.

Forkel M., Dorigo W., Lasslop G., Chuvieco E., Hantson S., Heil A., Teubner I., Thonicke K., and Harrison S.P. (2019). Recent global and regional trends in burned area and their compensating environmental controls. Environmental Research Communications, 1, 5, 051005.

Friedlingstein P., O'Sullivan M., Jones M.W., Andrew R.M., Hauck J., Olsen A., Peters G.P., et al., (2020). Global Carbon Budget 2020. Earth System Science Data, 12, 4, 3269–3340.

Friedlingstein P., Jones M. W., O'Sullivan M., Andrew R. M., Bakker D. C. E., Hauck J., Le Quéré C., et al., (preprint). Global Carbon Budget 2021, Earth Syst. Sci. Data Discuss. In review, 2021.

Galiatsatos N., Donoghue D.N.M., Watt P., Bholanath P., Pickering J., Hansen M.C., and Mahmood A.R.J. (2020). An Assessment of Global Forest Change Datasets for National Forest Monitoring and Reporting. Remote Sensing, 12, 11, 1790.

Gasser T., Crepin L., Quilcaille Y., Houghton R. A., Ciais P., and Obersteiner M. (2020). Historical CO2 emissions from land use and land cover change and their uncertainty. Biogeosciences, 17, 4075–4101.

Gatti L.V., Basso L.S., Miller J.B., Gloor M., Gatti Domingues L., Cassol H.L.G., Tejada G., Aragão L.E.O.C., Nobre C., Peters W., et al. (2021). Amazonia as a carbon source linked to deforestation and climate change. Nature, 595, 7867, 388–393.

GFOI (2020). Integrating remote-sensing and ground-based observations for estimation of emissions and removals of greenhouse gases in forests. Global Forest Observations Initiative: Rome, Italy.

Gifford, R. M. (1994). The global carbon cycle: a view point on the missing sink. Aust. J Plant Physiol. 21, 1–15.

Global Forest Watch (2021). Assessing Trends in Tree Cover Loss Over 20 Years of Data. Available at: https://www.globalforestwatch.org/blog/data-and-research/tree-cover-loss-satellite-data-trend-analysis/ [Accessed on 28 January 2022].

Grassi G., House J., Dentener F., Federici S., den Elzen M., and Penman J. (2017). The key role of forests in meeting climate targets requires science for credible mitigation. Nature Climate Change, 7, 3, 220–226.

Griscom B.W., Adams J., Ellis P.W., Houghton R.A., Lomax G., Miteva D.A., Schlesinger W.H., Shoch D., Siikamäki J.V., Smith P., et al. (2017). Natural climate solutions. Proceedings of the National Academy of Sciences, 114, 44, 11645–11650.

Griscom B.W., Busch J., Cook-Patton S.C., Ellis P.W., Funk J., Leavitt S.M., Lomax G., Turner W.R., Chapman M., Engelmann J., et al. (2020). National mitigation potential from natural climate solutions in the tropics. Philosophical Transactions of the Royal Society B: Biological Sciences, 375, 1794, 20190126.

Hansen M.C., Potapov P.V., Moore R., Hancher M., Turubanova S.A., Tyukavina A., Thau D., Stehman S.V., Goetz S.J., Loveland T.R., et al. (2013). High-Resolution Global Maps of 21st-Century Forest Cover Change. Science, 342, 6160, 850-853.

Harris N., Davis C., Goldman E.D., Petersen R., and Gibbes S. (2018). Comparing Global and National Approaches to Estimating Deforestation Rates in REDD+ Countries. World Resources Institute: Washington, D.C.

Harris N.L., Gibbs D.A., Baccini A., Birdsey R.A., de Bruin S., Farina M., Fatoyinbo L., et al. (2021). Global maps of twenty-first century forest carbon fluxes. Nat. Clim. Chang. 11, 234–240.

Hojas-Gascon L., Belward A., Eva H., Ceccherini G., Hagolle O., Garcia J., and Cerutti P. (2015). Potential improvement for forest cover and forest degradation mapping with the forthcoming Sentinel-2 program. The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XL-7-W3, 417–423.

Hosonuma N., Herold M., De Sy V., De Fries R.S., Brockhaus M., Verchot L., Angelsen A., et al., (2012). An assessment of deforestation and forest degradation drivers in developing countries. Environmental Research Letters, 7, 4, 12.

Houghton R. A., House J. I., Pongratz J., van der Werf G. R., DeFries R. S., Hansen M. C., Le Quéré C., and Ramankutty, N. (2012). Carbon emissions from land use and land-cover change. Biogeosciences, 9, 5125–5142.

Houghton R. A., and Nassikas A. A. (2018). Negative emissions from stopping deforestation and forest degradation, globally. Global Change Biology, 24, 350– 359.

Hubau W., Lewis S.L., Phillips O.L., Affum-Baffoe K., Beeckman H., Cuní-Sanchez A., Daniels A.K., Ewango C.E.N., Fauset S., Mukinzi J.M., et al. (2020). Asynchronous carbon sink saturation in African and Amazonian tropical forests. Nature, 579, 7797, 80–87.

Humpenöder F., Popp A., Dietrich J.P., Klein D., Lotze-Campen H., Bonsch M., Bodirsky B.L., Weindl I., Stevanovic M., Müller C. (2014). Investigating afforestation and bioenergy CCS as climate change mitigation strategies. Environ. Res. Lett. 9, 64029.

IPCC (2014). Climate Change 2014: Mitigation of Climate Change. Working Group III Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press: Cambridge, UK and New York, USA.

IPCC (2018). Global warming of 1.5 °C. An IPCC Special Report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. The Intergovernmental Panel on Climate Change: Geneva, Switzerland.

IPCC (2019). Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems. The Intergovernmental Panel on Climate Change: Geneva, Switzerland.

IPCC (2021). Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Chapter 5: Global Carbon and other Biogeochemical Cycles and Feedbacks. Cambridge University Press.

Jayachandran S., Laat J. de, Lambin E.F., Stanton C.Y., Audy R., and Thomas N.E. (2017). Cash for carbon: A randomized trial of payments for ecosystem services to reduce deforestation. Science, 57, 6348, 267-273.

Jia G., Shevliakova E., Artaxo P., De Noblet-Ducouré N., Houghton R.A., House J.I., Kitajima K., Lennard C., Popp A., Sirin A., et al. (2019). Land–climate interactions. In: Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems. IPCC, pp. 118.

Lee D., Skutsch M., and Sandker M. (2018). Challenges with Measurement and Accounting of the Plus in REDD+. Climate and Land Use Alliance: San Francisco, CA.

Lewis S.L., Lopez-Gonzalez G., Sonké B., Affum-Baffoe K., Baker T.R., Ojo L.O., Phillips O.L., Reitsma J.M., White L., Comiskey J.A., et al. (2009). Increasing carbon storage in intact African tropical forests. Nature, 457, 7232, 1003–1006.

Luyssaert S., Schulze E.-D., Börner A., Knohl A., Hessenmöller D., Law B.E., Ciais P., and Grace J. (2008). Old-growth forests as global carbon sinks. Nature, 455, 7210, 213–215.

Melo J.B., Ziv G., Baker T.R., Carreiras J.M.B., Pearson T.R.H., and Vasconcelos M.J. (2018). Striking divergences in Earth Observation products may limit their use for REDD+. Environmental Research Letters, 13, 10, 104020.

Mitchard E.T.A. (2018). The tropical forest carbon cycle and climate change. Nature, 559, 7715, 527–534.

Nabuurs G.J., Lindner M., Verkerk P.J., Gunia K., Deda P., Michalak R., and Grassi G. (2013). First signs of carbon sink saturation in European forest biomass. Nature Climate Change, 3, 9, 792–796.

Neeff T. (2021). What is the risk of overestimating emission reductions from forests – and what can be done about it?. Climatic Change, 166, 1, 26.

Neeff T. and Piazza M. (2019). Developing forest monitoring capacity – Progress achieved and gaps remaining after ten years. Forest Policy and Economics, 101, 88–95.

Nesha M.K., Herold M., Sy V.D., Duchelle A.E., Martius C., Branthomme A., Garzuglia M., Jonsson O., and Pekkarinen A. (2021). An assessment of data sources, data quality and changes in national forest monitoring capacities in the Global Forest Resources Assessment 2005–2020. Environmental Research Letters, 16, 5, 054029.

Newton A.C. (2021). Ecosystem Collapse and Recovery. Cambridge University Press: Cambridge.

Olofsson P., Foody G.M., Stehman S.V., and Woodcock C.E. (2013). Making better use of accuracy data in land change studies: Estimating accuracy and area and quantifying uncertainty using stratified estimation. Remote Sensing of Environment, 129, 122–131.

Olofsson P., Foody G.M., Herold M., Stehman S.V., Woodcock C.E., and Wulder M.A. (2014). Good practices for estimating area and assessing accuracy of land change. Remote Sensing of Environment, 148, 42–57.

Pan Y., Birdsey R.A., Fang J., Houghton R., Kauppi P.E., Kurz W.A., Phillips O.L., Shvidenko A., Lewis S.L., Canadell J.G., et al. (2011). A Large and Persistent Carbon Sink in the World's Forests. Science, 333, 6045, 988-993.

Pearson T.R.H. (2021). Editorial: REDD+: Protecting Climate, Forests and Livelihoods. Forests, 12, 4, 463.

Pearson T.R.H., Brown S., Murray L., and Sidman G. (2017). Greenhouse gas emissions from tropical forest degradation: an underestimated source. Carbon Balance and Management, 12, 1, 3.

Pendrill F., Persson U.M., Godar J., Kastner T., Moran D., Schmidt S., and Wood R. (2019). Agricultural and forestry trade drives large share of tropical deforestation emissions. Global Environmental Change, 56, 1–10.

Roe S., Streck C., Weiner P.H., Obersteiner M., Frank S. (2017). How Improved Land Use Can Contribute to the 1.5 °C Goal of the Paris Agreement. Working Paper prepared by Climate Focus and the International Institute for Applied Systems Analysis; Amsterdam, the Netherlands and Vienna, Austria.

Roe S., Streck C., Obersteiner M., Frank S., Griscom B., Drouet L., Fricko O., Gusti M., Harris N., Hasegawa T., et al. (2019). Contribution of the land sector to a 1.5 °C world. Nature Climate Change, 9, 11, 817–828.

Roe S., Streck C., Beach R., Busch J., Chapman M., Daioglou V., Deppermann A., Doelman J., Emmet-Booth J., Engelmann J., et al. (2021). Land-based measures to mitigate climate change: Potential and feasibility by country. Global Change Biology, 27, 23, 6025–6058.

Roopsind A., Sohngen B., and Brandt J. (2019). Evidence that a national REDD+ program reduces tree cover loss and carbon emissions in a high forest cover, low deforestation country. Proceedings of the National Academy of Sciences, 116, 49, 24492–24499.

Sandker M., Finegold Y., D'Annunzio R., and Lindquist E. (2017). Global Deforestation Patterns: Comparing Recent and Past Forest Loss Processes Through a Spatially Explicit Analysis. International Forestry Review, 19, 3, 350–368.

Sandker M. and Neeff T. (2021). Advances in monitoring and reporting forest emissions and removals in the context of the United Nations Framework Convention on Climate Change (UNFCCC). In: Achieving Sustainable Management of Tropical Forests. (Eds.) J. Blaser and P.D. Hardcastle. Burleigh Dodds Science Publishing: Cambridge, UK.

Sandker M., Carrillo O., Leng C., Lee D., d'Annunzio R., and Fox J. (2021). The Importance of High–Quality Data for REDD+ Monitoring and Reporting. Forests, 12, 1, 99.

SEPAL (2022). build number 806. Available at: https://sepal.io [Accessed on 4 March 2022].

Silva Junior C.H.L., Pessôa A.C.M., Carvalho N.S., Reis J.B.C., Anderson L.O., and Aragão L.E.O.C. (2021). The Brazilian Amazon deforestation rate in 2020 is the greatest of the decade. Nature Ecology & Evolution, 5, 2, 144–145.

Simonet G., Subervie J., Ezzine-de-Blas D., Cromberg M., and Duchelle A.E. (2019). Effectiveness of a REDD+ Project in Reducing Deforestation in the Brazilian Amazon. American Journal of Agricultural Economics, 101, 1, 211–229.

Stehman S.V. (2014). Estimating area and map accuracy for stratified random sampling when the strata are different from the map classes. International Journal of Remote Sensing, 35, 13, 4923–4939.

Tan Z.H., Zhang Y.P., Schaefer D., Yu G.R., Liang N., and Song Q.H. (2011). An old-growth subtropical Asian evergreen forest as a large carbon sink. Atmospheric Environment, 45, 8, 1548–1554.

Tewkesbury A.P., Comber A.J., Tate N.J., Lamb A., and Fisher P.F. (2015). A critical synthesis of remotely sensed optical image change detection techniques. Remote Sensing of Environment, 160, 1–14.

Tubiello F.N., Conchedda G., Wanner N., Federici S., Rossi S. and Grassi G. (2021). Carbon emissions and removals from forests: new estimates, 1990–2020. Earth Syst. Sci. Data, 13, 1681–1691.

Tyukavina A., Baccini A., Hansen M.C., Potapov P.V., Stehman S.V., Houghton R.A., Krylov A.M., Turubanova S., and Goetz S.J. (2015). Aboveground carbon loss in natural and managed tropical forests from 2000 to 2012. Environmental Research Letters, 10, 7, 074002.

Tzamtzis I., Federici S., and Hanle L. (2019). A Methodological Approach for a Consistent and Accurate Land Representation Using the FAO Open Foris Collect Earth Tool for GHG Inventories. Carbon Management, 10, 4, 437–450.

UNFCCC (2011). Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010. United Nations: New York, NY.

UNFCCC (2021a). Forest reference emission levels. Available at: https://redd.unfccc.int/fact-sheets/forest-reference-emission-levels.html [Accessed on 28 January 2022].

UNFCCC (2021b). Nationally determined contributions under the Paris Agreement. UNFCCC COP: Glasgow, UK.

UNFCCC (2022). Biennial Update Report submissions from Non-Annex I Parties. Available at: https://unfccc.int/BURs [Accessed on 28 January 2022].

United Nations (2015). Paris Agreement. United Nations: Paris, France.

van Oosterzee P., Blignaut J., and Bradshaw C.J.A. (2012). iREDD hedges against avoided deforestation's unholy trinity of leakage, permanence and additionality. Conservation Letters, 5, 4, 266–273.

Vancutsem C., Achard F., Pekel J.-F., Vieilledent G., Carboni S., Simonetti D., Gallego J., Aragão L.E.O.C., and Nasi R. (2020). Long-term (1990–2019) monitoring of forest cover changes in the humid tropics. Science Advances, 7, 10, eabe1603.

Xu L., Saatchi S.S., Yang Y., Yu Y., Pongratz J., Bloom A.A., Bowman K., Worden J., Liu J., Yin Y., et al. (2021). Changes in global terrestrial live biomass over the 21st century. Science Advances, 7, 27, eabe9829.

Yanai R.D., Wayson C., Lee D., Espejo A.B., Campbell J.L., Green M.B., Zukswert J.M., Yoffe S.B., Aukema J.E., Lister A.J., et al. (2020). Improving uncertainty in forest carbon accounting for REDD+ mitigation efforts. Environmental Research Letters, 15, 12, 124002.

Zheng B., Ciais P., Chevallier F., Chuvieco E., Chen Y., and Yang H. (2021). Increasing forest fire emissions despite the decline in global burned area. Science Advances, 7, 39, eabh2646.

Zhou G., Liu S., Li Z., Zhang D., Tang X., Zhou C., Yan J., and Mo J. (2006). Old-Growth Forests Can Accumulate Carbon in Soils. Science, 314, 5804, 1417–1417.

4

Chapter 4

Influence of REDD+ Implementation on Biodiversity, Livelihoods and Well-being

Lead authors: Valerie Kapos and Bhaskar Vira
Contributing authors: Matthew Harris, Anna O'Leary and Ramesh Wilson

TABLE OF CONTENTS

Abstract

This chapter reviews evidence from both the peer-reviewed and grey literature on the impacts of REDD+ implementation on 'non-carbon' outcomes – that is biodiversity, and broader environmental and socio-economic outcomes – focusing particularly on the last decade. The chapter also draws on a longer history of initiatives in the forestry sector that provide some lessons for REDD+ implementation.

Despite extensive activity related to REDD+, formal implementation and application of results-based payments have begun relatively recently, and it is difficult to directly attribute non-carbon outcomes to national or sub-national scale interventions. There is, however, more evidence at project scale that can be used to infer broader insights about the documented and expected impacts of REDD+ implementation on biodiversity, environmental services and livelihoods, and social and economic outcomes.

There has been limited progress in developing and implementing methods for monitoring, reporting and assessing these impacts despite the importance of understanding social and environmental benefits (and risks) for the long-term sustainability of REDD+. The need to address safeguards, integral to international agreements on REDD+, has also prompted greater focus on these non-carbon impacts. The evolution and growth of the voluntary carbon market over this period has also contributed to recognising the importance of these co-benefits in the form of additional premiums on the price of carbon. Nevertheless, despite this attention to the likely impacts of REDD+ implementation on biodiversity, livelihoods and well-being, not all impacts of interest are being actively monitored, and indicators for assessing impacts are imperfect across a number of domains – to this extent, the chapter also indicates knowledge gaps, and the need for monitoring frameworks to capture the full range of non-carbon benefits from REDD+ implementation.

Although positive synergies are to be expected because improved forest outcomes often deliver improvements in biodiversity and ecosystem services, the chapter finds insufficient direct evidence of delivery of non-carbon benefits from REDD+. The evidence also suggests that social and economic benefits need to be explicitly taken into account at design stages in order to deliver positive outcomes. The lack of attention to rights and tenure issues, unclear governance arrangements, unequal power relations and elite capture of benefits can all contribute to adverse social and economic outcomes, potentially undermining the overall objectives of REDD+.

4.1. Introduction

The last decade has seen both a formalisation of REDD+ under the United Nations Framework Convention on Climate Change (UNFCCC) and a proliferation of parallel initiatives that address forestry and land use in the context of the *climate*[1] emergency. Like REDD+, many of these initiatives also aim to achieve additional environmental and social objectives, potentially contributing to the goals of other multilateral environmental agreements (notably the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD)), as well as the *Sustainable Development Goals* (SDGs). This period has also seen a growing interest in private and not-for-profit sector activity to reduce *emissions* of *greenhouse gases* and enhance *carbon sequestration* through a focus on activities in the *forest* and land use sectors. This has resulted in an increasingly sophisticated set of protocols for certifying the quantity and quality of carbon that is available for market-based transactions, coupled with an associated expectation that these interventions will also deliver positive environmental and social co-benefits (or, at least, 'do no harm').

This chapter reviews some of the emerging evidence from this broad range of activities, both formally within national and sub-national implementation of REDD+ programmes and from project-level interventions. It draws primarily on evidence reported in available peer-reviewed literature and reports from organisations monitoring implementation, as well as on country-level submissions to international conventions. The evidence is limited, partly because interventions are at a relatively early stage, which makes it difficult to attribute outcomes directly to REDD+, but also because formal and consistent frameworks for the reporting of social and environmental co-ben-

1 All terms that are defined in the glossary of this report (Appendix 1) appear in italics the first time they are mentioned in a chapter.

efits have not evolved sufficiently to allow these outcomes to be measured and monitored at different scales of intervention.

There is also considerable unevenness in the reporting of different types of outcomes, at least in the peer-reviewed literature. Evidence on *biodiversity* and other environmental outcomes directly associated with REDD+ action is relatively limited. In contrast, there is a proliferation of published literature documenting expected or actually-realised social outcomes, including those related to the institutional hierarchies within REDD+ and their potential effects on social inclusion and *equity* in *forest management*. In light of this unevenness, the chapter makes use of evidence for likely environmental and socio-economic impacts of REDD+ available at different points along the impact pathways for REDD+ programmes and projects and concludes with some observations about current knowledge gaps.

4.2. The Landscape of Benefits and Risks

The potential for REDD+ to deliver benefits beyond *carbon storage* and sequestration has been recognised for some time, and has received increasing attention in international policy processes, national implementation and, increasingly, in financing for REDD+ as well as in developing carbon markets. It is integral to the Cancún safeguards (also see Section 2.2.4 in Chapter 2), which include in Safeguard E the requirement that "actions are consistent with the conservation of natural forests and biological diversity and ... enhance other social and environmental benefits" (UNFCCC Decision 1/CP.16, Appendix I, paragraph 2). The Warsaw Framework adopted by the UNFCCC in 2013 recognises the importance of incentivising non-carbon benefits to increase the long-term sustainability of REDD+ activities (UNFCCC, 2014). The *Paris Agreement* reaffirms the importance of incentivising non-carbon benefits and Decision 18/CP.21 invites countries to submit information on non-carbon benefits of their REDD+ activities. Increasingly, countries are bringing together information on co-benefits of REDD+ activities through their safeguards information systems and are including aspirations for co-benefits in their summaries of information (SOI) on safeguards (see Chapter 2). The Green Climate Fund (GCF) investment criteria include that a project should provide wider benefits that contribute to sustainable development. In particular, proposals need to identify project co-benefits in at least two of four categories: economic co-benefits (e.g., job creation, income enhancement, poverty alleviation); social co-benefits (e.g. for health and *well-being*, improved social inclusion); environmental co-benefits (e.g. improved air and water quality, biodiversity conservation); and gender empowerment co-benefits (GCF, 2021). The GCF further offers a non-carbon benefit premium of 2.5% on REDD+ results-based payments (GCF, 2021). All of the eight results-based payments projects approved by the GCF at the time of writing have included this premium. Standards and initiatives such as ART-TREES (Architecture for REDD+ Transactions – The REDD+ Environmental Excellence Standard) and the LEAF (Lowering Emissions by Accelerating Finance) Coalition that aim to leverage market-based finance for REDD+ (see Chapter 2) are increasingly focused on ensuring that countries demonstrate benefits for environmental and social integrity from the credits traded.

The wide range of potential non-carbon benefits or co-benefits from REDD+ action is commonly split into environmental and socio-economic co-benefits, and these categories can also be applied to the risks or negative impacts that may be generated by REDD+ activities. Environmental and socio-economic co-benefits (and risks) are closely linked because of the strong role that *ecosystem services* play in supporting human *livelihoods* and well-being, as well as in economic activity. However, for simplicity, here we discuss the evidence around these two broad groups of benefits and risks separately before returning to the question of linkages between them.

Environmental co-benefits of REDD+ action include enhancements to biodiversity conservation, such as increased persistence (reduced loss) and potentially increased abundance of species of conservation concern as well as improvements in the extent and condition of habitats, resulting from forest and *landscape* conservation, management and *restoration*. These benefits are likely to be greatest where land use change and other pressures would result in biodiversity loss in the absence of REDD+ action. They also include maintenance and enhancement of ecosystem services (or nature's contributions to people; Díaz et al., 2019; IPBES, 2019) such as hydrological services, or soil retention and pollination. Environmental risks associated with REDD+ may include adverse impacts on biodiversity from changes to habitat composition and configuration, for example through enrichment planting or establishment of *forest plantations* where non-*forest ecosystems* would naturally predominate (Veldman et al., 2015).

A sloth resting in the Costa Rican forests
Photo © Nelson Grima

While appropriate adherence to the Cancún safeguards should, in principle, minimise such risks, REDD+ action may also displace land use pressure ('*leakage*' and indirect land use change) with adverse consequences, especially for *ecosystems* other than forests, and their associated biodiversity and ecosystem services (as highlighted by Parrotta et al. (2012) and discussed further below). Similarly, '*rebound effects*' from REDD+ action that increases agricultural productivity with a view to '*land sparing*' may in fact increase land use pressure on both forest and non-forest ecosystems, with adverse environmental consequences (Ngoma et al., 2018) and substantial risks to biodiversity and ecosystem services. Other environmental risks include adverse impacts resulting from altered hydrological regimes that may reduce peak flows or access to water for some users.

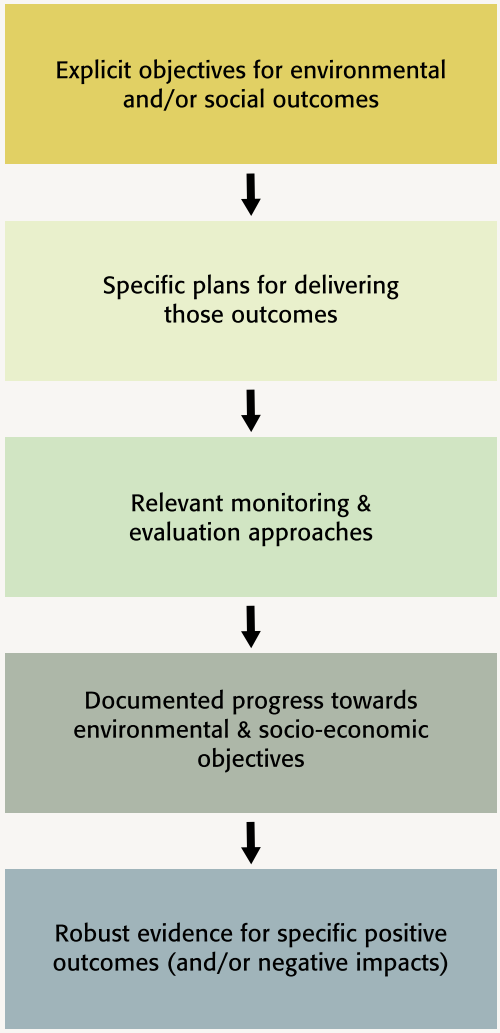
Socio-economic co-benefits of REDD+ action include improvements to livelihoods, incomes and the availability of, and access to, resources, and associated poverty reduction, as well as improvements to *governance* and rights that play an important role in people's livelihoods and well-being. Socio-economic risks relate to inequitable distribution of financial and other benefits (including through elite capture) and the risks associated with new forms of governance undermining existing and newly established rights to forest lands, forest products and carbon, especially those associated with *Indigenous Peoples* and local communities. The removal of forests from commercial use may also have negative impacts on local economic activity and employment opportunities.

Despite the last 10 years of progress in REDD+ implementation, it is as yet early to assess its impacts in terms of non-carbon co-benefits. Notwithstanding substantial monitoring effort, it is still difficult to demonstrate benefits of REDD+ action for emissions reduction (see Chapter 3) and considerably less effort has been devoted to effective monitoring of environmental and socio-economic

outcomes. This means that it remains necessary to infer likely outcomes for both environmental and socio-economic benefits and risks, drawing on qualitative evidence from a range of sources on progress along the possible pathways to particular types of impact (Figure 4.1). Therefore, we explore the evidence on the degree to which REDD+ programmes and projects have set explicit objectives for environmental and/or socio-economic outcomes and have specific plans in place for delivering those outcomes. We assess the extent to which monitoring and evaluation efforts exist to gauge progress towards such outcomes and whether they have documented progress or provided robust evidence for the achievement of specific positive outcomes (and/or the occurrence of negative impacts). Our evidence is drawn principally from a structured search of the peer reviewed literature (Box 4.1), supplemented by review of country proposals and reports as well as selected grey literature.

Figure **4.1**

Types of evidence for likely environmental and socio-economic impacts of REDD+ available at different points along the impact pathways for REDD+ programmes and projects



Box **4.1**

Sourcing evidence from peer reviewed literature

We conducted a literature review of REDD+ interventions and impact categories relevant to our three areas of concern (biodiversity, environmental and livelihoods/socio-economics) by creating relevant search strings: biodiversity (including species rich* and biodiv*, flor*, and fauna*); environment (including non-carbon ecosystem services and habitat*); livelihoods and socio-economics (including livelihoods, social, tenure and gender). Searches were limited to post-2011 (i.e., following the research period of the first Global Forest Expert Panel (GFEP) assessment on the subject – Parrotta et al., 2012). Our searches were primarily conducted on Elsevier Scopus and Google Scholar for peer-reviewed studies. The latter provided us with a starting point for our grey literature review. Additional grey literature was found through publication databases of environmental, climate and forestry organisations, as well as the UN-REDD platform and REDD+ funding organisations. We screened the title and abstract of the resulting outputs, and disregarded irrelevant documents. Language restrictions prevented systematic consideration of documents in languages other than English.

We further assessed the relevance of studies in terms of whether they were directly studying REDD+ as opposed to alternative forest conservation programmes. Furthermore, for inclusion, reports had to have been definitively assessing REDD+ impacts, rather than presenting hypothetical measures that had not yet been demonstrated or evaluated. Documents that contained policy recommendations or knowledge gaps without explicit discussion of relevant impacts were, however, kept in the data frame.

Information was extracted and synthesised from the resulting set of peer reviewed documents which covered all four tropical forest regions (East Asia and Pacific, South Asia, sub-Saharan Africa and Latin America and the Caribbean) and was distributed among the impact categories as follows: biodiversity (n=29); environmental (n=41); livelihoods and socio-economics (n=111), noting that some documents covered multiple areas.

4.3. Environmental Outcomes

4.3.1. Biodiversity outcomes

Evidence to date

Despite the well-recognised importance of reducing *deforestation* to decrease biodiversity loss, and the potential for REDD+ to therefore deliver biodiversity benefits (Parrotta et al., 2012), there is little explicit evidence of the impact of REDD+ on biodiversity over the last 10 years. Most evidence for potential impact comes from modelling of REDD+ futures at both regional and local scales (Lu et al., 2016; Capitani et al., 2019; Castella and Lestrelin, 2021). Overall, evidence for the impacts of REDD+ on biodiversity remains largely circumstantial/inferential, is based mainly on where projects and initiatives are located; systematic evidence based on sustained monitoring of trends in species abundance and composition or condition of ecosystems is limited.

This dearth in evidence is due in part to the absence of specific measurable biodiversity objectives in REDD+ projects and programmes (Entenmann et al., 2014a; Panfil and Harvey, 2016; Palomo et al., 2019), as well as to the challenges of monitoring biodiversity (Stephenson et al., 2017; Stephenson, 2019), especially in the context of REDD+ (Box 4.2) and the time lags before measurable results from REDD+ interventions can be assessed. National and local actors recognise that relevant biodiversity data and indicators exist (Entenmann et al., 2014b) but these are generally available only for studies or assessments at a single point in time. Furthermore, even where relevant environmental monitoring capacity is in place, the professionals and stakeholders most aware of and involved with relevant datasets are often disconnected from the carbon monitoring community most directly involved in REDD+ (Turnhout et al., 2017). Despite numerous calls for effective biodiversity monitoring to be

included in REDD+ programmes and activities and suggestions as to how this could be achieved (Dickson and Kapos, 2012; Gardner et al., 2012; Bustamante et al., 2016), long-term biodiversity monitoring during REDD+ implementation is relatively rare (Kiffner et al., 2019). A recent review of progress on national forest inventories in 70 countries (Gillerot et al., 2021) found only 33 included indicators of biodiversity other than trees, with limited documentation that could ensure methodological consistency over time.

Forests host a wide diversity of life
Photo © Nelson Grima

Box **4.2**

Challenges facing monitoring and evaluation of biodiversity co-benefits under REDD+

Despite effort from the research community to suggest how biodiversity monitoring could be incorporated into REDD+ programmes (Dickson and Kapos, 2012; Gardner et al., 2012; Parrotta et al., 2012; Bustamante et al., 2016), there remain considerable challenges relating both to the enabling environment and to technical issues.

Where biodiversity co-benefits may be seen as 'add-ons' that can make REDD+ implementation discouragingly complex (Krause and Nielsen, 2019), political will and incentives may be lacking for including effective biodiversity monitoring (Entenmann et al., 2014a). REDD+ monitoring may depend on existing forest monitoring processes that do not address biodiversity (Krause and Nielsen, 2019) or may simply opt to prioritise use of scarce financial resources for monitoring progress towards the primary carbon-centric goals of REDD+ (Deere et al., 2018). Furthermore, monitoring that captures changes in biodiversity beyond change in forest cover cannot yet be achieved through remote sensing and, to reduce uncertainty to acceptable levels, requires field sampling that can be costly even when automated (Bustamante et al., 2016). Technical capacity may also be a limiting factor, though there are advantages in some circumstances to making use of lower- technical approaches that can involve stakeholders and enhance their support, for example through community-based monitoring (Torres et al., 2014) or citizen science.

The availability of up-to-date biodiversity data is another major challenge. Projects often rely on existing data, which may be incomplete or discontinuous at the necessary scale, and are often distributed across many disparate research and other organisations unaccustomed to working together (Entenmann et al., 2014a). The lack of active monitoring efforts to produce consistent, up-to-date biodiversity data is a widespread challenge that can be compounded by difficulty in obtaining project details or clearly specified spatial boundaries for areas of intervention (Murray et al., 2015).

Planned and realised biodiversity benefits

Notwithstanding the above, there is a growing body of evidence on the potential for REDD+ and related action to deliver biodiversity benefits, much of which derives from identifying and building on geographical overlaps between high carbon density forests and those of high importance for biodiversity conservation. While some studies have found a strong, if uneven, association between these parameters at global scale (e.g., Strassburg et al., 2010), more recent work, especially at more detailed spatial scales, has found the relationships to be inconsistent (Di Marco et al., 2018) and dependent on the resolution of the data used (Deere et al., 2018; Kiffner et al., 2019) and the successional status of the forest (Ferreira et al., 2018), among other factors.

Several studies have highlighted that prioritising forests for conservation based on carbon alone potentially reduces benefits for biodiversity and may risk adverse impacts, and have emphasised instead the importance and value of basing planning and action on prioritisation approaches that take account of both carbon and biodiversity (Beaudrot et al., 2016; Ferreira et al., 2018; Kiffner et al., 2019; Strassburg et al., 2020; Jung et al., 2021). At global scale, studies have shown that planning for either carbon or biodiversity alone delivers substantially less of the other benefit, while optimising jointly for both minimises such trade-offs (de Lamo et al., 2020; Jung et al., 2021).

Despite the potential offered by joint planning approaches, the degree to which planning and objective setting for REDD+ specifically include non-carbon benefits as objectives is highly variable and not always spatially explicit. A 2018 review of 39 national and sub-national REDD+ strategies and planning documents (including the 24 REDD+ National Strategies and Action Plans that had then been published) found the vast majority made some reference to, or set more explicit objectives for non-carbon benefits (Pollini et al., 2019) and half mentioned benefits and risks associated with specific policy options. Although some relevant maps were included in two thirds of the documents reviewed, spatial analyses related to

multiple benefits were included explicitly in only three, though other spatial prioritisation processes were ongoing (Pollini et al., 2019).

However, specific biodiversity-related issues, such as the impacts of extractive activities (Parrotta et al., 2012) are rarely mentioned in national REDD+ documents; for example, in reviewing REDD+ documents for five countries, Krause and Nielsen (2019) found no mention of hunting and its implications for biodiversity or for carbon management. At project scale, objectives related to biodiversity are commonly included, but rarely comprise specific or quantitative targets beyond reducing *natural forest* loss or increasing forest extent or connectivity through restoration (Panfil and Harvey, 2016). Even where specific biodiversity issues are raised, detailed plans for addressing them tend to be lacking (Krause and Nielsen, 2019).

The limited number of studies assessing biodiversity impacts of REDD+ action mostly report positive potential or real impacts but are based on varying approaches and make little distinction between particular REDD+ activities and interventions. Murray et al. (2015) highlighted that REDD+ projects in Indonesia are sited in areas with high biodiversity value, but flagged that the potential for real impacts is limited by the fact that the majority are not in the areas under highest threat. Magnago et al. (2015) found that the potential biodiversity co-benefits of REDD+ action to preserve forest fragments in the Atlantic Forest of Brazil were projected to be greatest in larger fragments and in those closer to blocks of continuous forest, where the richness and abundance of endemic species and those of conservation concern were highest. Protection and restoration approaches that build on these relationships and finer grained patterns of carbon and biodiversity distribution (Deere et al., 2018) have the potential to yield biodiversity benefits in highly modified landscapes. In one of the only quasi experimental studies of REDD+ impacts, the use of REDD+ incentives to change local patterns of energy use in community forests in Nepal was associated with short term increases in wildlife sightings that may indicate positive biodiversity benefits (Sharma et al., 2020).

4.3.2. Biodiversity risks

Many studies also highlight the potential for negligible biodiversity benefit or even adverse biodiversity impacts that can arise from carbon-centred REDD+ implementation (Baraloto et al., 2014; Duque et al., 2014; Ferreira et al., 2018), including management shifts that favour smaller numbers of high carbon value species (Pandey et al., 2014) or facilitation of tree growth in grassland ecosystems (Mbatu, 2017). A particular concern is the role of REDD+ action for conservation of high carbon forests in shifting land use pressures to lower carbon forests and other ecosystems (Huettner, 2012; Armenteras et al., 2015; Bayrak and Marafa, 2016), causing 'biodiversity leakage' (Box 4.3).

Box **4.3**

Biodiversity Leakage

A central concern in the development of REDD+ has been that the benefits of locally effective action to reduce deforestation (or *forest degradation*) or enhance forest *carbon stocks* through restoration could cause *carbon emissions* from land use to be displaced to new locations, effectively negating any mitigation benefits. This concept of 'leakage', which had previously been applied primarily to carbon, has increasingly been applied in the context of biodiversity impacts, where leakage between different forest types and between forest and non-forest ecosystems are both important. Harrison and Paoli (2012) highlighted that the biodiversity of forests on mineral soils in Indonesia may be subject to this risk as a result of REDD+ efforts that have primarily targeted high carbon peat swamp forests. Duque et al. (2014) highlighted similar issues in relation to lower carbon high altitude ecosystems of the Peruvian Andes and flagged the risk to endangered and restricted range species that are characteristic of these systems. Stakeholders in Guyana discussing impacts of REDD+ have flagged shifting patterns of agricultural development that concentrate new agriculture in the country's savannahs with obvious implications for the biodiversity of these important grassland systems (Laing, 2015).

Community of forest dwellers in the Brazilian Amazon
Photo © Nelson Grima

4.3.3. Ecosystem service outcomes

In addition to contributions to biodiversity conservation, non-carbon benefits of REDD+ potentially include a wide range of other environmental benefits through retention and enhancement of ecosystem services beyond carbon sequestration and storage. These ecological benefits include reduced soil erosion (Brown et al., 2011; Lu et al., 2016; Sharma et al., 2020) and improved hydrological regulation enhancing water quality and quantity (Zongo et al., 2017; Creed and van Noordwijk, 2018; Capitani et al., 2019) and increasing *resilience* to drought and flood (e.g., Creed and van Noordwijk, 2018). Such benefits have significant economic importance (Ojea et al., 2016) and may increase both the value of REDD+ programmes and people's willingness to engage with them (Ranjan, 2021). However, it is as yet unclear whether non-carbon benefit premiums – such as those provided by the GCF – make their way to the local level.

Benefits derived from ecosystem services delivered through REDD+ extend beyond climate *mitigation* to *adaptation* and support to resilient livelihoods. The importance of the forest sector for adaptation is recognised across Nationally Determined Contributions (NDCs) and adaptation plans (Petersen and Brana Varela, 2017). Integrating adaptation strategies into REDD+ is partially incentivised through funding. For example, whilst the focus of the GCF is on emissions reductions, it also includes scope for adaptation, and GCF investments in REDD+ have been shown to provide both *climate change* mitigation and adaptation benefits (GCF, 2019).

At local levels, REDD+ action to retain or restore carbon-rich mangrove forests, for example (Box 4.4), can offer benefits for both climate change mitigation and adaptation, by increasing carbon sequestration whilst also promoting biodiversity and helping coastal communities to withstand the impacts of rising sea-levels and storms (McElwee et al., 2016). *Forest landscape restoration* (FLR) efforts under REDD+ can contribute to overall adaptation and resilience through judicious species selection (Kim et al., 2018) or assisted migration (Schreiber et al., 2013) that can help to ensure trees are well-adapted for growth in their respective landscapes, be that degraded cropland or areas experiencing significant climatic shifts. This can secure hydrological benefits (Ilstedt et al., 2016), support biodiversity (Wheeler et al., 2016; Burnett et al., 2019) and maximise productivity whilst improving rural livelihoods by providing timber and *non-timber forest products*.

Box **4.4**

REDD+ in the face of climate change: Mangroves

Mangrove forests are highly productive ecosystems that hold benefits for people as a source of food, fuelwood and income for coastal communities. They also play an important role in carbon sequestration, being among the most carbon-rich forests in the tropics with an average total carbon stock (in above and below ground biomass and soil) of 1,023 MgC per hectare (Donato et al., 2011). Amongst other types of 'green infrastructure', mangrove ecosystems offer a cheaper alternative to 'grey infrastructure' for services including flood management, water purification and storage, and coastal protection (Narayan et al., 2016). The value of mangrove-based mitigation and adaptation actions has been widely recognised, with at least 45 countries including mangroves in their NDCs and several countries, including Cambodia, Equatorial Guinea, Ghana, India, Indonesia and Myanmar, addressing mangroves in their national REDD+ strategies (Fortuna, 2020).

However, mangrove ecosystems are threatened by continued deforestation and forest degradation caused by human activities such as land conversion for coastal aquaculture, agriculture, plantations and coastal development (UNEP, 2014). From 1990 to 2020, the global area of mangroves decreased by 1.04 million ha (FAO, 2020). Whilst globally, the rate of mangrove loss more than halved during that period, Asia saw a significant increase in its rate of loss (FAO, 2020) and emissions from the deforestation of mangroves are estimated to constitute nearly a fifth of global deforestation emissions (UNEP, 2014).

REDD+ provides an opportunity for mangrove protection, using financial incentives to encourage conservation and restoration, as suggested in the Kyoto Protocol. As well as protecting mangrove ecosystems and their biodiversity, this can create a win-win for both climate mitigation and adaptation by reducing emissions whilst helping coastal communities to withstand the impacts of flooding, cyclones and sea-level rise associated with climate change (McElwee et al., 2016). For example, a non-REDD+ project in Kien Giang, Viet Nam, demonstrated that allowing limited production activities in mangrove forests to safeguard livelihoods as well as secure the protective buffer mangroves offer, can carry adaptation benefits for both people and forests (McElwee et al., 2016).

Thus far, there has been very little REDD+ activity in mangroves, so the evidence on REDD+ impacts in these important systems is very limited (Ahmed and Glaser, 2016; McElwee et al., 2016). More recently, however, this has been changing: in 2020, the UN-REDD Programme announced an investment of USD 2 million into the sustainable management, restoration and protection of Myanmar's mangroves for the following two years (UN-REDD Programme, 2020); and 'Mangroves for the Future' initiated a new element targeting the inclusion of mangrove forests into national REDD+ strategies more consistently (IUCN, 2017). Future REDD+ schemes could capitalise on the multiple benefits that mangroves offer by recognising the adaptation value of ecosystem services as a vitally important benefit and integrating ecosystem-based adaptation into REDD+ policies.

4.4. Livelihoods, Social and Economic Outcomes

Evidence to date

The last decade has seen a number of studies that have examined the ways in which REDD+ interventions have impacted local communities (Angelsen et al., 2018), especially in light of early concerns about the risks that an over-centralised approach could reverse some of the positive local benefits from community forestry and participatory forest management initiatives over the last thirty years (e.g., Phelps et al., 2010). Most of this literature is based on case study approaches, using a mix of surveys, interviews and discussion groups to investigate people's knowledge of REDD+, their perceptions of REDD+ and its advantages or disadvantages, and other demographic variables (such as gender, ethnicity, indigeneity, economic status and occupation) which might impact the distribution of benefits from REDD+. While in some cases, researchers were able to adopt participatory (e.g. Holmes et al., 2017) and/or ethnographic approaches which provided greater direct voice to those who were impacted by REDD+, in many cases, time constraints meant that these methods were not used (e.g., Bayrak and Marafa, 2016). This primary data was often supported by policy documentation about the projects, which usually provided some insights into the intended impacts of the interventions, although these were not always monitored systematically. The use of quantitative data was relatively limited and, where available, studies focused on economic benefits and modelling of expected benefits, rather than the wider social and livelihood impacts or outcomes for multidimensional well-being. Meta-analyses such as that by Hajjar et al. (2021b) examined multiple project-level case studies to draw wider conclusions from the literature. In some cases, articles focused on national governance structures and the overall approach to the implementation of REDD+ at the country level, but did not always provide direct evidence on socio-economic outcomes (e.g., McElwee et al., 2016; Westholm, 2016; Satyal et al., 2019).

Evidence on livelihoods, social and economic outcomes is very mixed, and it is difficult to summarise a clear overall impact from REDD+ implementation across these cases. Outcomes are often project specific and, despite earlier concerns about the differentiated impacts of REDD+ across scales and within communities (Strassburg et al., 2012), the evidence suggests that results are variable and context-dependent, making generalisation difficult. Distance from the forest, the availability of alternative forest areas and the amount of private farmland also caused differing impacts (Svarstad and Benjaminsen, 2017).

From the reviewed material, some general patterns do emerge, and the literature suggests that the extent to which REDD+ projects have had positive or negative impacts depends on: (i) the degree of participation of different social groups; (ii) the degree to which socio-economic and livelihood impacts were directly targeted in project implementation; (iii) the extent to which the project governance structure supported and reinforced existing local institutions, especially local participation in decision making, management and monitoring; (iv) the adherence to prescribed safeguards; and (v) the socio-economic conditions of the project site before the REDD+ project.

Inequalities

Unless specifically targeted within the project, impacts were often unequal across segments of society, varying with gender ethnicity, economic status and sometimes occupation (Poudel et al., 2015). The gendered outcomes of interventions tended to reproduce existing hierarchies and inequalities. Bayrak and Marafa (2020a) found that female-headed households earned 37% less income from forest monitoring than male-headed households, while Larson et al. (2018) reported that women's well-being was more negatively affected in REDD+ interventions. The gendered division of labour in the Kondoa-Irangi Hills REDD+ project in Tanzania, meant that women's activities were more affected than those of men (Svarstad and Benjaminsen, 2017). On the other hand, Devkota (2020) reported that women were more involved in the community, more able to express their views and more funding was directed to women's welfare.

Evidence indicates the influence of economic status on REDD+ experience, with richer households often less forest-dependent and thus either less likely to experience restrictions, or more likely to receive benefits due to reduced opportunity costs, or both. The impacts of REDD+ appear to differ depending on livelihood strategy, occupation and forest dependence, with a greater reliance on forest access or forest products associated with greater negative impacts. Due to limited alternative livelihood strategies, or lower original wealth, poorer households were more negatively affected by REDD+ projects; they had less land, fewer private trees and could not afford alternative energy sources (Poudel et al., 2015; Nathan and Pasgaard, 2017). Communities sometimes lost access to agricultural lands or grazing rangelands in order to

create community forests or REDD+ areas, which resulted in increases in forest *resources*, but declines in other livelihood options, and these were differentially experienced by different stakeholder groups. In Nepal, goat herders were displaced from their grazing area and blacksmiths had reduced access to charcoal due to the restrictions imposed by the REDD+ project, yet did not receive compensation, leading to negative impacts (Poudel et al., 2014, 2015). In the Bale Mountain ecoregion REDD+ project (Ethiopia) the majority of residents were excluded from the forest dwellers association and were denied access to the forest, without compensation (Duker et al., 2019). In Brazil and Tanzania, although costs were unequal, payments under REDD+ were not based on the costs, and thus the net impact was unequal (Nantongo, 2017). Similar to Poudel et al. (2014; 2015), those who were more dependent on forest access – e.g., charcoal makers and loggers – were more affected, but were not specifically targeted by the payments (Nantongo, 2017). In contrast, male pygmy hunters, despite being poorer and more vulnerable than other populations, were less likely to face costs or reduced subsistence, as their hunter-gatherer lifestyle meant they were less dependent on agriculture (Pelletier et al., 2018). In the Kariba REDD+ project in Kenya, an estimated 20 out of 4,000 people benefitted from the resources for alternative livelihoods (Gogo, 2014 in Appiah and Gbeddy, 2018).

Sometimes, the targeting of interventions meant that those who were not explicitly identified as beneficiaries did less well – for instance, a REDD+ project in Lamjung, Nepal focused on Indigenous People living in the village, while the Dalit (people of the lowest castes in the traditional Hindu hierarchy system) and poor households received less benefits as they lived on the edge of the village (Satyal et al., 2020). In Makira in Madagascar, development activities benefitted those living outside of the forest, who were less impacted by usage restrictions, and only benefitted 20–30% of people (Brimont and Leroy, 2018). In a study in the Terai region of Nepal, REDD+ participants believed that the richer residents received better quality wood under the allowable harvest than poorer residents (Devkota and Mustalahti, 2018). Poorer residents were more dependent on the forest by volume of material and were less represented in the decision-making structures (ibid.). The poor believed that the decision-making processes gave priority to the richer users, with the Dalit households having to implement a fish farming programme despite having limited influence in the decision-making (ibid.). However, the impacts of economic and social status on benefit distribution were not uniform: in a study of projects in Nepal (Shrestha et al., 2017), social hierarchy had a greater impact on the amount of payment, rather than economic status; and a study of the Emberá community in Panama (Holmes et al., 2017) found that the participants were not the wealthiest community members, suggesting that REDD+ did not necessarily aggravate already-existing inequalities.

As above, REDD+ projects only tended to reduce inequality and increase representation if the project explicitly focused on these issues, through clearly articulated objectives, monitoring and indicators. Otherwise, projects tended to reinforce existing inequalities, particularly lack of representation of female community members, those from poorer economic status and marginalised groups (see also Box 4.5). At times these factors also interacted with others to exacerbate or counteract inequalities.

Mangrove forests provide protection and livelihoods for communities
Photo © Nelson Grima

Box **4.5**

Impacts on Indigenous Peoples and local communities

REDD+ impacts are often unequal between indigenous and other groups, despite attempts at equitable benefit-sharing. Many Indigenous Peoples and local communities (IPLCs) are particularly vulnerable to climate change because they depend on fragile ecosystems, their *traditional knowledge* systems are challenged by the changing environment (Kronik and Verner, 2010) and they are more than twice as likely to be in extreme poverty (ILO, 2020). Climate change will negatively affect IPLCs' physical and spiritual well-being due to their unique reliance on natural resources (Levy and Patz, 2015). Furthermore, IPLCs play an important role in combatting climate change. While difficult to quantify precisely, estimates suggest that 24% of above-ground tropical forest carbon is managed by IPLCs (RRI, 2016) and their lands are important in conserving biodiversity and intact forest landscapes (Fa et al., 2020; O'Bryan et al., 2021). Nevertheless, IPLCs, often marginalised and seen only as victims (McGregor et al., 2020) are frequently negatively impacted by environmental legislation and conservation policies (Mamo, 2020). Evidence for the impacts of REDD+ on IPLCs is mixed, but continued and renewed focus on sufficient implementation of social safeguards is necessary for ensuring that IPLCs benefit from REDD+.

In general, REDD+ has not had significant impacts on improving Indigenous Peoples' rights. In Viet Nam, REDD+ has neither increased discussion of, or improvement in, Indigenous Peoples' rights (Errico, 2016). In Peru, limited structural reforms have meant that REDD+ has been implemented on top of the existing exclusionary structures (Younger, 2021). On the other hand, in Indonesia, there has been an increased focus on indigenous rights, with rights protection included in the national REDD+ strategy (Jodoin, 2017 in Sunderlin et al., 2018; Duchelle et al., 2018).

Alongside the general issues of land tenure with REDD+, IPLC land rights are also affected. The stated goals in national REDD+ strategies do not always lead to the expected land and tenure reforms (RRI, 2021), funding is not always allocated to improving IPLC land rights (Espinosa and Feather, 2018; Hatcher et al., 2021) and national REDD+ proposals sometimes do not abide by international law (Lemaitre, 2011).

Despite the United Nations Declaration on Indigenous Rights (UNDRIP; UN, 2007), there have been reported cases of indigenous rights abuses in relation to REDD+. A preliminary literature review of REDD+ documentation and peer-reviewed articles (Sarmiento et al., 2017) found frequent mentions of rights abuse allegations in relation to Indigenous Peoples during REDD+ projects, including infringements on rights to self-determination, protection from cultural destruction and recognition of their land and resources. In Guyana, national and international indigenous rights were not upheld in the REDD+ project in Chenapou and Amerindian communities were marginalised (Airey and Krause, 2017).

In Cameroon, impacts were unequal between the Baka and Bantu people, despite equal involvement within the process (Tegegne et al., 2021). The indigenous and nomadic Baka people struggled to use the income-generating activities introduced by REDD+ due to their lack of skills to harness the income generating activities (Tegegne et al., 2021). In examples from Nepal, REDD+ projects emphasised benefit sharing among Indigenous People, but this created conflicts between Indigenous People and other local communities (Poudel et al., 2015; Satyal et al., 2020). In one case, Dalit households – a marginalised caste – had a less positive experience as they were on the periphery of the village and had lower representation (Satyal et al., 2020). In another case, villagers saw the 25% allocation of benefits to Indigenous Peoples as unfair, as they held key positions in committees and were in the majority (Poudel et al., 2015).

Chomba et al.'s (2016) discussion of a project in Kenya demonstrated that unfair benefit sharing meant that while larger ranch owners were guaranteed a third share of the total carbon revenue, the share of smallholder farmers was reduced because of both high project costs and the small overall amount due to carbon market failures.

Tenure

Multiple REDD+ projects introduced conflict (within and between communities, between locals and project workers, between communities and national/sub-national structures and between communities and companies), often related to land *tenure*/rights disputes (see also Box 4.6 on land rights and tenure security). There were rarely positive effects on conflict reported (except Bayrak and Marafa (2020b), who reported fewer forestland conflicts) although it is possible that this reflects a lack of studies that focus specifically on how REDD+ reduces conflict.

Box **4.6**

Land rights and tenure security

Early concerns were raised over the impact of REDD+ on land rights and tenure security (Larson, 2011) and the available evidence suggests that the effect has been mixed. In some cases, land rights have been improved or unchanged, but in others, households and communities have lost access to land.

The literature on the impacts of REDD+ on land tenure shows a variety of outcomes: a meta-analysis of 41 REDD+ projects found that while 12 enhanced ownership and rights, 28 did not create any change and tenure rights were not weakened in the reviewed projects (Lawlor et al., 2013). In Brazil, early evidence suggested that REDD+ appeared to have increased efforts towards improving tenure security, building on pre-existing actions (Larson et al., 2013). In Indonesia, the implementation of the Plan Vivo REDD+ project improved the community's rights over their forest through a 35-year licence (Rakatama et al., 2020). A four-year project in Meru Betiri National Park (Indonesia) provided land access rights to disadvantaged and landless households, which meant they could engage in alternative livelihood strategies (Harada et al., 2015).

However, there are also cases where land rights have been negatively impacted. REDD+ strategies have at times contradicted pre-existing national and international laws recognising community rights to land, decreasing tenure security (Lemaitre, 2011; Larson et al., 2013). In cases in Tanzania, farmers have been relocated out of the forest, resulting in high social costs (Mutabazi et al., 2014) and there has been increased conflict over land titling and rights (Scheba, 2015).

In Thailand, community rights and tenure have not improved, and many villagers feared eviction due to the lack of formal recognition of their rights (Tulyasuwan et al., 2015). Although REDD+ strategies often include improvements, clarification or enhancement of tenure, these actions are not always carried out (Tulyasuwan et al., 2015; RRI, 2021). National priorities are often not focused on improving land and resource rights (Sunderlin et al., 2018), leading to limited changes in the state of land and forest tenure (Larson et al., 2013). In Peru, no REDD+ funds from the Forest Carbon Partnership Facility have been allocated to improve land rights, whereas the dedicated grant mechanism of the Forest Investment Program began to invest in land titling, highlighting the mixed focus of REDD+ finance on land tenure (Espinosa and Feather, 2018).

Although there is a considerable focus on how REDD+ projects impact arrangements relating to access to land and resources, as Box 4.6 shows, the reported impacts of REDD+ on tenure and access to resources/land are mixed. Duchelle et al. (2017) found limited impacts on tenure security with it increasing independently of forest intervention in Indonesia, Tanzania and Viet Nam, but decreasing in Brazil and Peru due to disincentives. As part of REDD+ implementation, many sites restricted access to forests and resources, and the resulting loss of livelihood options was not always compensated. Unless a project focused exclusively on tenure security, there was no improvement. More often than not, access to land and resources decreased for all of the community, or restrictions on access were socially differentiated (e.g., by gender, Maharani et al., 2019; or by ethnic groups/caste, Hoang et al., 2019). However, multiple studies noted the importance of clarifying and secur-

ing land and forest tenure (and carbon rights) before REDD+ implementation in order to ensure project success.

Sometimes, economic benefits were greater than the opportunity costs, but more often the economic benefits were socially differentiated (depending on households' *forest-dependence*) or there was more discussion on the qualitative benefits and costs, rather than the monetary ones. Maraseni et al. (2014: 43) noted that "if these additional costs and benefits were evaluated in monetary terms, the REDD+ payments would be even less attractive [… and] if the costs of all these activities [related to committee meetings] are considered, REDD+ payment is almost certainly not sufficient to offset them".

Livelihoods

The impacts on livelihoods were mixed. They were (as above) highly socially differentiated, dependent on the project interventions, and dependent on the existing conditions. Some projects successfully introduced alternative livelihood activities and, in the process, improved livelihoods; others did not and led to decreased livelihoods associated with reduced access to land and resources. Although there was some discussion of opportunity costs balancing benefits, these were often not quantified or directly compared, and there is a need for more attention to, and careful investigation of, the benefits and opportunity costs that are faced by poor local people who are included in REDD+.

Governance

There was some discussion of impacts of REDD+ projects on governance. In any REDD+ project, involving local stakeholders in decision-making and increasing participation in projects can both inform the project with *local knowledge* and further increase resilience, enabling communities to better handle climate risks (Pandey et al., 2016). Governance outcomes were usually dependent on the existing structures, and the extent to which the project attempted to change these governance structures. If projects did not focus on governance, there was either no change, or a reinforcement of the current systems (Hoang et al., 2019). If projects focused on governance, they often had a positive or limited effect. The perceptions of changes in governance are different by project site, often in the same country. For example, Pollini et al. (2019) discussed the positive changes in governance in Viet Nam, whereas Hoang et al. (2019) discussed the negative impacts in Viet Nam, and Bayrak and Marafa (2020a) discussed the lack of changes to forest governance in Viet Nam. Many studies note the importance of existing governance structures before REDD+ implementation and how limited/inadequate governance systems hinder REDD+ projects, particularly when they are top-down. The more successful REDD+ schemes appeared to be those working on top of existing Community or Participatory Forest Management (CFM/PFM) systems (Hajjar et al., 2021a).

Capacity building

There was limited discussion of capacity building (perhaps representing a gap in the literature, or a weakness of search terms used for this analysis). In terms of institutional capacity building, the results were mixed, as above, and depended on the extent to which there was an explicit focus on these issues in project implementation. In terms of individual capacity building, Poudel et al. (2014) noted the positive impact of REDD+ on local communities' capacity, with the latter study also noting the limited literature on capacity building in Nepal.

4.5. Linkages and Trade-offs between Benefits

Despite wide recognition of the links between socio-economic and environmental issues, including in the context of the SDGs (Schleicher et al., 2018; Scharlemann et al., 2020) there has been little published effort to explore how these linkages play out in concrete terms in the context of REDD+. A few studies address both environmental and socio-economic benefits of REDD+, but largely discuss them in parallel rather than exploring the links between them. Sharma et al. (2020) highlighted the links between REDD+-related behavioural change on energy use and both environmental and socio-economic outcomes, but cite only the behaviour change as the link between them.

On the other hand, considerable attention has focused on the potential for trade-offs between the different outcomes and benefits of REDD+, and in particular the risk that focusing primarily on carbon outcomes may reduce other benefits, or even lead to adverse impacts on environmental and social outcomes (e.g. Capitani et al., 2019; Ferreira et al., 2018; Palomo et al., 2019). Trade-offs between benefits at different scales have also been highlighted, for example on the loss of local environmental benefits such as provisioning services that may arise from a focus on carbon or on the loss of larger scale benefits such as hydrological services (Kim et al., 2018). However, little progress has been made beyond this realm of 'poten-

tial' in assessing how such trade-offs have played out in reality, and there is little work evaluating trade-offs between co-benefits from REDD+.

Outside of REDD+, one of the most insightful studies is a recent global analysis of environmental, livelihood and natural resource rights outcomes of community forest management (Hajjar et al., 2021b), using data from 643 cases in 51 countries, which provides some evidence on the frequency of joint positive outcomes and trade-offs from forest-based interventions. The community forestry literature is particularly helpful in understanding the social and governance issues related to large-scale ecological transitions which involve land use and forestry, with interventions typically overlapping in countries and regions that are the intended current and future focus of REDD+ Table 4.1 summarises the main findings from this analysis.

Table **4.1**

Social and environmental outcomes from community forests

	Trade-offs reported	Joint increases reported	Notes
Resource rights – forest condition (n = 186)	45%		Improvements in forest condition and decreases in resource rights (85% of trade-off cases)
Resource rights – income (n = 169)	31%	34%	Trade-offs mostly related to elite capture of benefits and restrictions on resource rights for poor and marginalised groups
Forest condition – income (n = 223)		46%	Increases associated with both forest- and non-forest-income
Resource rights – forest condition – income (n = 122)		18%	

Source: Hajjar et al., 2021b

A relatively limited number of studies (n=122) in this review reported three-way outcomes (environmental-rights-income), with 18% finding positive outcomes across all three dimensions. The analysis suggested that a wider range of livelihood and well-being metrics might be needed to accurately capture the full range of impacts from these community forestry interventions, and the focus on measured income probably underestimates some of these broader socio-economic impacts from forest sector interventions. The paper also analyses the factors that predict positive joint outcomes, highlighting three that emerge as statistically significant: (i) biophysical conditions, especially forest type and elevation; (ii) the interactions between the national governance context and the national development trajectories in which interventions took place; and (iii) community institutional arrangements, especially the strength of community tenure rights prior to the intervention. This study provides some valuable insights into the ways in which REDD+ interventions could enhance positive linkages to deliver on multiple objectives.

Further exploration of linkages and trade-offs between non-carbon benefits in the context of REDD+ programmes and action is needed to help address safeguards, enhance positive and minimise negative outcomes for people and the environment, and deliver on global goals for sustainable development.

4.6. Conclusions

There is a widespread understanding that REDD+ success is contingent on demonstrating positive non-carbon benefits and outcomes, which are essential for securing permanence. However, there is as yet limited direct evidence of the degree to which such outcomes are being achieved. Project-level evidence, and evidence from early-stage results-based pilots, do provide some useful lessons

which can be extrapolated to jurisdictional and national level interventions.

Some projects have shown positive impacts on biodiversity and ecosystem services, largely through their association with improved forest outcomes. Such benefits can make important contributions to achieving policy and development objectives including enhancing climate resilience. Evidence from social evaluations of REDD+ interventions demonstrates that, where direct and indirect benefits are clearly visible to local stakeholders, and have been delivered, community engagement is strong and projects have achieved positive carbon and social outcomes. The strength of existing rights and tenure arrangements at local scales, and clear governance responsibilities, create pre-conditions for effective implementation, but these are not always taken into account during project design. The meaningful engagement of local stakeholders in implementation also provides more transparent mechanisms for the reporting and monitoring of environmental and social co-benefits, but is not necessarily prioritised in project plans. Outcomes are often socially contested, and differentiated, with elite capture of benefits reported as an outcome of existing power structures in local communities, except in the relatively rare cases where these equity issues have been explicitly anticipated and addressed in the design of project interventions.

Frameworks for assessing, monitoring, reporting and verifying non-carbon benefits remain underdeveloped, and this results in considerable knowledge gaps, when trying to assess these outcomes. While biodiversity and other environmental objectives are strong parts of many REDD+ programmes, they tend to be framed in general terms that make purpose-driven monitoring difficult. The existence of these benefits has so far been demonstrated mostly by association of positive environmental values with the areas where REDD+ activity is taking place, and the likely benefits of positive forest outcomes, rather than explicit monitoring of environmental gains. Very few studies undertake comparative analyses of outcomes in areas that are not part of REDD+ interventions. There is, however, reason to expect this situation to improve through national efforts to address and respect REDD+ safeguards. Improved monitoring of non-carbon benefits will be needed for future – and is anticipated in current – Summaries of Information (SOI) on safeguards submitted under the Warsaw Framework. Some countries have in fact advanced in their monitoring of non-carbon benefits, such as Costa Rica with its soon-to-be released report on the non-carbon benefits of its implementation of the Forest Carbon Partnership Facility Emission Reduction Payment Agreement. These efforts should help to enhance the evidence base as REDD+ moves forward. In principle, monitoring for REDD+ can be improved by drawing on (and strengthening) monitoring for other policy areas – such as the implementation of National Biodiversity Strategies and Action Plans (NBSAPs) under the CBD. As highlighted by Maniatis et al. (2019) such cross-sectoral collaboration and cost sharing can help to keep overall monitoring costs to a minimum. It would also be sensible to align monitoring efforts with reporting requirements for other international processes, such as the post-2020 Global Biodiversity Framework under the CBD, and the SDGs, lowering costs for national governments and other actors, and contributing to greater harmonisation of international efforts (Stephenson, 2019).

The lack of direct exploration and evidence of linkages between environmental and socio-economic outcomes of REDD+ relates in part to challenges around valuing and accounting for environmental benefits in monetary or even economic terms. Increasing interest in natural capital and inclusive wealth accounting approaches (Dasgupta, 2021) may help to bridge this evidence gap, by taking account of environmental services and their contribution to livelihoods. These broader conceptual frameworks connecting environmental and socio-economic outcomes complement a growing focus on multidimensional measures of well-being as ways to report on progress towards the Sustainable Development Goals and related national priorities (Schleicher et al., 2018). Together, these approaches provide more comprehensive ways to capture the full range of non-carbon benefits from REDD+, beyond those that are currently reported in project documents and published literature.

The relatively early stage of REDD+ implementation also makes it difficult to assess the 'permanence' of the reported impacts from interventions. Where projects have been successful, it remains unclear whether there is long term 'behavioural change' away from activities that were resulting in deforestation and *forest degradation*, or whether stakeholders are simply responding to a particular set of (temporary) incentives. Here, there is some evidence that the integration of interventions with national development strategies and plans allows greater convergence of development finance and other resources towards addressing the ultimate drivers of deforestation and forest degradation and is more likely to result in enduring changes. This also avoids risks of leakage and helps to secure additionality. However,

most REDD+ activity is currently being conducted at a sectoral level and needs to be more closely aligned with broader national development plans.

A key focus of REDD+ is to move the scope of interventions beyond climate impacts towards an integrated view of climate-nature-livelihoods, recognising the overlapping risks associated with each of these domains, but also the positive synergies associated with joint action. In practice, evidence so far suggests that progress across each of these different dimensions is not taking place at the same pace, and there is a need to incorporate non-carbon benefits explicitly into the design of interventions, while also broadening frameworks for monitoring and reporting on biodiversity, environmental, social and well-being outcomes. Having raised expectations about the potential of interventions to deliver positive synergies across these multiple objectives, there is a risk that uneven progress across these different dimensions might undermine the confidence of the different sectors and stakeholders that are involved in implementation, thereby undermining the overall objectives of REDD+.

4.7. References

Ahmed N. and Glaser M. (2016). Coastal aquaculture, mangrove deforestation and blue carbon emissions: Is REDD+ a solution? Marine Policy, 66, 58–66.

Airey S. and Krause T. (2017). "Georgetown ain't got a tree. We got the trees"—Amerindian Power & Participation in Guyana's Low Carbon Development Strategy. Forests, 8, 3, 51.

Angelsen A., Hermansen E.A.T., Rajão R., and van der Hoff R. (2018). Results-based payment: Who should be paid, and for what? In: Transforming REDD+: Lessons and New Directions. (Eds.) A. Angelsen, C. Martius, et al. Center for International Forestry Research (CIFOR): Bogor, Indonesia., pp. 18. ISBN: 978-602-387-079-0.

Appiah D.O. and Gbeddy S.E.A. (2018). A synthesis of the implementation ambivalence of REDD+ in Sub-Saharan Africa and Southeast Asia. Forest and Society, 2, 1, 92–111.

Armenteras D., Rodríguez N., and Retana J. (2015). National and regional relationships of carbon storage and tropical biodiversity. Biological Conservation, 192, 378–386.

Baraloto C., Alverga P., Baéz Quispe S., Barnes G., Bejar Chura N., Brasil da Silva I., Castro W., da Souza H., de Souza Moll I., del Alcazar Chilo J., et al. (2014). Trade-offs among forest value components in community forests of southwestern Amazonia. Ecology and Society, 19, 4.

Bayrak M.M. and Marafa L.M. (2016). Ten Years of REDD+: A Critical Review of the Impact of REDD+ on Forest-Dependent Communities. Sustainability, 8, 7, 620.

Bayrak M.M. and Marafa L.M. (2020a). REDD+ as a Vehicle for Community-Based Forest Management? Critical Insights from Vietnam. Small-scale Forestry, 19, 1, 57–81.

Bayrak M.M. and Marafa L.M. (2020b). Are Vietnamese farmers able to combat global climate change? A case study on perceptions and attitudes towards sustainable forest management and REDD+ in Central Vietnam. Journal of Sustainable Forestry, 39, 3, 242–258.

Beaudrot L., Kroetz K., Alvarez-Loayza P., Amaral I., Breuer T., Fletcher C., Jansen P.A., Kenfack D., Lima M.G.M., Marshall A.R., et al. (2016). Limited carbon and biodiversity co-benefits for tropical forest mammals and birds. Ecological Applications, 26, 4, 1098–1111.

Brimont L. and Leroy M. (2018). Le mécanisme REDD+ et les projets pilotes à Madagascar: d'un idéal incitatif à la réalité des dispositifs de gestion. Natures Sciences Sociétés, 26, 3, 308–319.

Brown D.R., Dettmann P., Rinaudo T., Tefera H., and Tofu A. (2011). Poverty Alleviation and Environmental Restoration Using the Clean Development Mechanism: A Case Study from Humbo, Ethiopia. Environmental Management, 48, 2, 322–333.

Burnett K.M., Ticktin T., Bremer L.L., Quazi S.A., Geslani C., Wada C.A., Kurashima N., Mandle L., Pascua P., Depraetere T., et al. (2019). Restoring to the future: Environmental, cultural, and management trade-offs in historical versus hybrid restoration of a highly modified ecosystem. Conservation Letters, 12, 1, e12606.

Bustamante M.M.C., Roitman I., Aide T.M., Alencar A., Anderson L.O., Aragão L., Asner G.P., Barlow J., Berenguer E., Chambers J., et al. (2016). Toward an integrated monitoring framework to assess the effects of tropical forest degradation and recovery on carbon stocks and biodiversity. Global Change Biology, 22, 1, 92–109.

Capitani C., Soesbergen A. van, Mukama K., Malugu I., Mbilinyi B., Chamuya N., Kempen B., Malimbwi R., Mant R., Munishi P., et al. (2019). Scenarios of Land Use and Land Cover Change and Their Multiple Impacts on Natural Capital in Tanzania. Environmental Conservation, 46, 1, 17–24.

Castella J.C. and Lestrelin G. (2021). Explorer l'impact environnemental des transformations agraires en Asie du Sud-Est grâce à l'évaluation participative des services écosystémiques. Cahiers Agricultures, 30, 3.

Chomba S., Kariuki J., Lund J.F., and Sinclair F. (2016). Roots of inequity: How the implementation of REDD+ reinforces past injustices. Land Use Policy, 50, 202–213.

Creed I.F. and van Noordwijk M. (2018). Forest and water on a changing planet: Vulnerability, adaptation and governance opportunities. International Union of Forest Research Organizations (IUFRO): Vienna, Austria.

Dasgupta P. (2021). The Economics of Biodiversity: The Dasgupta Review. HM Treasury: London, UK.

Deere N.J., Guillera-Arroita G., Baking E.L., Bernard H., Pfeifer M., Reynolds G., Wearn O.R., Davies Z.G., and Struebig M.J. (2018). High Carbon Stock forests provide co-benefits for tropical biodiversity. Journal of Applied Ecology, 55, 2, 997–1008.

Devkota B.P. (2020). Social inclusion and deliberation in response to REDD+ in Nepal's community forestry. Forest Policy and Economics, 111, 102048.

Devkota B.P. and Mustalahti I. (2018). Complexities in accessing REDD+ benefits in community forestry: evidence from Nepal's Terai region. International Forestry Review, 20, 3, 332–345.

Di Marco M., Watson J.E.M., Currie D.J., Possingham H.P., and Venter O. (2018). The extent and predictability of the biodiversity–carbon correlation. Ecology Letters, 21, 3, 365–375.

Díaz S., Settele J., Brondízio E.S., Ngo H.T., Agard J., Arneth A., Balvanera P., Brauman K.A., Butchart S.H.M., Chan K.M.A., et al. (2019). Pervasive human-driven decline of life on Earth points to the need for transformative change. Science, 366, 6471, eaax3100.

Dickson B. and Kapos V. (2012). Biodiversity monitoring for REDD+. Current Opinion in Environmental Sustainability, 4, 6, 717–725.

Donato D.C., Kauffman J.B., Murdiyarso D., Kurnianto S., Stidham M., and Kanninen M. (2011). Mangroves among the most carbon-rich forests in the tropics. Nature Geoscience, 4, 5, 293–297.

Duchelle A., de Sassi C., Jagger P., Cromberg M., Larson A., Sunderlin W., Atmadja S., Resosudarmo I.A.P., and Pratama C.D. (2017). Balancing carrots and sticks in REDD+: implications for social safeguards. Ecology and Society, 22, 3.

Duchelle A.E., Seymour F., Brockhaus M., Angelsen A., Larson A.M., Moeliono M., Wong G.Y., Pham T.T., and Martius C. (2018). REDD+: Lessons from National and Subnational Implementation. World Resources Institute: Washington, D.C.

Duker A.E.C., Tadesse T.M., Soentoro T., de Fraiture C., and Kemerink-Seyoum J.S. (2019). The implications of ignoring smallholder agriculture in climate-financed forestry projects: empirical evidence from two REDD+ pilot projects. Climate Policy, 19, sup1, S36–S46.

Duque A., Feeley K.J., Cabrera E., Callejas R., and Idarraga A. (2014). The Dangers of Carbon-Centric Conservation for Biodiversity: A Case Study in the Andes. Tropical Conservation Science, 7, 2, 178–191.

Entenmann S.K., Schmitt C.B., and Konold W. (2014a). REDD+-related activities in Kenya: actors' views on biodiversity and monitoring in a broader policy context. Biodiversity and Conservation, 23, 14, 3561–3586.

Entenmann S.K., Kaphegyi T.A.M., and Schmitt C.B. (2014b). Forest biodiversity monitoring for REDD+: a case study of actors' views in Peru. Environmental Management, 53, 2, 300–317.

Errico S. (2016). Opportunities and challenges to strengthen indigenous peoples' rights and livelihoods in the context of REDD+: a study of REDD+ implementation in Vietnam. International Forestry Review, 18, 4, 412–428.

Espinosa R. and Feather C. (2018). A Marathon, Not a Sprint: The Role of International Climate Finance in Securing Indigenous Lands in Peru. AIDESEP (Inter Ethnic Association for the Development of the Peruvian Amazon) and FPP (Forest Peoples Programme): Lima, Peru.

Fa J.E., Watson J.E., Leiper I., Potapov P., Evans T.D., Burgess N.D., Molnár Z., Fernández-Llamazares Á., Duncan T., Wang S., et al. (2020). Importance of Indigenous Peoples' lands for the conservation of Intact Forest Landscapes. Frontiers in Ecology and the Environment, 18, 3, 135–140.

FAO (2020). Global Forest Resources Assessment 2020: Main report. Food and Agriculture Organization of the United Nations: Rome, Italy.

Ferreira J., Lennox G.D., Gardner T.A., Thomson J.R., Berenguer E., Lees A.C., Mac Nally R., Aragão L.E.O.C., Ferraz S.F.B., Louzada J., et al. (2018). Carbon-focused conservation may fail to protect the most biodiverse tropical forests. Nature Climate Change, 8, 8, 744–749.

Fortuna S. (2020). Mangroves: a unique role in the climate emergency. Available at: https://www.fao.org/redd/news/detail/en/c/1301430/ [Accessed on 31 January 2022].

Gardner T.A., Burgess N.D., Aguilar-Amuchastegui N., Barlow J., Berenguer E., Clements T., Danielsen F., Ferreira J., Foden W., Kapos V., et al. (2012). A framework for integrating biodiversity concerns into national REDD+ programmes. Biological Conservation, 154, 61–71.

GCF (2019). Accelerating REDD+ Implementation. Green Climate Fund: Incheon, Republic of Korea.

GCF (2021). GCF Handbook: Decisions, Policies and Frameworks as Agreed by the Board of the Green Climate Fund from B.01 to B.28. Green Climate Fund: Incheon, Republic of Korea.

Gillerot L., Grussu G., Condor-Golec R., Tavani R., Dargush P., and Attorre F. (2021). Progress on incorporating biodiversity monitoring in REDD+ through national forest inventories. Global Ecology and Conservation, 32, e01901.

Hajjar R., Engbring G., and Kornhauser K. (2021a). The impacts of REDD+ on the social-ecological resilience of community forests. Environmental Research Letters, 16, 2, 024001.

Hajjar R., Oldekop J.A., Cronkleton P., Newton P., Russell A.J.M., and Zhou W. (2021b). A global analysis of the social and environmental outcomes of community forests. Nature Sustainability, 4, 3, 216–224.

Harada K., Prabowo D., Aliadi A., Ichihara J., and Ma H.-O. (2015). How Can Social Safeguards of REDD+ Function Effectively Conserve Forests and Improve Local Livelihoods? A Case from Meru Betiri National Park, East Java, Indonesia. Land, 4, 1, 119–139.

Harrison M.E. and Paoli G.D. (2012). Managing the Risk of Biodiversity Leakage from Prioritising REDD+ in the Most Carbon-Rich Forests: The Case Study of Peat-Swamp Forests in Kalimantan, Indonesia. Tropical Conservation Science, 5, 4, 426–433.

Hatcher J., Owen M., and Yin D. (2021). Falling Short. Rainforest Foundation Norway: Oslo, Norway.

Hoang C., Satyal P., and Corbera E. (2019). 'This is my garden': justice claims and struggles over forests in Vietnam's REDD+. Climate Policy, 19, sup1, S23–S35.

Holmes I., Potvin C., and Coomes O.T. (2017). Early REDD+ Implementation: The Journey of an Indigenous Community in Eastern Panama. Forests, 8, 3, 67.

Huettner M. (2012). Risks and opportunities of REDD+ implementation for environmental integrity and socio-economic compatibility. Environmental Science & Policy, 15, 1, 4–12.

ILO (2020). Implementing the ILO Indigenous and Tribal Peoples Convention No. 169: towards an inclusive, sustainable and just future. International labour organization: Geneva. ISBN: 978-92-2-134034-8.

Ilstedt U., Bargués Tobella A., Bazié H.R., Bayala J., Verbeeten E., Nyberg G., Sanou J., Benegas L., Murdiyarso D., Laudon H., et al. (2016). Intermediate tree cover can maximize groundwater recharge in the seasonally dry tropics. Scientific Reports, 6, 1, 21930.

IPBES (2019). Global assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. (Eds.) E.S. Brondízio, J. Settele, S. Diaz, and H.T. Ngo. IPBES Secretariat: Bonn, Germany. pp. 1144. ISBN: 978-3-947851-20-1.

IUCN (2017). Mangroves and REDD+: A new component of MFF. Available at: https://www.iucn.org/news/asia/201711/mangroves-and-redd-new-component-mff [Accessed on 31 January 2022].

Jung M., Arnell A., de Lamo X., García-Rangel S., Lewis M., Mark J., Merow C., Miles L., Ondo I., Pironon S., et al. (2021). Areas of global importance for conserving terrestrial biodiversity, carbon and water. Nature Ecology & Evolution, 5, 11, 1499–1509.

Kiffner C., Arndt Z., Foky T., Gaeth M., Gannett A., Jackson M., Lellman G., Love S., Maroldi A., McLaughlin S., et al. (2019). Land use, REDD+ and the status of wildlife populations in Yaeda Valley, northern Tanzania. PLOS ONE, 14, 4, e0214823.

Kim Y.-S., Latifah S., Afifi M., Mulligan M., Burke S., Fisher L., Siwicka E., Remoundou K., Christie M., Masek Lopez S., et al. (2018). Managing forests for global and local ecosystem services: A case study of carbon, water and livelihoods from eastern Indonesia. Ecosystem Services, 31, 153–168.

Krause T. and Nielsen M.R. (2019). Not Seeing the Forest for the Trees: The Oversight of Defaunation in REDD+ and Global Forest Governance. Forests, 10, 4, 344.

Kronik J. and Verner D. (2010). Indigenous Peoples and Climate Change in Latin America and the Caribbean. The World Bank: Washington, D.C. pp. 186. ISBN: 978-0-8213-8237-0.

Laing T. (2015). The Impacts of International REDD+ Finance - Guyana Case Study. Climate and Land Use Alliance.

de Lamo X., Jung, Martin, Visconti P., Schmidt-Traub G., Miles L., and Kapos V. (2020). Strengthening Synergies: How Action to Achieve Post-2020 Global Biodiversity Conservation Targets Can Contribute to Mitigating Climate Change. UNEP-WCMC: Cambridge, UK.

Larson A.M. (2011). Forest tenure reform in the age of climate change: Lessons for REDD+. Global Environmental Change, 21, 2, 540–549.

Larson A.M., Brockhaus M., Sunderlin W.D., Duchelle A., Babon A., Dokken T., Pham T.T., Resosudarmo I.A.P., Selaya G., Awono A., et al. (2013). Land tenure and REDD+: The good, the bad and the ugly. Global Environmental Change, 23, 3, 678–689.

Larson A.M., Solis D., Duchelle A.E., Atmadja S., Resosudarmo I.A.P., Dokken T., and Komalasari M. (2018). Gender lessons for climate initiatives: A comparative study of REDD+ impacts on subjective wellbeing. World Development, 108, 86–102.

Lawlor K., Madeira E.M., Blockhus J., and Ganz D.J. (2013). Community Participation and Benefits in REDD+: A Review of Initial Outcomes and Lessons. Forests, 4, 2, 296–318.

Lemaitre S. (2011). Indigenous Peoples' Land Rights and REDD: A Case Study. Review of European Community & International Environmental Law, 20, 2, 150–162.

Levy B.S. and Patz J.A. (2015). Climate Change, Human Rights, and Social Justice. Annals of Global Health, 81, 3, 310–322.

Lu H., Liu G., Huang Z., and Yang Q. (2016). Carbon, soil, and ecological benefits of REDD+ policies in Southwest China. ScienceAsia, 42, 1, 1.

Magnago L.F.S., Magrach A., Laurance W.F., Martins S.V., Meira-Neto J.A.A., Simonelli M., and Edwards D.P. (2015). Would protecting tropical forest fragments provide carbon and biodiversity cobenefits under REDD+? Global Change Biology, 21, 9, 3455–3468.

Maharani C.D., Moeliono M., Wong G.Y., Brockhaus M., Carmenta R., and Kallio M. (2019). Development and equity: A gendered inquiry in a swidden landscape. Forest Policy and Economics, 101, 120–128.

Mamo D. (2020). The Indigenous World. The International Work Group for Indigenous Affairs (IWGIA): Copenhagen, Denmark.

Maniatis D., Scriven J., Jonckheere I., Laughlin J., and Todd K. (2019). Toward REDD+ Implementation. Annual Review of Environment and Resources, 44, 373–398.

Maraseni T.N., Neupane P.R., Lopez-Casero F., and Cadman T. (2014). An assessment of the impacts of the REDD+ pilot project on community forests user groups (CFUGs) and their community forests in Nepal. Journal of Environmental Management, 136, 37–46.

Mbatu R. (2017). Challenges and opportunities of a landscape governance approach to the REDD+ programme: a conservation outlook. Oryx, 53, 1, 130–135.

McElwee P., Thi Nguyen V.H., Nguyen D.V., Tran N.H., Le H.V.T., Nghiem T.P., and Thi Vu H.D. (2016). Using REDD+ Policy to Facilitate Climate Adaptation at the Local Level: Synergies and Challenges in Vietnam. Forests, 8, 1, 11.

McGregor D., Whitaker S., and Sritharan M. (2020). Indigenous environmental justice and sustainability. Current Opinion in Environmental Sustainability, 43, 35–40.

Murray J.P., Grenyer R., Wunder S., Raes N., and Jones J.P.G. (2015). Spatial patterns of carbon, biodiversity, deforestation threat, and REDD+ projects in Indonesia. Conservation Biology, 29, 5, 1434–1445.

Mutabazi K., George C.K., Dos Santos A.S., and Felinster M.M. (2014). Livelihood Implications of Redd+ and Costs-Benefits of Agricultural Intensification in Redd+ Pilot Area of Kilosa, Tanzania. Journal of Ecosystem & Ecography, 04, 02.

Nantongo M.G. (2017). Legitimacy of local REDD+ processes. A comparative analysis of pilot projects in Brazil and Tanzania. Environmental Science & Policy, 78, 81–88.

Narayan S., Beck M.W., Reguero B.G., Losada I.J., Wesenbeeck B. van, Pontee N., Sanchirico J.N., Ingram J.C., Lange G.-M., and Burks-Copes K.A. (2016). The Effectiveness, Costs and Coastal Protection Benefits of Natural and Nature-Based Defences. PLOS ONE, 11, 5, e0154735.

Nathan I. and Pasgaard M. (2017). Is REDD+ effective, efficient, and equitable? Learning from a REDD+ project in Northern Cambodia. Geoforum, 83, 26–38.

Ngoma H., Angelsen A., Carter S., and Roman-Cuesta R.M. (2018). Climate-Smart Agriculture: Will Higher Yields Lead to Lower Deforestation? In: Transforming REDD+: Lessons and New Directions. (Eds.) A. Angelsen, C. Martius, et al. Center for International Forestry Research (CIFOR): Bogor, Indonesia., pp. 21.

O'Bryan C.J., Garnett S.T., Fa J.E., Leiper I., Rehbein J.A., Fernández-Llamazares Á., Jackson M.V., Jonas H.D., Brondizio E.S., Burgess N.D., et al. (2021). The importance of Indigenous Peoples' lands for the conservation of terrestrial mammals. Conservation Biology, 35, 3, 1002–1008.

Ojea E., Loureiro M.L., Alló M., and Barrio M. (2016). Ecosystem Services and REDD: Estimating the Benefits of Non-Carbon Services in Worldwide Forests. World Development, 78, 246–261.

Palomo I., Dujardin Y., Midler E., Robin M., Sanz M.J., and Pascual U. (2019). Modeling trade-offs across carbon sequestration, biodiversity conservation, and equity in the distribution of global REDD+ funds. Proceedings of the National Academy of Sciences, 116, 45, 22645–22650.

Pandey S.S., Cockfield G., and Maraseni T.N. (2014). Dynamics of carbon and biodiversity under REDD+ regime: A case from Nepal. Environmental Science & Policy, 38, 272–281.

Pandey S.S., Cockfield G., and Maraseni T.N. (2016). Assessing the roles of community forestry in climate change mitigation and adaptation: A case study from Nepal. Forest Ecology and Management, 360, 400–407.

Panfil S.N. and Harvey C.A. (2016). REDD+ and Biodiversity Conservation: A Review of the Biodiversity Goals, Monitoring Methods, and Impacts of 80 REDD+ Projects. Conservation Letters, 9, 2, 143–150.

Parrotta J.A., Wildburger C., and Mansourian S. (2012). Understanding relationships between biodiversity, carbon, forests and people: the key to achieving REDD+ objectives. A global assessment report. International Union of Forest Research Organizations (IUFRO): Vienna. pp. 161. ISBN: 978-3-902762-17-7.

Pelletier J., Horning N., Laporte N., Samndong R.A., and Goetz S. (2018). Anticipating social equity impacts in REDD+ policy design: An example from the Democratic Republic of Congo. Land Use Policy, 75, 102–115.

Petersen K. and Brana Varela J. (2017). INDC Analysis: An Overview of the Forest Sector. WWF: Gland, Switzerland.

Phelps J., Webb E.L., and Agrawal A. (2010). Does REDD+ Threaten to Recentralize Forest Governance? Science, 328, 5976, 312-313.

Pollini B., Nimir R., and Miles L. (2019). Spatial Analysis: A Tool for Integrated Land Use Planning for REDD+. UN-REDD Programe: Cambridge, UK.

Poudel M., Thwaites R., Race D., and Dahal G.R. (2014). REDD+ and community forestry: implications for local communities and forest management- a case study from Nepal. International Forestry Review, 16, 1, 39–54.

Poudel M., Thwaites R., Race D., and Dahal G.R. (2015). Social equity and livelihood implications of REDD+ in rural communities – a case study from Nepal. International Journal of the Commons, 9, 1, 177–208.

Rakatama A., Iftekhar M.S., and Pandit R. (2020). Perceived benefits and costs of REDD+ projects under different forest management regimes in Indonesia. Climate and Development, 12, 5, 481–493.

Ranjan R. (2021). Can combining two environmental services under a single PES program result in better environmental outcomes and lower costs? Natural Resource Modeling, 34, 2, e12303.

RRI (2016). Toward a Global Baseline of Carbon Storage in Collective Lands: An Updated Analysis of Indigenous Peoples' and Local Communities' Contributions to Climate Change Mitigation. Rights and Resources Initiative: Washington, D.C.

RRI (2021). Status of Legal Recognition of Indigenous Peoples', Local Communities' and Afro-Descendant Peoples' Rights to Carbon Stored in Tropical Lands and Forests. Rights and Resources Initiative: Washington, D.C.

Sarmiento Barletti J.P. and Larson A.M. (2017). Rights abuse allegations in the context of REDD+ readiness and implementation: A preliminary review and proposal for moving forward. Center for International Forestry Research (CIFOR): Bogor, Indonesia.

Satyal P., Corbera E., Dawson N., Dhungana H., and Maskey G. (2019). Representation and participation in formulating Nepal's REDD+ approach. Climate Policy, 19, sup1, S8–S22.

Satyal P., Corbera E., Dawson N., Dhungana H., and Maskey G. (2020). Justice-related impacts and social differentiation dynamics in Nepal's REDD+ projects. Forest Policy and Economics, 117, 102203.

Scharlemann J.P.W., Brock R.C., Balfour N., Brown C., Burgess N.D., Guth M.K., Ingram D.J., Lane R., Martin J.G.C., Wicander S., et al. (2020). Towards understanding interactions between Sustainable Development Goals: the role of environment–human linkages. Sustainability Science, 15, 6, 1573–1584.

Scheba A. (2015). The politics of inclusion/exclusion of REDD+ in Tanzania. Paper presented at the Resource Politics 2015 Conference, Institute of Development Studies, 7-9 September.

Schleicher J., Schaafsma M., and Vira B. (2018). Will the Sustainable Development Goals address the links between poverty and the natural environment? Current Opinion in Environmental Sustainability, 34, 43–47.

Schreiber S.G., Ding C., Hamann A., Hacke U.G., Thomas B.R., and Brouard J.S. (2013). Frost hardiness vs. growth performance in trembling aspen: an experimental test of assisted migration. Journal of Applied Ecology, 50, 4, 939–949.

Sharma B.P., Karky B.S., Nepal M., Pattanayak S.K., Sills E.O., and Shyamsundar P. (2020). Making incremental progress: impacts of a REDD+ pilot initiative in Nepal. Environmental Research Letters, 15, 10, 105004.

Shrestha S., Shrestha U.B., and Bawa K.S. (2017). Contribution of REDD+ payments to the economy of rural households in Nepal. Applied Geography, 88, 151–160.

Stephenson P.J. (2019). The Holy Grail of biodiversity conservation management: Monitoring impact in projects and project portfolios. Perspectives in Ecology and Conservation, 17, 4, 182–192.

Stephenson P.J., Bowles-Newark N., Regan E., Stanwell-Smith D., Diagana M., Höft R., Abarchi H., Abrahamse T., Akello C., Allison H., et al. (2017). Unblocking the flow of biodiversity data for decision-making in Africa. Biological Conservation, 213, 335–340.

Strassburg B.B.N., Kelly A., Balmford A., Davies R.G., Gibbs H.K., Lovett A., Miles L., Orme C.D.L., Price J., Turner R.K., et al. (2010). Global congruence of carbon storage and biodiversity in terrestrial ecosystems. Conservation Letters, 3, 2, 98–105.

Strassburg B.B.N., Vira B., Mahanty S., Mansourian S., Martin A., Dawson N., Gross-Camp N., Latawiec A.E., and Swainson L. (2012). Social and Economic Considerations Relevant to REDD+. In: Understanding Relationships between Biodiversity, Carbon, Forests and People: The Key to Achieving REDD+ Objectives. (Eds.) J.A. Parrotta, Wildburger, Christoph, and S. Mansourian. International Union of Forest Research Organizations (IUFRO): Vienna, Austria., pp. 83–114.

Strassburg B.B.N., Iribarrem A., Beyer H.L., Cordeiro C.L., Crouzeilles R., Jakovac C.C., Braga Junqueira A., Lacerda E., Latawiec A.E., Balmford A., et al. (2020). Global priority areas for ecosystem restoration. Nature, 586, 7831, 724–729.

Sunderlin W.D., de Sassi C., Sills E.O., Duchelle A.E., Larson A.M., Resosudarmo I.A.P., Awono A., Kweka D.L., and Huynh T.B. (2018). Creating an appropriate tenure foundation for REDD+: The record to date and prospects for the future. World Development, 106, 376–392.

Svarstad H. and Benjaminsen T.A. (2017). Nothing succeeds like success narratives: a case of conservation and development in the time of REDD. Journal of Eastern African Studies, 11, 3, 482–505.

Tegegne Y.T., Palmer C., Wunder S., Moustapha N.M., Fobissie K., and Moro E. (2021). REDD+ and equity outcomes: Two cases from Cameroon. Environmental Science & Policy, 124, 324–335.

Torres A.B., Acuña L.A.S., and Vergara J.M.C. (2014). Integrating CBM into Land-Use Based Mitigation Actions Implemented by Local Communities. Forests, 5, 12, 3295–3326.

Tulyasuwan N., Henry M., and Karsenty A. (2015). REDD+ and tenure: a case study of Thailand. International Forestry Review, 17, 4, 414–426.

Turnhout E., Gupta A., Weatherley-Singh J., Vijge M.J., de Koning J., Visseren-Hamakers I.J., Herold M., and Lederer M. (2017). Envisioning REDD+ in a post-Paris era: between evolving expectations and current practice. WIREs Climate Change, 8, 1, e425.

UN (2007). United Nations Declaration on the Rights of Indigenous Peoples A/RES/61/295.

UNEP (2014). UNEP Year Book 2014: emerging issues in our global environment. United Nations Environment Programme: Nairobi, Kenya. ISBN: 978-92-807-3381-5.

UNFCCC (2014). Report of the Conference of the Parties on its nineteenth session, held in Warsaw from 11 to 23 November 2013. United Nations: New York, NY.

UN-REDD Programme (2020). 11th Consolidated annual progress report of the UN-REDD Programme Fund. UN-REDD Programme: Geneva, Switzerland.

Veldman J.W., Overbeck G.E., Negreiros D., Mahy G., Le Stradic S., Fernandes G.W., Durigan G., Buisson E., Putz F.E., and Bond W.J. (2015). Where Tree Planting and Forest Expansion are Bad for Biodiversity and Ecosystem Services. BioScience, 65, 10, 1011–1018.

Westholm L. (2016). Fruits from the forest and the fields: forest conservation policies and intersecting social inequalities in Burkina Faso's REDD+ program. International Forestry Review, 18, 4, 511–521.

Wheeler C.E., Omeja P.A., Chapman C.A., Glipin M., Tumwesigye C., and Lewis S.L. (2016). Carbon sequestration and biodiversity following 18years of active tropical forest restoration. Forest Ecology and Management, 373, 44–55.

Younger T. (2021). REDD hasn't contributed to the structural reforms that would improve the recognition and protection of Indigenous Peoples' rights. Forest Peoples Programme (part 4). Interview by Chris Lang.

Zongo B., Zongo F., Toguyeni A., and Boussim J.I. (2017). Water quality in forest and village ponds in Burkina Faso (western Africa). Journal of Forestry Research, 28, 5, 1039–1048.

Chapter 5

REDD+ Challenges and Lessons Learnt

Lead author: Stephanie Mansourian
Contributing authors: Amy Duchelle, Cesar Sabogal and Bhaskar Vira

TABLE OF CONTENTS

Abstract

Experience to date stemming from the different phases of REDD+ in over 65 countries provides useful insights into both challenges and lessons for the future of REDD+. The questions we seek to answer in this chapter are: 1. Which current technical, institutional, management and financial challenges at the local, sub-national, national and international scales, as well as across these scales, are likely to affect future implementation of REDD+ and related forest-based mitigation activities? 2. For each of these spatial scales, what relevant lessons can be identified for different stakeholder groups? In light of the United Nations Decade on Ecosystem Restoration (2021–2030), we also chose to place an emphasis on exploring some of the parallels between REDD+ and forest landscape restoration (FLR) given that forest restoration is one of the dimensions of REDD+ and an important component of the UN Decade.

We identify nine overarching challenges which can be further broken down into more specific challenges. These overarching challenges are: 1. Optimising synergies across sectors and with other global forest-related conventions and trends; 2: Ensuring legitimacy of REDD+ interventions; 3: Harmonising and simplifying methodologies; 4: Securing adequate financing and incentivising REDD+; 5: Ensuring national commitment and accountability; 6: Addressing drivers of forest loss and degradation; 7: Confirming engagement, inclusion and equity, and securing rights; 8: Improving human and institutional capacity for monitoring and implementation; 9: Securing both carbon and non-carbon benefits through operationalising safeguards.

Emerging lessons for different stakeholder groups are highlighted in the second part of the chapter. Nine lessons emerge: 1: Addressing drivers of deforestation and forest degradation at multiple levels of governance remains a fundamental component of REDD+ that is not yet effectively tackled; 2: REDD+ implementation requires a better understanding of power relations among different actors; 3: Ownership and accountability of in-country stakeholders are fundamental to REDD+ implementation; 4: The emergence of REDD+ brought renewed attention to the importance of the rights and knowledge of Indigenous Peoples and local communities, 5: Non-carbon benefits of forests represent essential components of REDD+, particularly as they provide direct and indirect benefits for Indigenous Peoples and local communities; 6: Sub-national jurisdictional approaches to REDD+ represent an important pathway to its broader uptake; 7: Monitoring non-carbon benefits is challenging, and a stepwise approach is needed to operationalise safeguards; 8: Communication, capacity building and engagement in REDD+ decision-making processes need to be improved; 9: Coordination and collaboration across scales and actors (public and private) holds the key to making a real change in REDD+ implementation.

5.1. Context and Introduction

The 2015 *Paris Agreement*[1] under the United Nations Framework Convention on Climate Change (UNFCCC) marked an important milestone for investments in forest-based *climate change mitigation* with its Article 5 specifically focused on REDD+. Intended to pay tropical countries for maintaining, sustainably managing or restoring *forests*, REDD+ was conceptualised as a multilevel *payments for environmental services* (PES) scheme (Wunder et al., 2020). The Glasgow Climate Pact, negotiated at the UNFCCC 26th Conference of the Parties (COP) in 2021, further consolidated the importance of forests for climate change mitigation and *adaptation*, and over 140 countries pledged to halt and reverse forest loss and *land degradation* by 2030 through the Glasgow Leaders' Declaration on Forests and Land Use.

At the same time, the future Post-2020 Global Biodiversity Framework under the Convention on Biological Diversity (CBD) being negotiated into 2022 will feature all actions associated with REDD+ (i.e., reducing *deforestation*, reducing *forest degradation*, conservation, sustainable management of forests and *restoration*) as central elements of the framework. Under the United Nations Convention to Combat Desertification (UNCCD), the land degradation neutrality target also includes activities associated with REDD+ (including tackling drivers of forest loss and degradation, and *afforestation*, *reforestation* and restoration). Although non-binding, the Bonn Challenge on *Forest Landscape Restoration* (FLR) launched in 2011 has gener-

1 All terms that are defined in the glossary of this report (Appendix 1) appear in italics the first time they are mentioned in a chapter.

ated significant interest and mobilisation around *forest restoration*, with over 60 governments having committed to restoring over 210 million ha at the time of writing (Bonn Challenge website). An estimated 115 countries have made quantitative restoration commitments under at least one of the three Rio Conventions (the CBD, UNCCD, UNFCCC) or the Bonn Challenge (Sewell et al., 2020).

The creation of an umbrella for forest protection, *sustainable forest management* and the enhancement of forest *carbon stocks* under REDD+ may have been a novelty, but more importantly, the intention to finance these activities through markets, and based on results, provided a distinctly new dimension (Turnhout et al., 2016). It also brought the promise of more private sector engagement and new actors on the international forest *governance* stage (see Chapter 2, Section 2.2.3.4). However, some of these special features of REDD+ (e.g., its reliance on carbon markets) failed to materialise early on and instead it developed into an umbrella concept for many existing activities in the forest sector spanning plans under Rio conventions, other agreements and initiatives with a de-emphasis on its original novelty of payments for results and private sector engagement (Angelsen et al., 2017).

In Glasgow, at the UNFCCC's COP in November 2021, over USD 20 billion were pledged to forests for 2021-2025, including USD 1.7 billion to advance *Indigenous Peoples'* and local communities' forest *tenure* rights. This builds on previous investments for REDD+ from bilateral donors and the Green Climate Fund (GCF) which, to date, has provided a total of USD 1.3 billion for 50 projects under its 'forestry and land use' theme, including through its REDD+ results based payments pilot programme (GCF website). It also includes the more than one billion USD in public-private finance mobilised for *tropical forest* protection through the LEAF (Lowering Emissions by Accelerating Forest Finance) Coalition (LEAF Coalition website). Furthermore, the Global Environment Facility (GEF) has included in its draft strategy for the new replenishment period (GEF-8 – 2022–2026) a new integrated programme on 'Ecosystem Restoration' (GEF, 2022). As a major source of funding for implementation of the Rio Conventions, this is likely to impact on future investments in REDD+ or associated activities. Finally, the rules for voluntary cooperation to reduce *emissions* through Article 6 of the Paris Agreement were finalised at COP 26, operationalising market and non-market mechanisms for the mitigation of *greenhouse gas* emissions, under which REDD+ is eligible as long as activities meet the required quality criteria.

In light of these global developments, it is timely to take stock of past and ongoing initiatives to inform the future. Experience has brought to light a number of challenges for REDD+, which are likely to continue impacting on its implementation and related forest conservation and restoration measures (e.g., protected areas, FLR). Reflecting on what has happened in the last ten years, since IUFRO's first Global Forest Expert Panel (GFEP) report on REDD+ (Parrotta et al., 2012) enables us to assess both challenges encountered that may have implications for the future, and lessons learnt from experience in the last decade. Our intention in this chapter is to be forward looking insofar as possible. We summarise the challenges by spatial scale and category (see Table 5.1).

Specifically, the questions we seek to answer in this chapter are: 1. Which current technical, institutional, management and financial challenges at the local, sub-national, national and international scales, as well as across these scales, are likely to affect future implementation of REDD+ and related forest-based mitigation activities? (Section 5.2.); and, 2. For each of these spatial scales, what relevant lessons can be identified for different stakeholder groups? (Section 5.4.). In Section 5.3. we place some of the challenges in context. We also seek to identify some overlaps and interesting parallels between REDD+ and FLR (Section 5.5.). Section 5.6. reflects on opportunities going forward and Section 5.7. concludes.

5.2. Challenges

Introducing the challenges

REDD+ design and implementation encompass several activities that both affect and engage a diversity of stakeholders situated at different administrative levels – from the local to the international – in different sectors, and with vastly divergent power relations (Larson et al., 2018). This gives rise to several challenges due to the inherent multilevel governance characteristics of REDD+ (Loft et al., 2017). For example, while political negotiators have committed governments and other stakeholders to carry out a wide range of activities related to land use, this has posed challenges for private sector actors situated at different levels. As a result, the private sector has shied away from the perceived institutional complexity of REDD+ (Ehara et al., 2019). In addition, non-governmental actors have criticised the REDD+ process for having exacerbated inequalities (Poudyal et al., 2016).

At the international level, challenges concern notably the overall architecture of REDD+ and its

translation into national contexts, as well as its interactions with other international forest-related processes and financing. At national and sub-national levels, multiple challenges have affected REDD+ over the years, some temporary that could be adequately addressed, and others of a more ´permanent´ nature, often reflecting structural policy or deep-rooted institutional challenges, particularly in tropical countries (e.g., Peskett and Brockhaus, 2009). Although REDD+ was conceived as a mechanism at the national scale (or sub-national in the interim), much of the early action has been through local REDD+ projects, giving rise to further local level challenges such as securing local rights. Table 5.1 summarises key challenges identified and situates them at a relevant scale (although some challenges may occur at several spatial scales).

Table **5.1**

Summary overview of key challenges

International	National	Local	Cross-Level
Top-down measures	Cross-sectoral coordination and overlap between REDD+ and related land use/forest initiatives	Limited or ineffective stakeholder participation	Achieving vertical multi-scalar coordination
Harmonising methodologies and definitions applied across countries	Unclear, unstable and/or conflicting tenure rights	Inadequate free, prior and informed consent	Limited participation of legitimate stakeholders
Complexity and carbon accounting	Limited financial resources	Maximising outcomes on local rights and livelihoods	From one-size fits all to national and local differentiation
Legitimacy and 'carbon colonialism'	Making the business case for REDD+		Tackling global drivers of tropical forest loss and degradation
Requirements to access finance	High expectations		Operationalising mechanisms to manage risks of leakage
Permanence	Weak government commitment & corruption		Policy-practice feedback loops
Complexity associated with safeguards	Constraints on institutional and human capacities		Ensuring both local and global co-benefits
Carbon effectiveness of REDD+ projects	Poor national response to effectively address drivers of deforestation and forest degradation		

REDD+ challenges

Categories of challenges: Institutional / governance; management / technical; finance

(NB: some challenges could be assigned to several levels and/or categories, we place them where they are most relevant)

Challenge 1: Optimising synergies across sectors and with other global forest-related conventions and trends

Achieving vertical multi-scalar coordination

Coordination across scales in REDD+ generates challenges vertically across spatial and administrative (or jurisdictional) scales, but also horizontally across sectors (Fujisaki et al., 2016; Loft et al., 2017; Duchelle et al., 2019). Actors in forest *landscapes* are situated at different spatial scales, from international to local, with power frequently vested in those further away from the resource, leaving those most at risk from forest loss and degradation having limited influence on forest-related activities and outcomes in their landscapes (Ostrom and Nagendra, 2007). Frequently, the main stakeholders that should be targeted by REDD+ interventions are not fully engaged, or represented at key meetings or decision-making processes (Milne et al., 2019).

Coordination between international and national actors and between national and sub-national actors features less prominently, although this is key for REDD+ success (Peskett and Brockhaus, 2009; Korhonen-Kurki et al., 2018). Action may also be misdirected to the wrong spatial or administrative scale. For example, frequently local level actors have sought to address tenure issues but these require national level engagement and facilitation (Sunderlin et al., 2018). In Brazil, while the national government has failed to engage in REDD+, within the state of Acre the regional government has spearheaded REDD+ implementation. In the case of Indonesia, unclear divisions of authority have led to conflicts between the central government and regional administrations (Ardiansyah et al., 2015). To be effective, national REDD+ strategies have to combine national coordination and policy coherence with meaningful local involvement in implementation, especially given differing levels of sub-national authority to reduce deforestation (Busch and Amarjargal, 2020). For example, in India, an estimated 300 million people are directly dependent on *forest resources* which has direct consequences on the way REDD+ can be implemented (Chand et al., 2021). Data further suggests a dissonance between funding allocated to different countries and the extent of their forest cover (Angelsen et al., 2018). In-country REDD+ success will depend in large part on how institutions are able to mediate and satisfy the interests of various stakeholders, especially those most directly impacted by REDD+ interventions (Seymour and Angelsen, 2009).

Cross-sectoral coordination and overlap between REDD+ and related land use or forest initiatives

Strategies for meeting REDD+ objectives require cross-sectoral coordination (Larson et al., 2018) with the forest, agriculture and mining sectors for example being key shapers of forest landscapes that are rarely aligned in policy, research and practice (Turnhout et al., 2016). Generally, plans to link REDD+ to other sectors such as agriculture remain vague, and the disconnect between policy, research and practice between the forest and agriculture sectors is overlooked in REDD+ (Turnhout et al., 2016). Further, the unclear definition of national REDD+ objectives can lead to contradictory or overlapping policies and ineffective implementation (Loft et al., 2017). For example, although Tanzania's REDD+ strategy is closely integrated with national growth and development policies, the goals of REDD+ are being superseded by other well-funded donor initiatives for both small- and large-scale commercial agriculture (Kweka et al., 2015, in Loft et al., 2017). Viet Nam's 2012 National REDD+ Action Plan (NRAP) was essentially an 'enabling document' for REDD+ implementation, composed of procedural objectives for further policy development, but lacked effective intra- and intersectoral coherence with existing policies and programmes (Wurtzebach et al., 2019).

Coordination between ministries is central to national REDD+ processes. For example, in the Democratic Republic of the Congo (DRC), the lack of cooperation between the mining and energy, and forestry ministries has been identified as an obstacle to effective REDD+ planning (Kengoum et al., 2020). In Brazil, intersectoral policy coordination also poses challenges for REDD+ implementation, as sectoral support for agribusiness, mining, transportation and energy infrastructure ignores the REDD+ vision (May et al., 2011 in Loft et al., 2017). This challenge, faced by many countries, reflects long-standing structural problems and institutional dysfunctionalities.

Experience has shown that closer coordination and data exchange between various ministries (e.g., ministries of environment, agriculture, finance, planning, etc.) can be challenging in REDD+ countries (Maniatis et al., 2019; UNDP, 2021). In response, some countries have established inter-ministerial REDD+ bodies. For example, Côte d'Ivoire has a National REDD+ Committee that is chaired by the Prime-Minister or her/his representative and presided over by the Minister for Environment and Sustainable Development (Maniatis et al., 2019). Although different types of national REDD+ institutions were set up

in many countries to act as conveners of diverse stakeholder groups, rivalries with existing sectoral agencies and overlapping responsibilities have stymied their effectiveness (Fujisaki et al., 2016).

Emerging from international *climate* negotiations, REDD+ is closely associated with the UNFCCC. Yet REDD+ is linked or expected to contribute to multiple national priorities (e.g., nationally-determined contributions (NDCs), *Sustainable Development Goals (SDG*), Nature-Based Solutions (NbS) or FLR targets). With no single convention addressing forests, related activities can be found scattered across the three main Rio Conventions: the UNFCCC, CBD and UNCCD, with activities such as forest protection, sustainable forest management and forest restoration long predating REDD+. As each convention emphasises different priorities, the role of forests and associated measures differ. This lack of policy harmonisation bears on the resulting approach to REDD+ implementation and outcomes (Corbera and Schroeder, 2017). The fact that different national focal points negotiate under each convention also leads to potential misalignment across common forest-related issues relevant to REDD+. More broadly, institutional fragmentation is reflected in the fact that over 40 formal or informal institutional elements (conventions, agreements, relevant schemes, etc.) relate to forests, spanning the following issues: sustainable development, climate change, forestry, trade, biodiversity, species and habitat conservation, and human rights (Rodríguez Fernández-Blanco et al., 2019). These same authors found 29 conflicts across the different institutional elements (but 820 synergistic interactions).

Box **5.1**

Cross-learning between REDD+ and FLR

One related concept that has acquired significant prominence in recent years is forest landscape restoration (FLR). FLR acquired momentum as a political process in 2011 with the launch of the Bonn Challenge (11 years after it was first defined and projects had been initiated – Mansourian et al., 2021) probably in large part because of its relevance to REDD+ (Christophersen, 2015). A review of NDCs under the UNFCCC (Roe et al., 2019) found that some form of restoration is present in 122 of the first set of 165. Converting all of these commitments under the NDCs into practice will bring significant amounts of funding, with for example the 2021 One Planet summit seeing international donors committing over USD 14 billion (specifically for Africa's Great Green Wall Initiative – a vast restoration programme across Africa) and the GCF having approved mitigation and adaptation projects for a total of USD 10 billion by 2021 (GCF, 2021). Sharing challenges and lessons across REDD+ and FLR serves to illustrate some commonalities and highlight opportunities going forward.

Challenges associated with FLR that are relevant to REDD+

FLR has acquired popularity as a promising approach to restoring forests. Its initial intention was to encourage a long-term process that would restore the functionality, goods and services that forests provide in a landscape for the benefit of people and nature (Mansourian et al., 2021). However, in practice, since its definition in 2000, there have been numerous interpretations and applications of the term that do not necessarily reflect its intended dimensions and principles (Besseau et al., 2018). The broad-scale, top-down definition of priority restoration areas via maps (Laestadius et al., 2011; Bastin et al., 2019) and other mechanisms that do not take into account the local socio-economic and ecological realities have been a major source of criticism (Veldman et al., 2015; Bond et al., 2019; Lewis et al., 2019; Fagan, 2020). More generally, there is a broadening debate developing around restoration and reforestation (e.g., Lewis et al., 2019; Bond et al., 2019; di Sacco et al., 2021). Criticism reflects a frequently uni-dimensional

(and uni-disciplinary) approach to restoration rather than a more comprehensive one. While FLR was initially set up to promote the twin goals of ecological integrity and *human well-being* (Mansourian et al., 2021), the Bonn Challenge in 2011 began shifting FLR towards a climate agenda.

Over time, easily quantifiable and measurable targets have been preferred in FLR leading to potentially simplistic and unsustainable outcomes. While calls are being made to restore up to 1 billion ha (Sewell et al., 2020), in practice these targets are fraught with many obstacles, notably related to several governance factors, such as conflicting tenure, perverse incentives or contradictory sectoral priorities (Mansourian, 2017). An emphasis on tree planting has led to inappropriate species being used under the guise of FLR in some instances (Nef et al., 2021). Financing has typically been affected by vertical integration challenges. While significant amounts of international funding have been committed for restoration activities, the amounts reaching local landscape populations has been minimal, despite the fact that the opportunity cost of restoration is borne by them and that they have the most at stake (McElwee, 2009; Wiegant et al., 2020; Elias et al., 2021). Similarly, the scale of funding committed or even disbursed at higher levels (e.g., through the Green Climate Fund) is not reflected in the funding reaching local populations. An emphasis on technical forest-related measures has overshadowed the importance of the human dimension (Elias et al., 2021). Governance factors such as ensuring cross-sectoral integration in landscapes to be restored have not been adequately considered (Mansourian and Parrotta, 2018). Real, effective and respected local decision-making mechanisms related to land use and forest restoration are still few and far between. These are all the more important in tropical countries with significant proportions of their population being rural and forest dependent. The limited role of local communities and poor engagement and participation in FLR has been highlighted (Elias et al., 2021). Although the first FLR principle identified by the Global Partnership on FLR refers to engagement of stakeholders, in practice, this has often been identified as a shortcoming.

Challenges and lessons from REDD+ of relevance to FLR

The growing remit, and complexity surrounding REDD+ has brought in new actors and diverse interpretations of the scope of REDD+ (Gupta et al., 2016). FLR is also facing such a challenge which has led to non-FLR interventions being called FLR, with ensuing criticism of the entire approach (Mansourian et al., 2021). Tenure was identified as a major issue in REDD+ early on and efforts were rapidly focused on addressing some key tenurial issues (Sunderlin et al., 2018). In contrast, it has taken many years for FLR proponents to acknowledge the relevance of tenure to FLR implementation (Mansourian, 2016; McLain et al., 2021). Although participation of non-state actors such as civil society, private sector, indigenous groups and forest dependent communities have been found to be weaker (than international NGOs, donors and government agencies), the existence of an institutional set up for REDD+ at the national level begins to facilitate such inclusion (Fujisaki et al., 2016). While FLR strives for engagement of stakeholders (its first principle) in practice, FLR, like other restoration efforts, often falls short on real engagement of local stakeholders (Elias et al., 2021; Mansourian, 2021). Cross-sectoral collaboration is also facilitated by using REDD+ institutions as an umbrella for re-grouping different state agencies. More generally, the development and application of safeguards in REDD+ might be something that FLR could benefit from in the future (Christophersen, 2015).

Harvesting tropical forests by clear cut
Photo © Nelson Grima

Challenge 2: Ensuring legitimacy of REDD+ interventions

Top-down measures

REDD+ has been viewed by many stakeholders as a top-down mechanism stemming from international negotiations with little flexibility for national circumstances (Kim et al., 2019). The failure of funds to reach local actors (Milne et al., 2019) or the lack of communication and engagement with local actors more generally has been a challenge (Turnhout et al., 2016). Similarly, restoration projects have been criticised for their lack of effective engagement with local communities (Sigman and Elias, 2021) and more generally for imposing land use restrictions or even facilitating 'land grabs' (Fairhead et al., 2012; Fleischman et al., 2020). Top-down targets such as the proposed 30% target for protected areas in the Post-2020 Global Biodiversity Framework carry the risk of further alienation of land from Indigenous and local communities, local conflict and exacerbated poverty (Turnhout et al., 2016; Corbera and Schroeder, 2017; Woodhouse et al., 2018). A disconnect between project plans and local realities can be observed (Corbera and Schroeder, 2017). The rhetoric of 'community engagement' and social inclusion remains superficial in many cases, leaving a gap between policy and practice (Dawson et al., 2021; Witter and Satterfield, 2019).

Legitimacy and 'carbon colonialism'

International funding was a major trigger for countries to initiate REDD+ implementation, placing external actors in the driving seat (Milne et al., 2019; Schroeder et al., 2020). The majority of funding for REDD+ to date has been from official development assistance (ODA), from both bilateral and multilateral donors (with about 80% of public funding coming from Australia, Germany, Norway, the UK and the USA – Köhl et al., 2020). Such bilateral and multilateral funders intervene in the land use sector that has strategic and long-term importance for the countries concerned, with questions of legitimacy having been raised (Lerch, 2014).

More generally, the fact that mostly Western nations have embraced REDD+ as a perceived solution to their own greenhouse gas emissions by paying tropical countries to conserve and restore their forests, has raised criticism and procedural justice concerns (Dehm, 2016; Suiseeya, 2017). Focusing on the emissions and solutions in tropical countries diverts attention away from the necessity of tackling the problem at source and those responsible by strengthening regulations in

carbon-intensive industries (Dehm, 2016). Falling short of addressing fundamental challenges of deforestation and degradation, many technical fixes proposed also fail to address effectively wider justice issues such as those associated with rights to natural resources (Myers et al., 2018).

Unclear, unstable and/or conflicting tenure rights

Unclear and conflicting land tenure has been identified as one of the biggest challenges in moving forward with REDD+ (Sunderlin et al., 2014; 2018). Targeting exclusively holders of *de jure* legal rights to forest or land may lead to the exclusion of most of the poorest forest users since in many countries they do not hold formal rights over land (Loft et al., 2017). Yet, to address the underlying drivers of deforestation and forest degradation, and to equitably distribute benefits from REDD+ programmes it is important to have clarity over carbon rights (WWF, 2013), which in turn requires clarity over underlying land rights. Indigenous Peoples and local communities are particularly affected due to their strong historic, traditional and customary ties to forestland (Streck, 2020). Evidence suggests that where there is secure collective rights for Indigenous Peoples, deforestation and forest degradation have been reduced (Bradley and Fortuna, 2021). Nevertheless, where land titles have been granted pursuant to REDD+ interventions, they may not have necessarily led to positive social outcomes. For example, in Cambodia, communal titling led to less areas being granted to communities than what was in their customary claims (Milne et al., 2019).

In their sample of 13 countries, Loft et al. (2017) found a lack of clarity over resource ownership, overlapping claims and conflicts between customary and statutory rights in Burkina Faso, Cameroon, Indonesia, Tanzania and Viet Nam. Further, external claims on local forests were rated as a major cause of tenure insecurity in a survey carried out across five REDD+ countries (Sunderlin et al., 2018). With the Paris Agreement entering into force, such future interventions could become more prevalent and potentially lead to conflict with Indigenous Peoples and local communities.

Limited participation of legitimate stakeholders

There is strong evidence that vulnerable and marginalised groups – such as customary users and Indigenous Peoples – are frequently sidelined in REDD+ policymaking, which is dominated by powerful stakeholders such as government agencies, private sector alliances and donors (Loft et al., 2017). In Nepal, for example, forest government agencies, international actors and powerful civil society organisations (CSOs) have taken the lead on REDD+ policy whereas community organisations are only marginally involved and have limited influence on REDD+ (Paudel et al., 2013, in Loft et al., 2017). More generally, Loft et al. (2017: 50) found that the "REDD+ design and implementation process is failing to provide a platform for non-state actors to have a voice in decision making", which may lead to biases in REDD+ design and elite capture of benefits. For example, marginal and vulnerable groups were excluded from planning and decision-making processes in the design of Viet Nam's national payment for forest environmental services programme. As a result, during the implementation phase, these groups were generally unable to access benefits because of limited capacities and opportunities. Instead, powerful groups, such as state enterprises captured benefits (Pham et al., 2012). In other cases, REDD+ has given Indigenous Peoples and local communities a national platform for asserting their land rights, such as in the case of Indonesia (Fay and Denduangrudee, 2018).

Challenge 3: Harmonising and simplifying methodologies

Harmonising methodologies and definitions applied across countries

The lack of an internationally agreed definition of forests hampers processes such as REDD+ as it has direct implications for monitoring forest loss and gain, and comparisons and aggregations across countries (Sandker et al., 2015). In addition, vast amounts of carbon are held in landscapes that contain trees but are not classified as forests (Mermoz et al., 2018; Bond et al., 2019). Some of the basic tenets of REDD+, notably related to reference levels and to monitoring, require some comparability across countries, but this is constrained by the complexity of methods used by different agencies and countries. Yet adjustments to calculations for reference levels and monitoring performance, make all the difference to funding under REDD+ (Angelsen et al., 2018). In the context of the private sector, companies making 'zero deforestation commitments' have been remarkably slow at developing criteria or methods to implement their commitments and to measure their impacts (Garrett et al., 2019).

Differences in safeguard-related guidance among lead institutions (such as FAO, UNDP, UNEP or the World Bank) add complexity and can be confusing for countries (Maniatis et al., 2019;

UNDP, 2021). Maniatis et al. (2019: 386) argued that "the fragmentation in advice to and approaches taken by countries [for REDD+ implementation and to access results-based payments (RBPs)] has resulted in (a) an increased burden on REDD+ countries to decipher and apply the necessary and often inconsistent requirements; (b) multiple sets of safeguards being applied to projects simultaneously and in the same country; and (c) numerous time-consuming comparative analyses to determine potential gaps".

From one-size fits all to national and local differentiation

The complexity (perceived or real) of the processes included in REDD+ strategies has created the need for common tools and methodologies. For instance, tools have been developed to monitor forest cover as an essential pre-requisite for setting baselines and being able to measure change in forest (Hansen et al., 2013). The application of many of these tools will however, require adaptation to local realities and contexts. For example, broad-brush approaches to restoration have expanded with a range of tools and methodologies being developed (such as the restoration opportunities assessment methodology – ROAM – which has been applied to over 25 countries to date). Yet, local circumstances require locally-adapted solutions that take into account not only local capacity, but also local socio-economic and political conditions (Sigman and Elias, 2021). Translating international processes and decisions to these unique local circumstances requires specific skillsets and inter-disciplinary teams, which are often absent in donor-funded programmes (Mansourian, 2021). Strict measurement, reporting and verification (MRV) requirements for REDD+ have also meant that countries where capacity and infrastructure are more developed have been favoured by donors (Turnhout et al., 2016).

Complexity and carbon accounting

At the national and sub-national levels, the complex design and implementation processes of REDD+ policies and measures (PAMs) signify that policymakers face severe risks and challenges when aiming to simultaneously reduce emissions and provide social and environmental co-benefits (Harvey et al., 2010; Huettner, 2012; Arhin, 2014). The unique complexities of the land use sector bring their own set of challenges for countries to account for emission reductions. Many countries face difficulties ensuring consistent data around greenhouse gas (GHG) inventories due to methodological complexities and poor communication between responsible ministries and/or departments. For instance, in Viet Nam, the national forest monitoring system (NFMS) has been deployed nationally since 2018 to generate data for monitoring REDD+. Another outstanding issue is reconciling NFMS data with what is considered the official forest dataset (UN-REDD Programme, 2020). More generally, there is a need to reduce data uncertainties to account and report on emissions and removals associated with REDD+ at various scales.

Furthermore, at relevant scales it is necessary to apply the same methods and accounting approaches, avoiding double-counting and ensuring consistent implementation of policies and measures (Maniatis et al., 2019; UNDP, 2021). In Brazil, many private sector funded REDD+ projects have been placed in areas of low deforestation threat with exaggerated projections of forest loss (West et al., 2020). Differences in carbon accounting methods between project levels and national levels – with unreliable data in about half of existing projects in Colombia, Indonesia and Peru – are a major barrier to sub-national projects nested within national programmes (Atmadja et al., 2022). Where new administrative levels have resulted from decentralisation, as is the case in the DRC with the creation of new provinces, a major challenge is to gradually put in place provincial institutions that can feed into the MRV system. For example, in Peru, several information systems operating in parallel hamper the capacity to monitor forests: the Vice Ministry of Culture has a system to monitor Indigenous reserves, the National Forest Service (SERFOR) uses the National Forest and Wildlife Control and Surveillance System, the Ministry of Environment (MINAM) and SERFOR have recently developed the Forest Cover Monitoring Module, and Indigenous groups have developed their own system of 'Forest Inspection' (*veedurías forestales*) (Lozano Flores, 2018).

Challenge 4: Securing adequate financing and incentivising REDD+

Limited financial resources

One of the biggest challenges for effective delivery of REDD+ is securing adequate ongoing finance, both public and private (IIED, 2016). Current funding for REDD+ comes predominantly from the public sector through donor funding, while funding from the voluntary or compliance markets remains negligible (Arts et al., 2019; Sunderlin et al., 2014). The level of investment necessary to support the technical systems and political, eco-

nomic and regulatory transformations that need to take place has not been realised in many countries (Maniatis et al., 2019; UNDP, 2021). In the DRC, the National REDD+ Coordination lacked funding to adequately prepare the tools for REDD+ development, including the safeguard information system, the national REDD+ registry, the NFMS, the complaint and grievance mechanism, the benefit sharing mechanism, the social and environmental safeguards and the final national REDD+ strategy (Kengoum et al., 2020). In addition, international transactions that occur under REDD+ frequently omit to consider the reality on the ground (Fleischman et al., 2020). In Tanzania, the limited financial resources available have failed to motivate staff and led to limited trust in institutions (UN-REDD Programme, 2013).

Making the business case for REDD+

REDD+ ambitions concerning payments for avoiding or reducing emissions from forests may not materialise due to high opportunity costs making it difficult to compete with other, less sustainable but more profitable land uses such as cash crops (e.g., oil palm, rubber, soybean, beef and timber – Pasgaard et al., 2016; Turnhout et al., 2016). Humphreys et al. (2019) found that the main drivers of deforestation in Brazil and Indonesia received domestic public funding that was 136 times more than international public finance for forests over the period 2009 and 2012, and these incentive structures continue to drive investment choices and development pathways in both countries. Private investments continue at large scale for the production of many of these deforestation-driving commodities. This fundamentally economic challenge behind land use change has been at the centre of REDD+ debates in many tropical countries. Making the business case for REDD+ has been hampered by decreasing investment (and research) in sustainable management of, and production from, standing forests (Streck and Parker, 2012). In Indonesia, for example, significant revenue for the domestic economy is generated through activities that impact negatively on forests, creating additional challenges for the country to reduce its forest-based emissions. Design challenges include identifying and targeting key actors and landscapes for REDD+ incentives, and devising the optimal incentive mix to change the behaviour of these actors (Pacheco et al., 2010). Ghana for instance, is seeking through institutional reforms to encourage farmers to adopt sustainable production practices in the cocoa sector that can both meet *livelihood* needs and secure environmental benefits (UN-REDD Programme, 2017a).

Requirements to access finance

Requirements for countries to access RBPs for REDD+ are often inconsistent (see Chapter 2, Section 2.2.4.1.). The multiple guidelines and safeguards designed under different REDD+ programmes add complexity. As a result REDD+ countries, states, and local voluntary carbon market projects, often have to address conflicting or duplicate rules and modalities for reporting data and information (Maniatis et al., 2019). In Viet Nam, government participation was hampered by high transaction costs associated with working with three different UN-REDD organisations (the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP)), each with their own decision-making procedures, organisational goals and culture (Wurtzebach et al., 2019).

High expectations

REDD+ pilot projects have generated high expectations from tropical countries for significant funding (Sunderlin et al., 2014; Atela et al., 2015). Countries that developed their Readiness Preparation Proposals (R-PPs) assumed that REDD+ would be funded through market-based mechanisms. However, in most cases countries did not have a clear vision or institutional arrangements to stimulate the flow of REDD+ funding. For example, Massarella et al. (2018) highlighted the lack of political will among government officials, the lack of donor support for the post-pilot phases and low carbon prices as leading to unmet expectations.

The countries analysed by Loft et al. (2017) have proposed different approaches to the REDD+ benefit-sharing mechanisms (BSMs) to obtain, administer and allocate financial resources directly to implementation agencies and target stakeholders. These include (i) the fund-based approach (adopted by Brazil, Burkina Faso, Cameroon, DRC, Indonesia, Tanzania and Viet Nam), although the establishment and operation of these funds implies risks; (ii) the decentralised, nested approach in which the national government distributes REDD+ benefits to sub-national jurisdictions based on their emissions reductions performance (e.g., in Brazil and Peru), but it requires a clear devolution of rights and a multilevel governance system in order to be effective; and (iii) building on existing systems (as is the case in Indonesia and Mexico).

Challenge 5: Ensuring national commitment and accountability

Weak government commitment and corruption

Coordination and level of government commitment emerge as key national-level challenges, with cross-sectoral coordination a particular focus in national REDD+ processes (Peskett and Brockhaus, 2009; Duchelle et al., 2019). Financial flows under national REDD+ programmes could create conflict and new opportunities for forest sector corruption (Bond et al., 2009; Seymour and Angelsen, 2009). In turn, corruption may threaten the effectiveness, *equity* and ultimately, implementation of REDD+ (Williams and Dupuy, 2019). Increasing levels of corruption in land use planning, land and natural resource tenure, allocation of carbon rights, setting reference emission levels and the design of benefit-sharing mechanisms represent a real risk (Thorpe and Ogle, 2011, in Loft et al., 2017). In the DRC, for example, Assembe-Mvondo (2015) identified the following corrupt practices: payment of kickbacks, political cronyism, the non-transparent use of REDD+ funds and inadequate reporting on REDD+ projects, and non-transparent employment contracts. Dermawan et al. (2011) carried out an analysis of potential corruption risks in Indonesia and identified for example the risk of collusion in REDD+ policymaking, collusion in the coordination of processes among implementation actors, fraud around the benefit-sharing mechanism and fraud in applying the REDD+ accounting system. In the Philippines, the most likely risk associated with REDD+ has been political influence on REDD+ via the misuse of official resources (financial, human, assets), while fraudulent reporting concerning reforestation efforts was considered the highest impact risk (Williams and Dupuy, 2019).

Challenge 6: Addressing drivers of forest loss and degradation

Tackling global drivers of tropical forest loss and degradation

A fundamental aspect of REDD+ is halting the drivers of forest loss and degradation. Curtis et al. (2018) identified that 27% of global forest loss is permanent transformation to commodity production. In a globalised world, most of these drivers are situated outside of local and national jurisdictions. In practice this requires governance and market measures which many powerful international and national stakeholders are unwilling to take. Entrenched business interests continue to negatively impact on forests across the globe (Angelsen, 2016; Sunderlin et al., 2018) and insufficient attention is being paid to the actual drivers of forest loss and degradation (Corbera and Schroeder, 2017).

The disconnect across scales is also apparent in how the problem of forest loss and degradation is addressed. The primary drivers of forest loss are large scale commercial agriculture, including cattle-rearing (Hosonuma et al., 2012; IPBES, 2018) with the main global and domestic commodity chains driving deforestation being beef, palm oil, cocoa, soya, timber, pulp and paper (Duchelle et al., 2019). Yet the primary targets of REDD+ schemes tend to be local communities (IPBES, 2018; Skutsch and Turnhout, 2020). This has been attributed to countries shying away from tackling the large-scale and economically important interests driving forest loss, opting instead to focus on the stakeholders that are weaker and where the impact on gross domestic product (GDP) would be insignificant (de Sy et al., 2018). Without addressing the multi-scalar causes of deforestation and forest degradation, REDD+ will not achieve its objectives (Turnhout et al., 2016).

Poor national response to effectively address the drivers of deforestation and degradation

Most REDD+ target countries have failed to effectively change economic models to address drivers of deforestation and forest degradation (Loft et al., 2017; Duchelle et al., 2019). At national level, this requires a substantive shift in discourse, incentives and power relations (Di Gregorio et al., 2015) as well as steering decision-makers away from short-term economic interests (Turnhout et al., 2016). A review of 43 national REDD+ readiness documents found that in most cases, proposed interventions did not match the identified large-scale, and often commodity-based, drivers of deforestation. Instead, proposed activities related to sustainable forest management, woodfuel efficiency and agroforestry, rather than tackling large and powerful commercial actors (Salvini et al., 2014 in Duchelle et al., 2019). In an overview of REDD+ readiness across Cameroon, Indonesia, Peru and Viet Nam, Minang et al. (2014) found significant gaps both in addressing drivers of deforestation and forest degradation, and in linking REDD+ to other national strategies and priorities and to systematic capacity building. This could be linked to the lack of, or poor, involvement by sectors involved in driving deforestation (agriculture, mining, infrastructure development) as found in a study analysing the public discourse around REDD+ in seven countries (Brazil, Cameroon, Indonesia, Nepal, Papua New Guinea, Peru and Viet Nam) (Di Gregorio et al., 2015).

Deforestation and forest degradation challenge the survival of many species, such as wild elephants in Sri Lanka
Photo © Nelson Grima

Challenge 7: Confirming engagement, inclusion and equity, and securing rights

Limited or ineffective stakeholder participation

One of the most prominent issues in national REDD+ processes is participation and rights, particularly those of Indigenous Peoples and local forest stewards (Peskett and Brockhaus, 2009). Although processes and systems have tried to enhance participation, there have been some concerns about the degree of representativeness, with many cases dominated by government officials (e.g., Viet Nam), involving large numbers of external consultants (e.g., Indonesia) or not being held in areas where REDD+ was due to be implemented (Peskett and Brockhaus, 2009). The ineffective or inadequate participation of women in REDD+ implementation has also raised concerns (Larson et al., 2015; Korwin, 2016). In Peru, actors at all levels, and especially those at the local level, have been discouraged by slow implementation and a strong focus on the national scale (Lozano Flores, 2018). Mexico's REDD+ multi-stakeholder engagement processes have been criticised for their lack of representation and transparency (Spiric, 2018) with for example, the lack of engagement of 'ejidatarios' and 'comuneros' in the large number of forums and councils held to lay the foundations of the National REDD+ strategy (Almanza Alcalde et al., 2020). In contrast, in Viet Nam changes were introduced in 2013 and 2014 to re-energise the REDD+ implementation process notably by increasing outreach to domestic CSOs and ethnic minorities, including by giving them seats on UN-REDD's decision-making Programme Executive Board (UN-REDD Programme, 2017b).

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., 2015). Women were also more involved in village-decision making (Kariuki and Birner, 2016).

Inadequate free, prior and informed consent

Free, prior and informed consent (FPIC) is a minimum ethical requirement for REDD+, but implementers have faced difficulties in carrying out comprehensive FPIC processes on the ground. A framework for FPIC in REDD+ has been developed in the DRC by the National REDD+ Coordination and was validated in 2015 (Kengoum et al., 2020). In many cases, local stakeholders have been unaware of REDD+ projects (e.g., Bayrak and Marafa, 2016; Saeed et al., 2017; Milne et al., 2019). In 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) despite an emphasis on information sharing, the degree of awareness was uneven among locals, with women and poorer villagers being least informed about project activities. In addition, Pham et al. (2015) highlighted that FPIC is often obtained in a rushed manner, notably because of donor pressure, rather than taking the time to refine the approaches so that they are locally sensitive, ensure quality facilitation and take place in suitable consultation venues (Pham et al., 2015).

Hunting party of the Batek or Orang Asli people, a hunter-gatherer community from Malaysia
Photo © Nelson Grima

Challenge 8: Improving human and institutional capacity for monitoring and implementation

Constraints on institutional and human capacities

A common challenge at all levels has been and continues to be the capacity of institutions in terms of human resources and funding to adequately design, plan, monitor and deliver outcomes for REDD+. In Viet Nam, for example, readiness challenges identified included: (i) developing national and sub-national institutional capacity for coordination and management of REDD+ related activities; (ii) building capacity for REDD+ and PES at local level, and (iii) building knowledge of approaches for reducing regional displacement of emissions (Wurtzebach et al., 2019). In the development of the NRAP 2012, limited technical capacity for policy design was identified as well as human resource capacity limitations – from the Viet Nam Administration of Forestry (VNFOREST) and the Viet Nam REDD+ Office (VRO) – for effective coordination and effective outreach with critical civil society and private sectors actors. In Guatemala, the institutional capacity of government agencies leading the implementation of REDD+ is low, which makes it difficult to promote capacity building. The high turnover of staff results in considerable delays in the processes and decisions, affecting the continuity and stability of these public institutions (Iturbide Flores, 2014). In Brazil, Gallo et al. (2020) referred to the lack of: (i) knowledge and awareness about REDD+ by relevant stakeholders of the national strategy; (ii) effective coordination between state agencies, the private sector and civil society; (iii) broad consensus on changes in existing land use plans; and (iv) (or low) capacity to enforce laws and regulations. At the same time, a recent global study on changes in national forest monitoring capacity highlighted substantial improvements over the past 15 years, especially in countries that have received REDD+ readiness support (Nesha et al., 2021).

Operationalising mechanisms to manage risks of leakage

'*Leakage*', whereby emissions are reduced in the target area but instead displaced elsewhere, is a risk in the land-use sector. In order to minimise this risk, a comprehensive national MRV system is required to monitor impacts in the project area and beyond. While there is progress with national MRVs, in practice few REDD+ national MRV and NFMS simultaneously integrate measurement and monitoring (Maniatis et al., 2019; UNDP, 2021). Most countries have limited data availability and technical capacities to measure and monitor emissions reductions, or administer MRV and NFMS (Peskett and Brockhaus, 2009; Maniatis et al., 2019; UNDP, 2021). This includes calculating baselines or reference levels against which to assess REDD+ performance (Turnhout et al., 2016; Loft et al., 2017).

Policy-practice feedback loops

The divide between international negotiations and on the ground implementation is exacerbated by a lack of systematic data collection and lesson learning feeding back to the international level. This poor linkage between projects on the ground and the national or international context signifies that lessons emerging from practice fail to directly feed back into international discussions and decisions associated with REDD+ (Turnhout et al., 2016). Equally, national level learning from local sites is often absent (Angelsen, 2016). Such a disconnect between policy and practice is also present in FLR. For example, in seeking to better understand lessons stemming from 20 years of FLR experience, Mansourian and Vallauri (2020; 2022) reflected on the limited measures taken to date by projects, programmes and key stakeholders in terms of lesson learning at all levels, and subsequently the inability to use lessons to influence future practice.

Challenge 9: Securing both carbon and non-carbon benefits through operationalising safeguards

Ensuring both local and global (co-)benefits

Arising in the climate policy sphere, REDD+ was designed to focus on the carbon dimension of forests. However, early on calls were made for REDD+ to consider other additional co-benefits (e.g., Parrotta et al., 2012), particularly social and biodiversity ones that better reflect the values of forests (see Chapter 4), which led to the adoption of the Cancún safeguards (UNFCCC, 2011). Initially intended to achieve global benefits through reductions in greenhouse gas emissions, the tension between global and local benefits rapidly emerged in REDD+ (Duchelle et al., 2019). While forests secure a range of benefits for local communities, the imbalance and injustice in imposing the responsibility for reducing emissions onto (poorer) local communities for the benefit of the (wealthier) global community was vividly contested by a growing number of civil society actors (Mathur et al., 2014). In consequence, ensuring the balance between securing the intended global benefits and local live-

lihood and biodiversity benefits has emerged as a significant cross-scale challenge (Martius et al., 2018).

Carbon effectiveness of REDD+ projects

In the REDD+ impact evaluation literature, quantitative studies measuring forest and carbon outcomes are scarce but growing (Duchelle et al., 2018; and see Chapter 3). Global comparative work on 23 local REDD+ sites in six countries (Brazil, Cameroon, Indonesia, Peru, Tanzania and Viet Nam), 150 villages and 4,000 households found that more than half of the REDD+ initiatives reduced deforestation at the community level (Bos et al., 2017). These findings were reinforced in studies on individual projects in Brazil (Simonet et al., 2019) and Uganda (Jayachandran et al., 2017), as well as one on Guyana's national REDD+ programme that showed a 35% reduction in tree cover loss in the period 2010-2015 (Roopsind et al., 2019). Yet, other recent impact evaluations found small or insignificant effects of REDD+ projects on reducing deforestation, including in Mexico (Ellis et al., 2020), Peru (Montoya-Zumaeta et al., 2021) and Brazil (Cisneros et al., 2022). Even when projects successfully reduced deforestation, it rebounded once payments stopped, although the increase did not take away from initial reductions achieved (Jayachandran et al., 2018; Etchart et al., 2020).

Maximising outcomes on local rights and livelihoods

A focus on monitoring tools for carbon coupled with the difficulty in measuring social benefits, may lead to a reduced emphasis on co-benefits of REDD+ interventions going forward (Turnhout et al., 2016). Rights issues remain a major challenge for REDD+ projects. Despite early attention to tenure in REDD+, sensitive and systemic issues such as land tenure insecurity cannot be fully addressed at the project scale. For instance, in a subset of the 23 initiatives mentioned above, there is little evidence that project level efforts to address tenure security were successful (Sunderlin et al., 2018).

In terms of effects on local livelihoods, most REDD+ impact evaluations show mixed or insignificant effects. In Brazil, Cameroon, Indonesia, Peru, Tanzania and Viet Nam there were no negative impacts of REDD+ on local welfare (Sunderlin et al., 2018). It is clear, however, that results depend on the types of interventions being applied. Providing smallholders and communities with incentives (e.g., payments or infrastructure) helped to alleviate the burdens of land use restrictions (e.g., through law enforcement, protected areas) associated with some REDD+ initiatives (Duchelle et al., 2017). As highlighted by Palomo et al. (2019), truly achieving co-benefits from REDD+ is a more costly endeavour than simply focusing on carbon benefits.

Permanence

The 'permanence' of emissions reductions in the forest sector has been a concern. The risk of reversals (the emission of previously stored carbon) is challenging for countries to monitor, report and account for (UNDP, 2021). Colombia, for example, has identified the need for technical improvements to ensure consistency between its forest reference emissions level (FREL) and the national GHG inventories, and to include carbon pools corresponding to necromass and soil organic carbon in future monitoring and accounting efforts. Tanzania could not include sustainable forest management (SFM) in its submission due to inadequate data on: (i) removals and emissions from *forest management*; (ii) growing stock under different forest management regimes; (iii) relevant historical data on forest management and governance at national level; (iv) existing forest areas set for SFM and their monitoring plans; (v) new areas subjected to SFM; and (vi) inadequate and outdated forest management plans (United Republic of Tanzania, 2016).

Complexity associated with safeguards

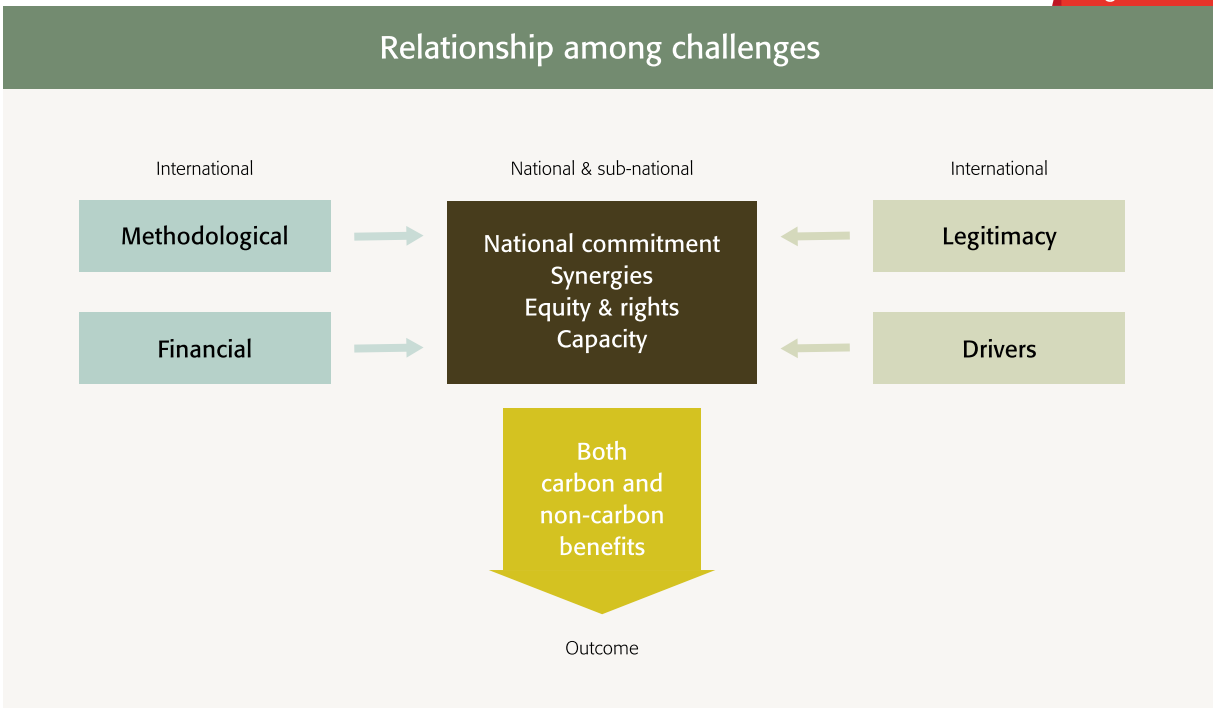
At the international level, the issue of social and environmental safeguards has been left broad, leaving countries to define them in their contexts which has created tensions between those advocating for more comprehensive international safeguards and those preferring to delegate those to countries (and donors) (Suiseeya, 2017). At the national level, although countries engaged in REDD+ have made progress in promoting and supporting social and environmental safeguards (UNDP, 2021), a decade of advocacy, analysis and practice related to REDD+ safeguards reveal normative and operational shortcomings. Based on six case studies, Brockhaus et al. (2014b) identified the lack of robust criteria and indicators for assessing benefit-sharing mechanisms (BSM), data and methods for data collection as challenges in operationalising safeguards and transparency of information flows. In addition, they found problems with the standardisation of methods, including high costs for 'ground truthing' due to specific local contexts. For example, a challenge for Viet Nam is to adopt a monitoring framework with indicators that track impacts on ethnic minorities who are key partici-

pants in the REDD project (UN-REDD Programme, 2020). In Colombia, there is a need to improve ownership and internalisation of the gender approach at the institutional and community level, and particularly to improve the participation of Indigenous and Afro-Colombian women in different spaces and instances of consultation, coordination and decision-making including valuing their role and knowledge in the conservation and management of forests (UNDP, 2018). In Ghana, the challenge is to develop a system or support structure that takes into account the country's existing governance system, particularly the legal, institutional and compliance frameworks (Ghana Forestry Commission, 2016).

5.3. Contextualising the Challenges

The challenges identified for REDD+ and related interventions are not all present in all REDD+ countries or at all times. They can be seen as inter-connected (see Figure 5.1). These challenges are context specific and evolve over time. For example, despite its imperfections, the land titling process carried out in Peru since the mid-1970s has seen about 11 million ha handed over to more than 1,200 Indigenous communities (Blackman et al., 2017). Where this has happened, during the 2-year period after titling, forest clearing was found to have dropped by more than 75% and forest disturbance by roughly two-thirds (Ibid). Understanding the specific socio-political – but also economic, institutional and ecological – contexts in which REDD+ is taking place provides vital information to prioritise actions that address relevant challenges. For example, governance challenges have been identified as a major impediment to large scale FLR implementation (Mansourian, 2017). Yet, governance challenges in the context of Brazil's Atlantic Forest – where a large part of the forest is on private land – are significantly different to those in Madagascar where tenure to land and forests is contested. Whereas in one case the challenge relates to working with private landowners and incentivising them to change their approach to managing their forests, in the other case, a priority may be to formalise rights to forests among local communities (Mansourian et al., 2014).

Figure **5.1**



5.4. Lessons from the Past to Inform the Future

We identify nine important overarching lessons from over a decade of REDD+ that are useful to inform future interventions. The link between the challenges and lessons are shown in Table 5.2. In Section 5.5. we also compare the lessons emerging from FLR to those identified for REDD+.

Lesson 1. Addressing drivers of deforestation and forest degradation at multiple levels of governance remains a fundamental component of REDD+ that is not yet effectively tackled

Many of the drivers of land use change leading to deforestation and forest degradation are economic and include, among others, perverse financial incentives that encourage the removal of forests. To date, REDD+ has fallen short of addressing these drivers of forest loss and degradation (Pham et al., 2018; Duchelle et al., 2019). Nevertheless, some authors argue that at the international level, the enabling conditions to tackle deforestation and forest degradation have been improved (Lee and Pistorius, 2015).

High opportunity costs or existing policies and incentives in the agriculture and other sectors (mining, infrastructure development) signify that addressing drivers under the REDD+ schemes has not been sufficiently attractive for land users. It is critical to ensure effective involvement and commitment of these sectors to find and implement a working balance of short- and long-term national/sub-national priorities and interests. At the same time, REDD+ also requires the support of sound policies, backed by enforcement, that address illegal logging and the *conversion* of forests to agriculture and other land uses (Duchelle et al., 2019). The transformational change needed requires policies and institutional capacity to create the right conditions for the adoption of sustainable land use practices coupled with (technical, financial) instruments to enhance their business prospects. There is an important role for REDD+ policies and incentives that reward production practices certified as legal and sustainable (Ibid).

Lesson 2: REDD+ implementation requires a better understanding of power relations among different actors

Power relations in REDD+ implementation play out within and across different governance and administrative levels. The involvement of numerous actors representing local to international interests exacerbates power inequalities. It is important to better understand these tensions and address them as they impact on the effectiveness of REDD+ implementation (Ravikumar et al., 2015; Bayrak and Marafa, 2016). Similarly, equity concerns in the distribution of benefits and costs should be recognised to better understand who gains and who loses, and how the costs and benefits of REDD+ implementation might be more fairly shared.

Lesson 3: Ownership and accountability of in-country stakeholders are fundamental to REDD+ implementation

Decisions on location of REDD+ projects and programmes are frequently externally driven. For example, REDD+ projects are often found in places that are most convenient for implementers rather than where they would promote additionality (West et al., 2020; Atmadja et al., 2022). Yet, for their long-term sustainability, such projects should fully engage with national institutions, governments and local stakeholders at the design phase as it is essential that they take full ownership and accountability for the process. In doing so, governments are more likely to integrate REDD+ in existing or future plans and to allocate the necessary resources. This is especially important in light of often competing needs and scarce financial resources (UN-REDD Programme, 2013). Programme design should include an assessment of country needs and a stakeholder analysis that goes beyond seeking endorsement of concepts (UN-REDD Programme, 2013). Ensuring that individuals, communities and companies receive the rights to REDD+ credits may also reduce the incentives for corrupt behaviour in the public sector. Suitable mechanisms to ensure accountability and transparency of payments for both private and public stakeholders would be required (Tacconi et al., 2009).

Lesson 4: The emergence of REDD+ brought renewed attention to the importance of the rights and knowledge of Indigenous Peoples and local communities

REDD+ safeguards have highlighted the role of Indigenous Peoples and local communities in managing forests. Recognising Indigenous Peoples and local communities as rightsholders can help place them at the centre of REDD+ initiatives (Sarmiento Barletti and Larson, 2017; Wong et al., 2019). Experience from Nepal, Peru and Tanzania demonstrates that where secure collective rights are in place, several co-benefits – including biodiversity

conservation and food security – can be achieved (Bradley and Fortuna, 2021). Where *Indigenous* and *local knowledge* is included in REDD+ implementation there can be greater ownership and better participation in implementation. Institutional actors should, therefore, rely more on the knowledge of Indigenous and rural communities and invest more resources, time and patience to understand their aspirations and respectfully support their ways of achieving REDD+ objectives (Almanza Alcalde et al., 2020).

Lesson 5: Non-carbon benefits of forests represent essential components of REDD+, particularly as they provide direct and indirect benefits for Indigenous Peoples and local communities

The non-carbon benefits of forests have become a central issue as REDD+ started developing from a concept to reality (also see Chapter 4). REDD+ interventions designed with local stakeholders, and based on their perceptions of equity, will likely be better adapted to local realities and have greater legitimacy; such local engagement, could help combine forest conservation and local well-being, leading to better long-term outcomes. Benefits such as access to *non-timber forest products* or income from ecotourism are essential for Indigenous Peoples and local communities and incentivise their participation in REDD+ schemes (Dhungana et al., 2018). Pursuing both carbon and non-carbon benefits acknowledges the different objectives of REDD+ sought by local and global stakeholders. Moving away from an exclusive focus on carbon benefits, allows for a more comprehensive approach that is aligned with sustainable rural development, and enables Indigenous Peoples and local communities to play a more prominent role in national REDD+ strategies (Almanza Alcalde et al., 2020).

How benefits are perceived and valued by local people is important. Shorter-term benefits from environmental values are found to be more effective drivers than benefits reaped in longer timeframes, as shown in the experience of Guatemala, suggesting that projects should incorporate shorter-term economic and social values when possible (Gray, 2020).

Lesson 6: Sub-national jurisdictional approaches to REDD+ represent an important pathway to its broader uptake

Sub-national jurisdictional approaches to REDD+ have advanced throughout the tropics, and there are clear ways to support these initiatives, including: purposefully investing in sub-national jurisdictions at all stages of progress and not only the most advanced (Boyd et al., 2018); targeting geographies where sub-national governments possess greater authorities to reduce deforestation (e.g., Brazil, China, India, Indonesia, Laos, Malaysia, Mozambique, Papua New Guinea, Peru and Viet Nam) (Busch and Amarjargal, 2020); encouraging public-private partnerships, especially when local governments lack capacity to fully lead such initiatives (Brandão et al., 2020); formalising participation of Indigenous Peoples and local communities in jurisdictional REDD+ programmes (DiGiano et al., 2020); and providing ways to link initiatives across jurisdictions and scales (Seymour et al., 2020).

Lesson 7: Monitoring non-carbon benefits is challenging, and a stepwise approach is needed to operationalise safeguards

Although there have been remarkable improvements in forest monitoring capacity, which is considered a milestone of REDD+ (Nesha et al., 2021), there is still an opportunity to harmonise baselines across levels and improve methods for baseline setting. Furthermore, REDD+ implementation requires improvements in monitoring systems for ecological and social non-carbon benefits. There is a need to invest in robust and transparent methods for demonstrating positive non-carbon outcomes, and adherence to safeguards. Data quality needs to be improved to allow for better priority setting, improved assessment and reporting (Brockhaus et al., 2014a). Integration of data in multipurpose data platforms (one data platform policy) could be considered as a way to seek cost reductions, both for REDD+ implementation but also when considering the integration of NbS in NDCs (UNDP, 2021).

Lesson 8: Communication, capacity building and engagement in REDD+ decision-making processes need to be improved

Assessments in Brazil have highlighted that to ensure the full and effective participation of stakeholders, it is necessary to: "(i) broadly communicate relevant information, in a timely and culturally appropriate manner, at all stages of REDD+ actions; (ii) provide for qualified and effective access to decision-making processes and the continuous monitoring of REDD+ actions, promoting social control; (iii) ensure stakeholder consultation in decision making at the local, regional and national levels, respecting traditional decision-making and governance systems in Indigenous lands and territories, traditional peoples and communities, and

Learning from previous experiences can help preventing further ecosystem degradation
Photo © Nelson Grima

traditional and family farmers; (iv) encourage local and participatory monitoring of these actions; and (v) provide mechanisms for grievance, diligence, appeal and resolution of conflicts through, among others, "ombudsman systems" (Brazilian Ministry of Environment, 2018:30). Communications and capacity building concerning REDD+ aspects need to be tailored to individual audiences (UN-REDD Programme, 2015). At the same time, technical assistance and capacity building activities would benefit from extending beyond REDD+ to more general forest management capacities, including the socio-political aspects of multi-stakeholder planning and collaboration (UN-REDD Programme, 2013).

Lesson 9: Coordination and collaboration across scales and actors (public and private) holds the key to making a real change in REDD+ implementation

Bringing different sectors and groups of actors together under coalitions, partnerships or alliances can help to better tackle drivers of deforestation and degradation (Brockhaus et al., 2014b). The roles of both private and public sectors in REDD+ are important and complementary. Cross sectoral coordination can be improved through a master land use plan that brings in relevant sectors (Pham et al., 2018). The inclusion of multiple actors in the readiness process provides an opportunity to share and mediate across different interests and backgrounds and therefore improve REDD+ governance legitimacy (Spiric, 2018). Furthermore, rather than being perceived as an add-on activity, REDD+ implementation would benefit from being mainstreamed in government budgets and regular planning processes (UN-REDD Programme, 2013). At the local and sub-national levels, platforms and spaces for social organisations and international cooperation play an important role in supporting the continuity of REDD+ processes beyond government and donor involvement (García et al., 2018). Public-private partnerships are particularly important when local governments lack capacity to fully lead such initiatives (Brandão et al., 2020). More generally, improved collaboration and exchange between scientists, policymakers and practitioners can help to overcome knowledge gaps and advance REDD+ implementation (and tackle associated challenges) (Roe et al., 2019).

Initially intended to better integrate the private sector in forest-related climate mitigation measures, complexity in the architecture of REDD+ associated with the multiple layers implicit in forest-related interventions has dampened any initial enthusiasm by the private sector. A milestone was reached in early 2021 with the launch of the 'Lowering Emissions by Accelerating Forest Finance' (LEAF) Coalition, which by the end of the year (2021) had already exceeded its target to mobilise at least USD 1 billion. It is the largest public-private sector investment for REDD+ with clear requirements for high environmental and social integrity in credits generated. Multistakeholder partnerships across private and public sectors are a fundamental component of REDD+ and serve to reduce fragmentation by promoting enhanced transparency, participation, knowledge sharing and coordination (Gupta et al., 2016).

Table **5.2**

Relationship between challenges identified for REDD+ implementation and some key lessons to improve REDD+ processes and outcomes

Challenge	Lesson
Challenge 1: Optimising synergies across vertical and horizonal scales • Achieving vertical multi-scalar coordination • Cross-sectoral coordination and overlap between REDD+ and related land use or forest initiatives	**Lesson 9:** Coordination and collaboration across scales and actors (public and private) holds the key to making a real change in REDD+ implementation
Challenge 2: Ensuring legitimacy of REDD+ interventions • Top-down measures • Legitimacy and 'carbon colonialism' • Unclear, unstable and/or conflicting tenure rights • Limited participation of legitimate stakeholders	**Lesson 2:** REDD+ implementation requires a better understanding of power relations among different actors **Lesson 6:** Sub-national jurisdictional approaches to REDD+ represent an important pathway to its broader uptake
Challenge 7: Confirming engagement, inclusion and equity, and securing rights • Limited or ineffective stakeholder participation • Inadequate free, prior and informed consent	**Lesson 4:** The emergence of REDD+ brought renewed attention to the importance of the rights and knowledge of Indigenous Peoples and local communities
Challenge 5: Ensuring national commitment and accountability • Weak government commitment and corruption	**Lesson 3:** Ownership and accountability of in-country stakeholders are fundamental to REDD+ implementation
Challenge 4: Securing adequate financing and incentivising REDD+ • Limited financial resources • Making the business case for REDD+ • Requirements to access finance • High expectations	
Challenge 6: Addressing drivers of forest loss and degradation • Tackling global drivers of tropical forest loss and degradation • Poor national response to effectively address the drivers of deforestation and degradation	**Lesson 1:** Addressing drivers of deforestation and forest degradation at multiple levels of governance remains a fundamental component of REDD+ that is not yet effectively tackled
Challenge 8: Improving human and institutional capacity for monitoring and implementation • Constraints on institutional and human capacities • Operationalising mechanisms to manage risks of leakage • Policy-practice feedback loops	**Lesson 7:** Monitoring non-carbon benefits is challenging, and a stepwise approach is needed to operationalise safeguards **Lesson 8:** Communication, capacity building and engagement in REDD+ decision-making processes need to be improved
Challenge 3: Harmonising and simplifying methodologies • Harmonising methodologies and definitions applied across countries • From one-size fits all to national and local differentiation • Complexity and carbon accounting	
Challenge 9: Securing both carbon and non-carbon benefits through operationalising safeguards • Ensuring both local and global (co-)benefits • Carbon effectiveness of REDD+ projects • Maximising outcomes on local rights and livelihoods • Permanence • Complexity associated with safeguards	**Lesson 5:** Non-carbon benefits of forests represent essential components of REDD+, particularly as they provide direct and indirect benefits for Indigenous Peoples and local communities

5.5. Comparison between Lessons Learnt from Forest Landscape Restoration and REDD+ Implementation

Lesson learning from processes such as REDD+ provides opportunities for corrective actions and the dissemination of positive practices. With this in mind, two recent lesson learning exercises were carried out for FLR (Stanturf et al., 2020; Mansourian et al., 2021). Both processes reflected on the practical experience in implementing FLR emerging from a number of landscapes around the globe. These overarching lessons are broadly consistent, and most are of direct relevance and value to REDD+ (see Table 5.3). Three aspects that stand out are capacity building, monitoring and the need to address threats and/or drivers of forest loss and degradation. Both processes also highlight the need for local level participation and governance. This is a particularly critical issue with REDD+ and Table 5.3. highlights several lessons that emerge under the categories of equity and rights for example. The lessons can be categorised as follows: expectations; threats and drivers; collaboration; finance and incentives; spatial and temporal scales; capacity building, knowledge and methods; monitoring and *adaptive management*; communication; political support and policies; diversity of approaches and benefits; equity, tenure and rights; power; local governance and ownership. Most of these categories align with the challenges and lessons identified for REDD+.

In Table 5.3 we compare the lessons for FLR emerging from these two exercises with those identified here for REDD+. The first column provides the overarching categories associated with the lessons.

Table **5.3**

Comparing lessons for FLR with REDD+ lessons

Category of lesson	Lessons from 19 landscapes (Stanturf et al., 2020)	Lessons from seven landscapes (Mansourian et al., 2021)	REDD+ Lessons
Expectations	Lesson 1: Align **expectations** in project design		
Threats & drivers	Lesson 2: Address **threats**	Meta-lesson 6: Addressing the **drivers** of forest loss and degradation is a key first step in FLR	Lesson 1: Addressing **drivers** of deforestation and forest degradation at multiple levels of governance remains a fundamental component of REDD+ that is not yet effectively tackled
Collaboration	Lesson 3: Strengthen **collaboration** and participation	Meta-lesson 9: Mechanisms that bring **stakeholders together** are essential	Lesson 9: Coordination and **collaboration** across scales and actors (public and private) holds the key to making a real change in REDD+ implementation
Finance and Incentives	Lesson 4: Incorporate **incentives** and reduce disincentives	Meta-lesson 11: Long term **financing** tends to rely on public funding, but should be diversified	
Spatial & temporal scales	Lesson 5: Consider spatial and time **scales**	Meta-lesson 1: FLR takes place at a landscape scale, but multiple spatial **scales** must be considered, from sites to ecoregions, as well as the way in which they inter-relate	

Capacity building, knowledge & methods	Lesson 6: Utilise appropriate **knowledge** and methods Lesson 7: Focus on **capacity** building and technical assistance	Meta-lesson 13: Scientific **knowledge** provides an important basis for FLR interventions	Lesson 4: The emergence of REDD+ brought renewed attention to the importance of the rights and **knowledge** of Indigenous Peoples and local communities
Monitoring & adaptive management	Lesson 8: Include **monitoring**	Meta-lesson 12: **Monitoring** is always weak but crucial to support FLR implementation and adaptive management Meta-lesson 8: Commitment to FLR should be long term, but flexibility and **adaptive management** are necessary to incorporate changes over time	Lesson 7: **Monitoring** non-carbon benefits is challenging, and a stepwise approach is needed to operationalise safeguards
Communication	Lesson 9: Improve **communication**	Meta-lesson 14: Engagement starts with awareness raising, capacity building and **communications**	Lesson 8: **Communication**, capacity building and engagement in REDD+ decision-making processes need to be improved
Political support & policies	Lesson 10: Strengthen **political** support	Meta-lesson 10: Public **policies** and instruments are needed to support FLR	
Diversity of approaches & benefits		Meta-lesson 2: **Several actions** in a landscape contribute to a strategic approach to FLR Meta-lesson 4: Forest restoration can take several **pathways**	Lesson 5: Non-carbon **benefits** of forests represent essential components of REDD+, particularly as they provide direct and indirect benefits for Indigenous Peoples and local communities
Equity, tenure & rights		Meta-lesson 3: **Equitable** implementation must be inclusive and build on social realities	Lesson 4: The emergence of REDD+ brought renewed attention to the importance of the **rights** and knowledge of Indigenous Peoples and local communities Lesson 6: REDD+ interventions designed with local people, and based on their perceptions of **equity**, will likely be better adapted to local realities and have greater legitimacy
Power			Lesson 2: REDD+ implementation requires a better understanding of **power** relations among different actors
Local governance & ownership		Meta-lesson 5: Inclusive, **local level governance** facilitates long-term FLR efforts Meta-lesson 7: The organisation leading implementation must plan for a careful hand-over strategy to ensure **local ownership** and continuity	Lesson 3: Ownership and accountability of in-country stakeholders are fundamental to REDD+ implementation Lesson 6: **Sub-national jurisdictional** approaches to REDD+ represent an important pathway to its broader uptake

5.6. Reflecting on Opportunities Going Forward

Although many challenges remain, looking to the next 10 years, we can highlight a number of opportunities for the future of REDD+. Firstly, REDD+ may prove to be a useful mechanism to promote synergies across at least the three main Rio Conventions (and possibly others). At the international level there is a potential for real alignment across major frameworks such as the Post-2020 Global Biodiversity Framework under the CBD that should be agreed in 2022, the UNFCCC Glasgow Climate Pact agreed in November 2021 and the global thrust on *ecosystem restoration* as exemplified by the UN General Assembly's launch of the UN Decade on Ecosystem Restoration from 2021 to 2030. Promoting the integration of biodiversity concerns in land-use and land-use change aspects of the UNFCCC and prioritising climate change *impacts* on biodiversity would be a first step to aligning the CBD and the UNFCCC. All of these frameworks contain or will contain priorities associated with REDD+ such as protection, sustainable management and restoration of forests. Such an alignment is likely to be reflected in the way ODA funding will be distributed, notably through the GEF and GCF. However, it will also create a more comprehensive framework for potential private sector investment.

Secondly, the private sector is operating a significant shift towards 'nature-based solutions' that include in many cases, forest-related climate mitigation and adaptation mechanisms, aligned with REDD+. This in turn potentially provides two significant advances for REDD+: 1. A significant injection of additional funding, including through private-public partnerships (e.g., LEAF); 2. A shift in mindset concerning drivers of forest loss and degradation. The financial sector, for example, concerned notably with the risks of exposure to environmental disasters, is increasingly seeking 'greener' financial products. Similarly, many large international corporations – in line with their drive for improved corporate social responsibility (CSR) and environment, social and governance (ESG) concerns – are seeking to improve their value chains, with subsequent impacts on drivers of forest loss and degradation. This is the case for example, with Olam's living landscapes policy (Olam, 2018) or Nestlé's 'no deforestation' commitment (Nestlé, 2020). In reviewing 250 large companies, Jopke and Schoneveld (2018) found that while there is an increasing drive to make zero deforestation commitments, implementation and real change still fall short. They noted in particular that implementation mechanisms are poorly defined, and externality issues are not well acknowledged and addressed. That said, there have been recent advances to address commodity-driven deforestation. At the UNFCCC COP 26, 28 governments, representing 75% of global trade in key commodities that can threaten forests, signed on to the roadmap of the Forest, Agriculture and Commodity Trade (FACT) Dialogue, which is co-chaired by the UK and Indonesia. And ten of the largest companies managing over half of global trade in key forest-risk commodities, such as palm oil and soy, announced the development of a roadmap for enhanced supply chain action by COP 27 in 2022.

Thirdly, improvements in technology are making monitoring of forest change increasingly easier and cheaper. Combining global satellite imagery with local ground-truthing can yield valuable and increasingly accurate and up-to-date information on forests (e.g., Hojas-Gascon and Eva, 2014; Adjognon et al., 2019).

5.7. Conclusions

While there has been significant progress in REDD+ since the 2012 GFEP assessment, several challenges have emerged at multiple levels. Many challenges relate to governance dimensions (e.g., at the national or local scales) but also to technical aspects (e.g., methods) and financial ones (e.g., opportunity costs). The initial intent (and uniqueness) of REDD+ did not pan out, largely because of the challenges we highlight. REDD+ ambitions remain far from achieved because of the complexity and multi-layered nature of interventions in forests more generally. Forests also continue to be grossly undervalued which skews decisions concerning their exploitation. Aiming to inform future REDD+ interventions and processes, we identified nine overarching challenges that can be split by spatial scale and category of challenge. In addition, we highlight nine lessons that can be extracted from experience in REDD+ to date.

Considering how REDD+ contributes or adds value to existing initiatives may be a more powerful means of advancing progress on the intersection between forest and climate change, rather than seeing REDD+ as a separate entity. With a new impetus being given particularly to protected areas (via the Post-2020 Global Biodiversity Framework) and restoration (via the UN Decade on Ecosystem Restoration), there is a renewed role for REDD+ to contribute to wider land use and forest

interventions. However, for this role to effectively address deforestation and forest degradation while providing co-benefits, requires acknowledgement of, and solutions to, the challenges identified to date. The recent IPCC (2021) report has also provided stark warnings that signify that land-based mitigation and adaptation measures will need to be expanded. Addressing some of the challenges identified here and applying lessons learnt, can support future interventions by countries and the donor community.

5.8. References

Adjognon G.S., Rivera-Ballesteros A., and van Soest D. (2019). Satellite-based tree cover mapping for forest conservation in the drylands of Sub Saharan Africa (SSA): Application to Burkina Faso gazetted forests. Development Engineering, 4, 100039.

Airey S. and Krause T. (2017). Georgetown ain't got a tree. We got the trees—Amerindian Power & Participation in Guyana's Low Carbon Development Strategy. Forests, 8, 3, 51.

Almanza Alcalde H., Satyal P., Sánchez A.P.S., and Pskowski M. (2020). Conflictividad en la implementación temprana de REDD+ en México. Sociedad y Ambiente, 22, 152–179.

Angelsen A. (2016). REDD+: What should come next? In: Towards a Workable and Effective Climate Regime. (Eds.) S. Barrett, C. Carraro, and J. de Melo. Center for International Forestry Research (CIFOR), pp. 17.

Angelsen A., Brockhaus M., Duchelle A.E., Larson A., Martius C., Sunderlin W.D., Verchot L., Wong G., and Wunder S. (2017). Learning from REDD+: a response to Fletcher et al. Conservation Biology: The Journal of the Society for Conservation Biology, 31, 3, 718–720.

Angelsen A., Hermansen E.A.T., Rajão R., and van der Hoff R. (2018). Results-based payment: Who should be paid, and for what? In: Transforming REDD+: Lessons and New Directions. (Eds.) A. Angelsen, C. Martius, et al. Center for International Forestry Research (CIFOR): Bogor, Indonesia., pp. 18. ISBN: 978-602-387-079-0.

Ardiansyah F., Marthen A.A., and Amalia N. (2015). Forest and land-use governance in a decentralized Indonesia: A legal and policy review. Center for International Forestry Research (CIFOR): Bogor, Indonesia.

Arhin A.A. (2014). Safeguards and dangerguards: a framework for unpacking the black box of safeguards for REDD+. Forest Policy and Economics, 45, 24-31.

Arts B., Ingram V., and Brockhaus M. (2019). The Performance of REDD+: From Global Governance to Local Practices. Forests, 10, 10, 837.

Assembe-Mvondo S. (2015). National-level corruption risks and mitigation strategies in the implementation of REDD+ in the Democratic Republic of the Congo: An overview of the current situation. Anti-Corruption Resource Centre: Bergen, Norway.

Atela J.O., Quinn, C.H., Minang P.A., and Duguma L.A. (2015). Implementing REDD+ in view of integrated conservation and development projects: Leveraging empirical lessons. Land Use Policy, 48, 329-340.

Atmadja S., Duchelle A.E., de Sy V., Selviana V., Komalasari M., Sills E.O., and Angelsen A. (2022). How do REDD+ projects contribute to the goals of the Paris Agreement. Environmental Research Letters, 17, 4, 044038.

Bastin J.F., Finegold Y., Garcia C., Mollicone D., Rezende M., Routh D., Zohner C.M., et al., (2019). The global tree restoration potential. Science, , 365, 6448, 76-79.

Bayrak M.M. and Marafa L.M. (2016). Ten years of REDD+: A critical review of the impact of REDD+ on forest-dependent communities. Sustainability, 8, 7, 620.

Besseau P., Graham S., and Christophersen T. (2018). Restoring forests and landscapes: the key to a sustainable future. Global Partnership on Forest and Landscape Restoration, Vienna, Austria. ISBN, 978–3, 902762-97.

Blackman A., Corral L., Lima E.S., and Asner G.P. (2017). Titling indigenous communities protects forests in the Peruvian Amazon. Proceedings of the National Academy of Sciences, 114, 16, 4123–4128.

Bond I., Grieg-Gran M., Wertz-Kanounnikoff S., Hazlewood P., Wunder S., and Angelsen A. (2009). Incentives to sustain forest ecosystem services: A review and lessons for REDD. International Institute for Environment and Development, London, UK, with CIFOR, Bogor, Indonesia, and World Resources Institute, Washington D.C., USA.

Bond W.J., Stevens N., Midgley G.F., and Lehmann C.E.R. (2019). The Trouble with Trees: Afforestation Plans for Africa. Trends in Ecology & Evolution, 34, 11, 963–965.

Bonn Challenge website. The Bonn Challenge. Available at: https://www.bonnchallenge.org/ [Accessed on 26 January 2022].

Bos A.B., Duchelle A.E., Angelsen A., Avitabile V., Sy V.D., Herold M., Joseph S., Sassi C. de, Sills E.O., Sunderlin W.D., et al. (2017). Comparing methods for assessing the effectiveness of subnational REDD+ initiatives. Environmental Research Letters, 12, 7, 074007.

Boyd W., Stickler C., Duchelle A., Seymour F., Nepstad D., Bahar N., et al. (2018). Jurisdictional Approaches to REDD+ and Low Emissions Development: Progress and prospects. Working Paper. Washington, DC: World Resources Institute.

Bradley A. and Fortuna S. (2021). Collective tenure rights for REDD+ implementation and sustainable development. FAO: Rome, Italy.

Brandão F., Piketty M. G., Poccard-Chapuis R., Brito B., Pacheco P., Garcia E., Duchelle A., et al. (2020). Lessons for jurisdictional approaches from municipal-level initiatives to halt deforestation in the Brazilian Amazon. Frontiers in Forests and Global Change, 96.

Brazilian Ministry of Environment (2018). Second summary of information on how the Cancun Safeguards were addressed and respected by Brazil throughout the implementation of actions to reduce emissions from deforestation in the Amazon biome. Brazilian Ministry of Environment: Brasilia, Brazil.

Brockhaus M., Wong G.Y., Luttrell C., Loft L., Pham T.T., Duchelle A.E., Assembe-Mvondo S., and Di Gregorio M. (2014a). Operationalizing Safeguards in National REDD+ Benefit-sharing Systems: Lessons on effectiveness, efficiency and equity. Center for International Forestry Research (CIFOR): Bogor, Indonesia.

Brockhaus M., Di Gregorio M., and Mardiah S. (2014b). Governing the design of national REDD+: An analysis of the power of agency. Forest Policy and Economics, 49, 23–33.

Busch J. and Amarjargal O. (2020). Authority of Second-Tier Governments to Reduce Deforestation in 30 Tropical Countries. Frontiers in Forests and Global Change, 3, 1-14.

Chand H.B., Singh S., Kumar A., Kewat A.K., Bhatt R., and Bohara R. (2021). Comprehensive Overview of REDD+ in India: Status, Opportunities and Challenges. Grassroots Journal of Natural Resources, 4, 3, 185–200.

Christophersen T. (2015). Momentum continues for forest landscape restoration. Arbor Vitae 46, 7.

Cisneros E., Börner J., Pagiola S., and Wunder S. (2022). Impacts of conservation incentives in protected areas: The case of Bolsa Floresta, Brazil. Journal of Environmental Economics and Management, 111, 102572.

Corbera E. and Schroeder H. (2017). REDD+ Crossroads Post Paris: Politics, Lessons and Interplays. Forests, 8, 12, 508.

Curtis P.G., Slay C.M., Harris N.L., Tyukavina A., and Hansen M.C. (2018). Classifying drivers of global forest loss. Science, 361, 6407, 1108-1111.

Dawson N., Coolsaet B., Sterling E., Loveridge R., Gross-Camp N., Wongbusarakum S., Sangha K., Scherl L., Phan H., Zafra-Calvo N., et al. (2021). The role of Indigenous peoples and local communities in effective and equitable conservation. Ecology and Society, 26, 3.

Dehm J. (2016). Carbon Colonialism or Climate Justice: Interrogating the International Climate Regime from a TWAIL Perspective. Windsor Yearbook of Access to Justice, 33, 3, 129–161.

Dermawan A., Petkova E., Sinaga A., Muhajir M., and Indriatmoko Y. (2011). Preventing the risk of corruption in REDD+ in Indonesia. Center for International Forestry Research (CIFOR): Bogor, Indonesia.

Dhungana S., Poudel M., and Bhandari T.S. (2018). REDD+ in Nepal: Experiences from the REDD readiness phase. REDD Implementation Centre, Ministry of Forests and Environment, Government of Nepal: Kathmandu, Nepal.

DiGiano M., Stickler C., and David O. (2020). How Can Jurisdictional Approaches to Sustainability Protect and Enhance the Rights and Livelihoods of Indigenous Peoples and Local Communities? Frontiers in Forests and Global Change, 3, 40.

Di Gregorio M., Brockhaus M., Cronin T., Muharrom E., Mardiah S., and Santoso L. (2015). Deadlock or Transformational Change? Exploring Public Discourse on REDD+ Across Seven Countries. Global Environmental Politics.

Di Sacco A., Hardwick K.A., Blakesley D., Brancalion P.H., Breman E., Cecilio Rebola L., Chomba S., et al. (2021). Ten golden rules for reforestation to optimize carbon sequestration, biodiversity recovery and livelihood benefits. Global Change Biology, 27, 7, 1328-1348.

Duchelle A., de Sassi C., Jagger P., Cromberg M., Larson A., Sunderlin W., Atmadja S., Resosudarmo I.A.P., and Pratama C.D. (2017). Balancing carrots and sticks in REDD+: implications for social safeguards. Ecology and Society, 22, 3.

Duchelle A.E., Simonet G., Sunderlin W.D., and Wunder S. (2018). What Is REDD+ Achieving on the Ground? Current Issues in Sustainability, 32, 134–40.

Duchelle A.E., Seymour F., Brockhaus M., Larson A.M., Moeliono M., Wong G.Y., Pham T.T., and Martius C. (2019). Forest-based climate mitigation: Lessons from REDD+ implementation. World Resources Institute: Washington, D.C.

Ehara M., Samejima H., Yamanoshita M., Asada Y., Shogaki Y., Yano M., and Hyakumura K. (2019). REDD+ engagement types preferred by Japanese private firms: The challenges and opportunities in relation to private sector participation. Forest Policy and Economics, 106, 101945.

Elias M., Joshi D., and Meinzen-Dick R. (2021). Restoration for Whom, by Whom? A Feminist Political Ecology of Restoration. Ecological Restoration, 39, 1–2, 3–15.

Ellis E.A., Sierra-Huelsz J.A., Ceballos G.C.O., Binnqüist C.L., and Cerdán C.R. (2020). Mixed Effectiveness of REDD+ Subnational Initiatives after 10 Years of Interventions on the Yucatan Peninsula, Mexico. Forests, 11, 9, 1005.

Etchart N., Freire J.L., Holland M.B., Jones K.W., and Naughton-Treves L. (2020). What happens when the money runs out? Forest outcomes and equity concerns following Ecuador's suspension of conservation payments. World Development, 136, 105124.

Fagan M.E. (2020). A lesson unlearned? Underestimating tree cover in drylands biases global restoration maps. Global Change Biology, 26, 9, 4679–4690.

Fairhead J., Leach M., and Scoones I. (2012). Green Grabbing: a new appropriation of nature? The Journal of Peasant Studies, 39, 2, 237–261.

Fay C. and Denduangrudee H.M.S. (2018). An Uneven Path Toward Rights and REDD+ in Indonesia. Center for Global Development: Washington, D.C.

Fleischman F., Basant S., Chhatre A., Coleman E.A., Fischer H.W., Gupta D., Güneralp B., Kashwan P., Khatri D., Muscarella R., et al. (2020). Pitfalls of Tree Planting Show Why We Need People-Centered Natural Climate Solutions. BioScience, 70, 11, 947–950.

Fujisaki T., Hyakumura K., Scheyvens H., and Cadman T. (2016). Does REDD+ Ensure Sectoral Coordination and Stakeholder Participation? A Comparative Analysis of REDD+ National Governance Structures in Countries of Asia-Pacific Region. Forests, 7, 9, 195.

Gallo P., Brites A., and Micheletti T. (2020). REDD+ achievements and challenges in Brazil. Perceptions over time (2015–2019). Center for International Forestry Research (CIFOR): Bogor, Indonesia.

García P., Yepes A., Rodríguez M., Leguía D., Camacho A., Ome E., and Reyes L. (2018). Informe Final: Logros, Aprendizajes y Retos. Programa ONU-REDD: Bogotá, Colombia.

Garrett R.D., Levy S., Carlson K.M., Gardner T.A., Godar J., Clapp J., Dauvergne P., et al. (2019). Criteria for effective zero-deforestation commitments. Global environmental change, 54, 135-147.

GCF (2021). GCF: Financing climate action. Green Climate Fund: Incheon, Republic of Korea.

GCF website. Green Climate Fund. Available at: https://www.greenclimate.fund/ [Accessed on 26 January 2022].

GEF (2022). Third Meeting for the Eighth Replenishment of the GEF Trust Fund, February 2 - 4, 2022. Global Environmental Facility: Washington, DC.

Ghana Forestry Commission (2016). Ghana's Country Approach to Safeguards Roadmap. UN-REDD Programme Collaborative Workspace. Ghana Forestry Commission: Accra, Ghana.

Gray M. (2020). An analysis of climate change mitigation programs: Identifying factors for success in Guatemala. University of Graz: Graz, Austria. pp. 127.

Gupta A., Pistorius T., and Vijge M.J. (2016). Managing fragmentation in global environmental governance: the REDD+ Partnership as bridge organization. International Environmental Agreements: Politics, Law and Economics, 16, 3, 355–374.

Hansen M.C., Potapov P.V., Moore R., Hancher M., Turubanova S.A., Tyukavina A., Thau D., Stehman S.V., Goetz S.J., Loveland T.R., et al. (2013). High-Resolution Global Maps of 21st-Century Forest Cover Change. Science, 342, 6160, 850-853.

Harada K., Prabowo D., Aliadi A., Ichihara J., and Ma H.O. (2015). How Can Social Safeguards of REDD+ Function Effectively Conserve Forests and Improve Local Livelihoods? A Case from Meru Betiri National Park, East Java, Indonesia. Land, 4, 1, 119–139.

Harvey C.A., Zerbock O., Papageorgiou S., and Parra A. (2010). What is needed to make REDD+ work on the ground? Lessons learned from pilot forest carbon initiatives. Conservation International: Arlington, Virginia, USA. 121 pp.

Hojas-Gascon L. and Eva H. (2014). Field guide for forest mapping with high resolution satellite data. Monitoring deforestation and forest degradation in the context of the UN-REDD programme. The Tanzania REDD+ initiative. Joint Research Centre, European Commission: Brussels, Belgium.

Hosonuma N., Herold M., Sy V.D., Fries R.S.D., Brockhaus M., Verchot L., Angelsen A., and Romijn E. (2012). An assessment of deforestation and forest degradation drivers in developing countries. Environmental Research Letters, 7, 4, 044009.

Huettner M. (2012). Risks and opportunities of REDD+ implementation for environmental integrity and socio-economic compatibility. Environmental science & policy, 15, 1, 4-12.

Humphreys D., Singer B., McGinley K., Smith R., Budds J., Gabay M., Bhagwat S., de Jong W., Newing H., Cross C., et al. (2019). SDG 17: Partnerships for the Goals – Focus on Forest Finance and Partnerships. In: Sustainable Development Goals: Their Impacts on Forests and People. (Eds.) C.J. Pierce Colfer, G. Winkel, et al. Cambridge University Press: Cambridge., pp. 541–576. ISBN: 978-1-108-48699-6.

IIED (2016). Mozambique's REDD+: The challenge is scaling success. Available at: https://pubs.iied.org/sites/default/files/pdfs/migrate/17407IIED.pdf [Accessed on 2 February 2022].

IPBES (2018). The IPBES assessment report on land degradation and restoration. Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services: Bonn, Germany.

IPCC (2021). Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press.

Iturbide Flores M.J. (2014). REDD+: dream or nightmare? A multi-level exploration of the design and implementation of REDD+ scheme. Lincoln University: Lincoln, New Zealand. pp. 204.

Jayachandran S., Laat J. de, Lambin E.F., Stanton C.Y., Audy R., and Thomas N.E. (2017). Cash for carbon: A randomized trial of payments for ecosystem services to reduce deforestation. Science, 357, 6348, 267-273.

Jayachandran S., de Laat J., Audy R., Pagiola S., and Sedano Santamaria F. (2018). Evaluating the permanence of forest conservation following the end of payments for environmental services in Uganda. World Bank: Washington D.C., USA.

Jopke P. and Schoneveld G. (2018). Corporate commitments to zero deforestation: An evaluation of externality problems and implementation gaps. Center for International Forestry Research (CIFOR): Bogor, Indonesia.

Kariuki J. and Birner R. (2016). Are market-based conservation schemes gender-blind? A qualitative study of three cases from Kenya. Society & natural resources, 29, 4, 432-447.

Kengoum F., Pham T.T., Moeliono M., Dwisatrio B., and Sonwa D.J. (2020). The context of REDD+ in the Democratic Republic of Congo. Center for International Forestry Research (CIFOR): Bogor, Indonesia.

Khatun K., Corbera E., and Ball S. (2017). Fire is REDD+: offsetting carbon through early burning activities in south-eastern Tanzania. Oryx, 51, 1, 43-52.

Kim D., Kim D., Lee D.H., Park S., and Kim S. (2019). Centralization of the Global REDD+ Financial Network and Implications under the New Climate Regime. Forests, 10, 9, 753.

Köhl M., Neupane P.R., and Mundhenk P. (2020). REDD+ measurement, reporting and verification–A cost trap? Implications for financing REDD+ MRV costs by result-based payments. Ecological Economics, 168, 106513.

Korhonen-Kurki K., Brockhaus M., Sehring J., Di Gregorio M., Assembe-Mvondo S., Babon A., Bekele M., Benn V., Gebara M.F., Kambire H.W., et al. (2018). What drives policy change for REDD+? A qualitative comparative analysis of the interplay between institutional and policy arena factors. Climate Policy, 19, 3, 315–328.

Korwin S. (2016). REDD+ and Corruption Risks for Africa's forests: Case Studies from Cameroon, Ghana, Zambia and Zimbabwe. Transparency International: Berlin, Germany.

Laestadius L., Maginnis S., Minnemeyer S., Potapov P., Saint-Laurent C., and Sizer N. (2011). Opportunities for forest landscape restoration. Unasylva, 62, 2, 47-48.

Larson A.M., Dokken T., Duchelle A.E., Atmadja S., Resosudarmo I.A.P., Cronkleton P., Cromberg M., Sunderlin W., Awono A., and Selaya G. (2015). The role of women in early REDD+ implementation: lessons for future engagement. International Forestry Review, 17, 1, 43–65.

Larson A.M., Sarmiento Barletti J.P., Ravikumar A., and Korhonen-Kurki K. (2018). Multilevel Governance: Some Coordination Problems Cannot Be Solved through Coordination. In: Transforming REDD+: Lessons and New Directions. (Eds.) A. Angelsen, C. Martius, et al. Center for International Forestry Research (CIFOR): Bogor, Indonesia., pp. 16.

LEAF Coalition website. Lowering Emissions by Accelerating Forest finance (LEAF). Available at: https://leafcoalition.org/ [Accessed on 31 August 2021].

Lee D. and Pistorius T. (2015). The impacts of international REDD+ finance. Climate and Land Use Alliance: San Francisco, CA.

Lerch L. (2014). The Geopolitics of Land: Population, Security and Territory Viewed from the International Financing of the Land Survey in Bolivia (1996 - 2013). Journal of Latin American Geography, 13, 1, 137–168.

Lewis S.L., Mitchard E.T.A., Prentice C., Maslin M., and Poulter B. (2019). Comment on 'The global tree restoration potential'. Science (New York, N.Y.), 366, 6463, eaaz0388.

Loft L., Pham T.T., Wong G.Y., Brockhaus M., Le D.N., Tjajadi J.S., and Luttrell C. (2017). Risks to REDD+: potential pitfalls for policy design and implementation. Environmental Conservation, 44, 1, 44–55.

Lozano Flores L. (2018). Peru's Participation in REDD+: Perceptions of and Impacts on Indigenous Communities. Center for Global Development: Washington, DC.

Maniatis D., Scriven J., Jonckheere I., Laughlin J., and Todd K. (2019). Toward REDD+ Implementation. Annual Review of Environment and Resources, 44, 373–398.

Mansourian S. (2016). Understanding the relationship between governance and forest landscape restoration. Conservation and Society, 14, 3, 267-278.

Mansourian S. (2017). Governance and forest landscape restoration: A framework to support decision-making. Journal for Nature Conservation, 37, 21–30.

Mansourian S. (2021). Disciplines, Sectors, Motivations and Power Relations in Forest Landscape Restoration. Ecological Restoration, 39, 1, 16–26.

Mansourian S., and Parrotta J. (2019). From addressing symptoms to tackling the illness: reversing forest loss and degradation. Environmental Science & Policy, 101, 262-265.

Mansourian S., and Vallauri D. (2020). How to Learn Lessons from Field Experience in Forest Landscape Restoration: A Tentative Framework. Environmental Management, 66, 6, 941-951.

Mansourian S., and Vallauri D. (2022). Challenges in measuring multiple impacts hinder performance recognition in forest landscape restoration: experience from seven field projects. Restoration Ecology, 30, 1, e13504.

Mansourian S., Diederichsen A., and Vallauri D. (2021). Twenty Years Later: Lessons learnt from seven forest landscape restoration initiatives worldwide. WWF-France: Paris, France.

Mansourian S., Aquino L., Erdmann T.K., and Pereira F. (2014). A comparison of governance challenges in forest restoration in Paraguay's privately-owned forests and Madagascar's co-managed state forests. Forests, 5, 4, 763-783.

Martius C., Angelsen A., Larson A.M., Pham T.T., Sonwa D.J., and Belcher B. (2018). Pathway to Impact: Is REDD+ a Viable Theory of Change? In: Transforming REDD+: Lessons and New Directions. (Eds.) A. Angelsen, C. Martius, et al. Center for International Forestry Research (CIFOR): Bogor, Indonesia., pp. 18.

Massarella K., Sallu S.M., Ensor J.E., and Marchant R. (2018). REDD+, hype, hope and disappointment: The dynamics of expectations in conservation and development pilot projects. World Development, 109, 375–385.

Mathur V.N., Afionis S., Paavola J., Dougill A.J., and Stringer L.C. (2014). Experiences of host communities with carbon market projects: towards multi-level climate justice. Climate Policy, 14, 1, 42–62.

McElwee P. (2009). Reforesting "bare hills" in Vietnam: Social and environmental consequences of the 5 million hectare reforestation program. Ambio: A Journal of the Human Environment, , 38, 6, 325-333.

McLain R., Lawry S., Guariguata M.R., and Reed J. (2021). Toward a tenure-responsive approach to forest landscape restoration: A proposed tenure diagnostic for assessing restoration opportunities. Land Use Policy, 104, 103748.

Mermoz S., Bouvet A., Toan T.L., and Herold M. (2018). Impacts of the forest definitions adopted by African countries on carbon conservation. Environmental Research Letters, 13, 10, 104014.

Milne S., Mahanty S., To P., Dressler W., Kanowski P., and Thavat M. (2019). Learning From 'Actually Existing' REDD+: A Synthesis of Ethnographic Findings. Conservation and Society, 17, 1, 84–95.

Minang P.A., Van Noordwijk M., Duguma L.A., Alemagi D., Do T.H., Bernard F., Agung P., Robiglio V., Catacutan D., Suyanto S., et al. (2014). REDD+ Readiness progress across countries: time for reconsideration. Climate Policy, 14, 6, 685–708.

Montoya-Zumaeta J.G., Wunder S., and Tacconi L. (2021). Incentive-based conservation in Peru: Assessing the state of six ongoing PES and REDD+ initiatives. Land Use Policy, 108, 105514.

Myers R., Larson A.M., Ravikumar A., Kowler L.F., Yang A., and Trench T. (2018). Messiness of forest governance: How technical approaches suppress politics in REDD+ and conservation projects. Global Environmental Change, 50, 314–324.

Nef D.P., Gotor E., Wiederkehr Guerra G., Zumwald M., and Kettle C.J. (2021). Initial Investment in Diversity Is the Efficient Thing to Do for Resilient Forest Landscape Restoration. Frontiers in Forests and Global Change, 3.

Nesha M.K., Herold M., Sy V.D., Duchelle A.E., Martius C., Branthomme A., Garzuglia M., Jonsson O., and Pekkarinen A. (2021). An assessment of data sources, data quality and changes in national forest monitoring capacities in the Global Forest Resources Assessment 2005–2020. Environmental Research Letters, 16, 5, 054029.

Nestlé (2020). Nestlé No Deforestation Commitment. Available at: https://www.nestle.com/sites/default/files/2020-05/nestle-deforestation-update.pdf [Accessed on 28 February 2022].

Olam (2018). Olam Living Landscapes Policy. Olam Group. Available at: https://www.olamgroup.com/content/dam/olamgroup/sustainability/policies-codes-and-standards/living-landscapes-policy/living-landscapes-policy-pdfs/Olam-Living-Landscapes-Policy_English.pdf [Accessed on 28 February 2022].

Ostrom E. and Nagendra H. (2007). Tenure alone is not sufficient: Monitoring is essential. Environmental Economics and Policy Studies, 8, 3, 175-199.

Pacheco P., Aguilar-Støen M., Börner J., Etter A., Putzel L., and del Carmen Vera Diaz M. (2010). Actors and landscape changes in tropical Latin America: Challenges for REDD+ design and implementation. Center for International Forestry Research: Bogor, Indonesia.

Palomo I., Dujardin Y., Midler E., Robin M., Sanz M.J., and Pascual U. (2019). Modeling trade-offs across carbon sequestration, biodiversity conservation, and equity in the distribution of global REDD+ funds. Proceedings of the National Academy of Sciences, 116, 45, 22645–22650.

Parrotta J.A., Wildburger C., and Mansourian S. (2012). Understanding relationships between biodiversity, carbon, forests and people: the key to achieving REDD+ objectives. A global assessment report. International Union of Forest Research Organizations (IUFRO): Vienna, Austria. pp. 161. ISBN: 978-3-902762-17-7.

Pasgaard M., Sun Z., Müller D., and Mertz O. (2016). Challenges and opportunities for REDD+: A reality check from perspectives of effectiveness, efficiency and equity. Environmental Science & Policy, 63, 161–169.

Peskett L. and Brockhaus M. (2009). When REDD+ goes national: A review of realities, opportunities and challenges. In: Realising REDD+: National Strategy and Policy Options. (Eds.) A. Angelsen, M. Brockhaus, et al. Center for International Forestry Research (CIFOR): Bogor, Indonesia. pp. 20.

Pham T.T., Moeliono M., Nguyen T.H., Nguyen H.T., and Vu T.H. (2012). The context of REDD+ in Vietnam: drivers, agents and institutions. CIFOR Occasional Paper, 75.

Pham T.T., Castella J.C., Lestrelin G., Mertz O., Le D.N., Moeliono M., Nguyen T.Q., et al. (2015). Adapting free, prior, and informed consent (FPIC) to local contexts in REDD+: Lessons from three experiments in Vietnam. Forests, 6, 7, 2405-2423.

Pham T.T., Moeliono M., Angelsen A., Brockhaus M., Gallo P., Hoang T.L., Dao T.L.C., Ochoa C., and Bocanegra K. (2018). Strategic alignment: Integrating REDD+ in NDCs and national climate policies. In: Transforming REDD+: Lessons and New Directions. (Eds.) A. Angelsen, C. Martius, et al. Center for International Forestry Research (CIFOR): Bogor, Indonesia., pp. 18.

Poudyal M., Ramamonjisoa B.S., Hockley N., Rakotonarivo O.S., Gibbons J.M., Mandimbiniaina R., Rasoamanana A., and Jones J.P. (2016). Can REDD+ social safeguards reach the 'right' people? Lessons from Madagascar. Global Environmental Change, 37, 31-42.

Ravikumar A., Larson A., Duchelle A., Myers R., and Tovar J.G. (2015). Multilevel governance challenges in transitioning towards a national approach for REDD+: evidence from 23 subnational REDD+ initiatives. International Journal of the Commons, 9, 2.

Rodríguez Fernández-Blanco C., Burns S.L., and Giessen L. (2019). Mapping the fragmentation of the international forest regime complex: institutional elements, conflicts and synergies. International Environmental Agreements: Politics, Law and Economics, 19, 2, 187–205.

Roe S., Streck C., Obersteiner M., Frank S., Griscom B., Drouet L., Fricko O., Gusti M., Harris N., Hasegawa T., et al. (2019). Contribution of the land sector to a 1.5 °C world. Nature Climate Change, 9, 11, 817–828.

Roopsind A., Sohngen B., and Brandt J. (2019). Evidence that a national REDD+ program reduces tree cover loss and carbon emissions in a high forest cover, low deforestation country. Proceedings of the National Academy of Sciences, 116, 49, 24492–24499.

Saeed A.R., McDermott C., and Boyd E. (2017). Are REDD+ community forest projects following the principles for collective action, as proposed by Ostrom? International Journal of the Commons, 11, 1.

Sandker M., Crete P., Lee D., and Sanz-Sanchez M. (2015). Technical considerations for Forest Reference Emission Level and/or Forest Reference Level construction for REDD+ under the UNFCCC. FAO: Rome, Italy.

Sarmiento Barletti J.P. and Larson A. M. (2017). Rights abuse allegations in the context of REDD+ readiness and implementation: A preliminary review and proposal for moving forward. Info Brief 190. CIFOR: Bogor, Indonesia.

Scheba A. and Rakotonarivo O.S. (2016). Territorialising REDD+: Conflicts over market-based forest conservation in Lindi, Tanzania. Land Use Policy, 57, 625-637.

Schroeder H., Di Gregorio M., Brockhaus M., and Pham T.T. (2020). Policy learning in REDD+ donor countries: Norway, Germany and the UK. Global Environmental Change, 63, 102106.

Sewell A., van der Esch S., and Löwenhardt H. (2020). Technical Note on Methodology for the Global Restoration Commitments Database. PBL Netherlands Environmental Assessment Agency: The Hague.

Seymour F. and Angelsen A. (2009). Summary and conclusions: REDD wine in old wineskins? In: Realising REDD+: National Strategy and Policy Options. (Eds.) A. Angelsen, M. Brockhaus, et al. Center for International Forestry Research (CIFOR): Bogor, Indonesia., pp. 12.

Seymour F. J., Aurora L., and Arif J. (2020). The jurisdictional approach in Indonesia: Incentives, actions, and facilitating connections. Frontiers in Forests and Global Change, 3, 503326.

Sigman E. and Elias M. (2021). Three Approaches to Restoration and Their Implications for Social Inclusion. Ecological Restoration, 39, 1-2, 27–35.

Simonet G., Subervie J., Ezzine-de-Blas D., Cromberg M., and Duchelle A.E. (2019). Effectiveness of a REDD+ Project in Reducing Deforestation in the Brazilian Amazon. American Journal of Agricultural Economics, 101, 1, 211–229.

Skutsch M. and Turnhout E. (2020). REDD+: If communities are the solution, what is the problem? World Development, 130, 104942.

Spiric J. (2018). Finding balance: perceptions of REDD+ in Mexico. Available at: https://www.iucn.org/news/forests/201809/finding-balance-perceptions-redd-mexico [Accessed on 2 February 2022].

Stanturf J.A., Mansourian S., Darabant A., Kleine M., Kant P., and Burns J. (2020). Forest Landscape Restoration Implementation: Lessons learned from selected landscapes in Africa, Asia and Latin America. International Union of Forest Research Organizations (IUFRO): Vienna, Austria.

Streck C. (2020). Shades of REDD+ The Right to Carbon, the Right to Land, the Right to Decide. Available at: https://www.ecosystemmarketplace.com/articles/the-right-to-carbon-the-right-to-land-the-right-to-decide/ [Accessed on 2 February 2022].

Streck C. and Parker C. (2012). Financing REDD+. In: Analysing REDD+: Challenges and Choices. (Eds.) A. Angelsen, M. Brockhaus, W. Sunderlin, and L. Verchot. Center for International Forestry Research (CIFOR): Bogor, Indonesia., pp. 20.

Suiseeya K.R.M. (2017). Contesting Justice in Global Forest Governance: The Promises and Pitfalls of REDD+. Conservation and Society, 15, 2, 189–200.

Sunderlin W., Ekaputri A.D., Sills E.O., Duchelle A.E., Kweka D.L., Diprose R., Doggart N., Ball S., Lima R., Enright A., et al. (2014). The challenge of establishing REDD+ on the ground: Insights from 23 subnational initiatives in six countries. Center for International Forestry Research (CIFOR): Bogor, Indonesia.

Sunderlin W.D., de Sassi C., Sills E.O., Duchelle A.E., Larson A.M., Resosudarmo I.A.P., Awono A., Kweka D.L., and Huynh T.B. (2018). Creating an appropriate tenure foundation for REDD+: The record to date and prospects for the future. World Development, 106, 376–392.

de Sy V., Herold M., Brockhaus M., Di Gregorio M., and Ochieng R. (2018). Information and policy change: Data on drivers can drive change – if used wisely. In: Transforming REDD+: Lessons and New Directions. (Eds.) A. Angelsen, C. Martius, et al. Center for International Forestry Research (CIFOR): Bogor, Indonesia. pp. 19.

Tacconi L., Downs F., and Larmour P. (2009). Anti-corruption policies in the forest sector and REDD+. In: Angelsen A. with Brockhaus M., Kanninen M., Sills E., Sunderlin W. D., and Wertz-Kanounnikoff S. (eds), 2009 Realising REDD+: National strategy and policy options. CIFOR: Bogor, Indonesia. Chapter 13, pp. 163-174.

Turnhout E., Gupta A., Weatherley-Singh J., Vijge M.J., de Koning J., Visseren-Hamakers I.J., Herold M., and Lederer M. (2016). Envisioning REDD+ in a post-Paris era: between evolving expectations and current practice. WIREs Climate Change, 8, 1, e425.

UNDP (2018). Environmental sustainability and policy for cocoa production in Ghana. United Nations Development Programme: New York, NY.

UNDP (2021). Considerations for integrating nature-based solutions in nationally determined contributions: illustrating the potential through REDD+. United Nations Development Programme: New York, NY.

UNFCCC (2011). Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010. United Nations: New York, NY.

United Republic of Tanzania (2016). Tanzania's forest reference emission level submission. Available at: https://redd.unfccc.int/files/frel__for__tanzania_december2016_27122016.pdf [Accessed on 03 March 2022].

UN-REDD Programme (2013). Final evaluation of the UN-REDD Tanzania National Programme. UN-REDD Programme Secretariat: Geneva, Switzerland.

UN-REDD Programme (2015). Ecuador: successfully positioned to implement national REDD+ Action Plan. UN-REDD Programme Secretariat: Geneva, Switzerland.

UN-REDD Programme (2017a). Ghana REDD+ Strategy. UN-REDD Programme Secretariat: Geneva, Switzerland.

UN-REDD Programme (2017b). UN-REDD National Programme Annual Report for 2016. Hanoi, Vietnam.

UN-REDD Programme (2020). 11th Consolidated annual progress report of the UN-REDD Programme Fund. UN-REDD Programme Secretariat: Geneva, Switzerland.

Veldman J.W., Overbeck G.E., Negreiros D., Mahy G., Le Stradic S., Fernandes G.W., Durigan G., Buisson E., Putz F.E., and Bond W.J. (2015). Where Tree Planting and Forest Expansion are Bad for Biodiversity and Ecosystem Services. BioScience, 65, 10, 1011–1018.

West T.A.P., Börner J., Sills E.O., and Kontoleon A. (2020). Overstated carbon emission reductions from voluntary REDD+ projects in the Brazilian Amazon. Proceedings of the National Academy of Sciences, 117, 39, 24188–24194.

Wiegant D., Peralvo M., van Oel P., and Dewulf A. (2020). Five scale challenges in Ecuadorian forest and landscape restoration governance. Land Use Policy, 96, 104686.

Williams D.A. and Dupuy K.E. (2019). Will REDD+ Safeguards Mitigate Corruption? Qualitative Evidence from Southeast Asia. The Journal of Development Studies, 55, 10, 2129–2144.

Witter R. and Satterfield T. (2019). Rhino poaching and the "slow violence" of conservation-related resettlement in Mozambique's Limpopo National Park. Geoforum, 101, 275–284.

Wong G.Y., Luttrell C., Loft L., Yang A., Pham T.T., Naito D., Assembe-Mvondo S., and Brockhaus M. (2019). Narratives in REDD+ benefit sharing: Examining evidence within and beyond the forest sector. Climate Policy, 19, 8, 1038-1051.

Woodhouse E., Bedelian C., Dawson N., and Barnes P. (2018). Social impacts of protected areas: Exploring evidence of trade-offs and synergies. In: Ecosystem Services and Poverty Alleviation. (Eds.) K. Schreckenberg, G. Mace, and M. Poudyal. Routledge: London, UK., pp. 19. ISBN: 978-0-429-50709-0.

Wunder S., Duchelle A. E., Sassi C. D., Sills E. O., Simonet G., and Sunderlin W. D. (2020). REDD+ in theory and practice: how lessons from local projects can inform jurisdictional approaches. Frontiers in Forests and Global Change, 3, 11.

Wurtzebach Z., Casse T., Meilby H., Nielsen M., and Milhøj A. (2019). REDD+ policy design and policy learning: The emergence of an integrated landscape approach in Vietnam. Forest Policy and Economics, 101, 129–139.

WWF (2013). Guide to Building REDD+ Strategies: A toolkit for REDD+ practitioners around the globe. WWF Forest and Climate Programme: Washington, D.C.

Chapter 6

Key Findings: The Evolving Role of REDD+ for Climate, Forests and People

Lead Authors: Stephanie Mansourian and John Parrotta
Contributing Authors: Emily Donegan, Valerie Kapos, Constance McDermott, Marieke Sandker, Bhaskar Vira, Nelson Grima and Christoph Wildburger

During the past ten years since the first GFEP assessment on REDD+ was published, much progress has been made in the development and implementation of REDD+ as a means to address the climate crisis. At the same time, there has been significant development and refinement of the evidence base needed to critically assess how REDD+ is being implemented, its potential and actual role in halting and reversing deforestation and forest degradation, as well as its implications for affected communities, conservation of biodiversity and enhancement of forest-related ecosystem services. This follow-up GFEP assessment by IUFRO comes at a pivotal time as several related international initiatives are gaining ground, notably the Glasgow Leaders' Declaration on Forests and Land use, the UN Decade on Ecosystem Restoration, the Convention on Biological Diversity (CBD) Global Biodiversity Framework, among others.

One major conclusion from this assessment is that while REDD+ has provided a convenient umbrella for many forest and land use related activities aimed at reducing deforestation and forest degradation – and associated greenhouse gas emissions – the complexities involved in the nexus between forests/land use and climate are profound. They touch squarely on political and governance issues at international, national and sub-national scales that remain to be resolved and require fundamental transformations.

Based on the extensive review of available evidence presented in Chapters 2 to 5 of this assessment, six key messages emerge.

1. Ongoing deforestation and forest degradation are altering the critical role of forests in the global carbon cycle

The role of forests in the global carbon cycle and in climate change is fundamental. Forests absorb approximately 11 $GtCO_2$/yr as they grow, which is as much as 29% of annual anthropogenic CO_2 emissions. Yet deforestation and forest degradation also result in significant emissions, estimated at 4.1± 2.6 $GtCO_2$/yr, or 10% of the annual anthropogenic CO_2 emissions. According to data compiled in FAO's Forest Resources Assessment 2020 (FRA 2020) report, an estimated 420 million hectares of forest were lost between 1990 and 2020, with more than 90% of this loss occurring in the tropics. Globally, although the rate of deforestation is slowing, we were still losing an estimated 10 million ha per year between 2015 and 2020. Forest degradation, which is harder to detect and measure than deforestation, is estimated to generate between 25% and >65% of total forest-related emissions. FAO's FRA 2020 estimates that 34% of emissions in UNFCCC reference levels arise from forest degradation.

Estimates of the mitigation potential from reducing deforestation vary widely between 0.4 and 5.8 $GtCO_2$/yr. Recent research suggests that the capacity of existing forests to continue acting as a carbon sink is reaching saturation. Extreme weather events, fire, drought, and forest pest and disease outbreaks, exacerbated under climate change, will likely further erode forest area, and a tipping point may be reached beyond which forests will not recover and will instead become large sources of emissions.

Activities under REDD+ offer different potentials for reducing GHG emissions. In the short term (the next decade) conservation and sustainable management of forests are likely to be the most effective REDD+ activities for reducing emissions from the land use, land-use change and forestry (LULUCF) sector. The cost-effective mitigation potential of forest management alone has been estimated at 0.9 $GtCO_2$eq/yr, which is reduced to 0.6 $GtCO_2$eq/yr if developed (i.e., high income) countries are excluded from the estimate. In the longer term, afforestation/reforestation (A/R) activities are believed to offer the largest mitigation potential. The technical potential of A/R has been estimated at 8.5 $GtCO_2$eq/yr, while the practical cost-effective mitigation potential has been estimated to be much lower, approximately 1.2 $GtCO_2$eq/yr.

2. REDD+ governance is distributed across a complex landscape of institutions with different sources of authority and power dynamics that influence its outcomes

Ultimately, REDD+ governance determines its performance. Disparate actors situated at local, national and international scales create a complex web of interactions around REDD+, with those holding power frequently disconnected from those most dependent on forests. The resulting landscape of REDD+-related governance and finance has exposed the challenges inherent to land-based (or more specifically, forest-based) climate measures. At the international level, these include 'legitimacy', the overall architecture of REDD+ and 'carbon colonialism', with those holding power imposing forest management measures at national and sub-national levels that may not reflect local priorities. In contrast, at the national level, a pervasive and deep-rooted challenge is the lack of alignment across sectors (e.g., forest, agriculture, mining) that shape land-

scapes. Both local forest-dependent people and forests frequently suffer as a result of the contradictory policies influencing REDD+ implementation. A lack of transparency and accountability in relevant sectors exacerbate inequities and power imbalances.

States, finance and markets also influence the way in which REDD+ is implemented, with the relative power of each determining national and sub-national outcomes. The political ecology of REDD+ is shaped by ongoing friction between global, national and locally driven environment and development agendas, and between the need to rein in the global finance and commodities sectors (as drivers of deforestation) while also courting them as critical sources of REDD+ funding.

Attempts have been made to finance progress towards REDD+ objectives through various forms of supply chain governance that aim to provide financial incentives (e.g., individual and jurisdictional certification, 'deforestation-free' supply chains and 'green finance') or focus on sanctions and divestments from commodities tied to forest loss (e.g., through government mandated import restrictions and financial due diligence requirements). All of these initiatives are subject to tensions between more inclusive, participatory approaches to forest management (including REDD+) and the logic of market-based governance centred on commodification, standardisation and profit accumulation.

Multiple forest (and climate) schemes have emerged in the last ten years, leaving the boundaries between REDD+ and other initiatives more porous. Several of these initiatives, such as forest landscape restoration, potentially contribute to meeting REDD+ objectives but also exist outside of the REDD+ processes. Overlapping and disjointed actions and institutions around these initiatives add further complexity, and often generate confusion and uncertainty among key stakeholders.

3. REDD+ plays an important role in climate change mitigation, but this role is limited given the magnitude of the problem and actions required in other greenhouse gas emitting sectors

REDD+ is only a partial solution to forest loss and degradation, with fundamental drivers underlying greenhouse gas emissions remaining to be addressed. The Sixth IPCC report is unequivocal: climate change is already affecting every inhabited region across the globe with human influence contributing to many observed changes in weather and climate extremes. Given the magnitude and main sources of emissions, forests can only be one part of the solution. A focus on the emissions and forest-related mitigation actions in tropical countries addresses neither the principal sources of the problem nor those responsible. Instead, what is needed includes strengthening regulation of carbon-intensive industries and reducing emissions from the transport and energy sectors, among others.

Nonetheless, forests and actions under REDD+ have the potential to make significant contributions to reducing greenhouse gas emissions while addressing deforestation and forest degradation. Unfortunately, it is not yet possible to reach any firm conclusions regarding REDD+ impacts to date (or evaluate questions related to 'permanence' and 'leakage') given the limited information available from national reporting on REDD+ results, the relatively early stage of REDD+ implementation at sub-national levels, and the short period of time during which REDD+ activities have been implemented. Despite these limitations, indirect evidence suggests that deforestation is declining more in REDD+ than in eligible non-REDD+ countries. For example, based on information from FRA 2020 and the Tropical Moist Forest (TMF) dataset, 46–85% of REDD+-engaging countries reported a reduction in deforestation over the past decade, while only 16–33% of countries not engaging in REDD+ reported reductions. By 1 January 2022, 17 countries had reported a combined amount of 11.4 $GtCO_2eq$ REDD+ results (i.e., increased emission reductions and removals relative to reference levels) achieved over the period 2006–2020, or an average of 0.8 $GtCO_2eq/yr$. The causal evidence between REDD+ and reduced deforestation, however, remains elusive at this stage due to both monitoring gaps and other complexities surrounding REDD+.

Where REDD+ interventions have been integrated with national development strategies and plans, this appears to have allowed for greater convergence of development finance and other resources towards addressing the ultimate drivers of deforestation and forest degradation. Such integration makes it more likely to secure lasting changes, avoid risks of leakage and secure additionality of REDD+ activities.

4. Safeguards to address the social and environmental outcomes of REDD+ are complex and have yet to be fully operationalised in REDD+ implementation, reporting and accountability

It is widely understood that REDD+ success and permanence of results are contingent on the par-

Sunset in the forests of Cambodia
Photo © Nelson Grima

ticipation and support of local stakeholders who may be directly or indirectly affected, as well as on ensuring positive biodiversity and other environmental impacts of REDD+ activities. However, there is as yet limited direct evidence of the degree to which such social and environmental outcomes are being achieved.

Social and environmental safeguards were intended to ensure that outcomes beyond carbon were central to REDD+. To date, however, measuring implementation of safeguards has been limited, with no requirements concerning performance and outcomes. Complexity surrounding safeguards and proliferation of diverse standards, affect not only their implementation but also accountability in their application.

Thus far, the available evidence indicates that impacts of REDD+ interventions on biodiversity, as well as on livelihoods and other economic and social outcomes, are uneven and often highly context dependent. So far, positive impacts on biodiversity and ecosystem services from REDD+ actions have been assessed largely through their association with improved forest outcomes that increase extent, connectivity and function of key ecosystems and habitats. Such benefits can make important contributions to achieving policy and development objectives, including enhancing climate resilience of both ecosystems and people.

Evidence from social evaluations of REDD+ interventions indicates that, where direct and indirect benefits are clearly visible to local stakeholders, and have been delivered, community engagement is strong and projects have achieved positive carbon and social outcomes, at least in the short term. Such evidence, primarily from project level analyses, demonstrates the importance of meaningful engagement of local stakeholders. Explicit attention to rights and tenure issues in REDD+ planning and implementation provides more transparent mechanisms for the reporting and monitoring of environmental and social co-benefits, as well as better, more equitable outcomes, particularly for more vulnerable communities. Conversely, lack of attention to rights and tenure concerns, unclear governance arrangements, unequal power relations and elite capture of benefits at local to national levels all contribute to adverse social and economic outcomes that can undermine realisation of the objectives of REDD+. Limited evidence of linkages between environmental and socio-economic outcomes of REDD+ relates in part to challenges around valuing and accounting for environmental and social benefits in monetary or even economic terms. Approaches such as natural capital and inclusive wealth accounting may help to bridge this evidence gap, by taking account of environmental services (and 'disservices') and their impacts on livelihoods.

5. Although technological improvements are supporting better quantification of forest and carbon changes, measurement, reporting and verification of both carbon and non-carbon outcomes need to be improved

Given the limited information available from national reporting on REDD+ results, and the short period of time during which REDD+ activities have been implemented, it is difficult to reach firm conclusions regarding the impacts of REDD+ to date.

Recent years have seen significant progress in the use of remote sensing to assess forest area change. Improvements are observed in data quality, availability and abundance. Yet, while forest cover change (deforestation) can be assessed through such remote imagery, degradation is much more difficult to monitor. Estimates of global emissions from forest degradation vary widely from 25% to over 65% of total forest-related emissions.

Persistent knowledge gaps hamper measurement, reporting and verification of carbon outcomes of REDD+. These include, among others, discrepancies between different datasets; lack of country-specific data; inadequate reporting on estimate uncertainty; insufficient resolution of satellite imagery to monitor forest degradation; lack of inclusion of other carbon pools such as deadwood or soil carbon; and the uncertainty surrounding the impact that climate change will have on forests and their carbon sink function.

At the same time, quantifying non-carbon benefits of REDD+ also faces monitoring limitations, hindering our ability to determine the degree to which non-carbon objectives are being met. For example, long-term biodiversity monitoring during REDD+ implementation is relatively rare while monitoring of social impacts tends to be project-based, at best. Frameworks for assessing, measuring, reporting and verifying non-carbon benefits remain underdeveloped, resulting in significant limitations for assessing these outcomes. Biodiversity and other environmental and social benefits of REDD+ interventions are mostly inferred by association with positive environmental values of the areas where REDD+ activity is taking place, rather than being explicitly monitored. Further, few studies involve comparative analyses of outcomes in areas that are not part of REDD+ interventions to determine REDD+ additionality.

Monitoring REDD+ non-carbon outcomes could be enhanced by drawing on (and strengthening) monitoring for other policy areas such as the implementation of National Biodiversity Strategies and Action Plans (NBSAPs) under the CBD. Cross-sectoral collaboration and cost sharing in monitoring environmental and social impacts of REDD+ can also help to keep overall monitoring costs to a minimum. Similarly, alignment of monitoring efforts with reporting requirements for other international processes, such as the CBD's post-2020 Global Biodiversity Framework and the Sustainable Development Goals, can lower costs for national governments and other actors, and contribute to greater harmonisation of international efforts.

6. The recent proliferation of global commitments and initiatives aimed at halting and reversing deforestation and forest degradation is creating additional complexities and burdens, but also offers opportunities for synergies with REDD+

Interest in forests as a 'nature-based solution' has probably never been higher, with multiple initiatives aimed at conserving, sustainably managing and restoring forests. Such private and public initiatives contribute to REDD+ but also overlap with it, potentially creating additional demands on, and confusion among, national and sub-national stakeholders. For example, there has been growing interest in forest landscape restoration (FLR) since the launch of the Bonn Challenge in 2011. This approach to restoration could in principle contribute significantly to REDD+ but typically disparate initiatives are led by different groups, under different banners, with different partners and different funding sources. As a result, rather than aggregating under a common umbrella, they may lead to competition, confusion and added reporting burdens on local stakeholders.

At the same time, lessons from initiatives such as FLR may prove useful to REDD+ and vice versa. For example, issues such as tenure and rights are of direct relevance to both FLR and REDD+, and collaboration, cross-learning and the combining of resources and efforts to tackle such structural challenges could provide a constructive path forward.

A key focus of REDD+ is to move the scope of interventions beyond climate impacts towards an integrated view of climate-nature-livelihoods, recognising the overlapping risks associated with each of these domains, but also the positive synergies associated with joint action. Having raised expectations about the potential of interventions to deliver positive synergies across these multiple objectives, more even progress is essential to build the confidence of different sectors and stakeholders that will be necessary to achieve the overall objectives of REDD+.

Appendix I
Glossary

Above-ground biomass
All biomass of living vegetation above the soil, both woody and herbaceous. Including stems, stumps, branches, bark, seeds and foliage (FAO, 2004; IPCC, 2006).

Adaptation (in relation to climate change impacts)
Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (Seppälä et al., 2009).

- Anticipatory adaptation: Adaptation that takes place before impacts of climate change are observed.
- Autonomous adaptation: Adaptation that does not constitute a conscious response to climate stimuli but is triggered by ecological changes in natural systems and by market or welfare changes in human systems. Also referred to as spontaneous adaptation.
- Planned adaptation: Adaptation that is the result of a deliberate policy decision, based on an awareness that conditions have changed or are about to change and that action is required to return to, maintain, or achieve the desired state (IPCC, 2007).

Adaptive management
A dynamic approach to forest management in which the effects of treatments and decisions are continually monitored and used, along with research results, to modify management on a continuing basis to ensure that objectives are being met.

Afforestation
Establishment of forest through planting and/or deliberate seeding on land that, until then, was not classified as forest (FAO, 2010). According to the definition used by the UNFCCC, afforestation can take place on land that has not been covered by forest for at least 50 years.

Below-ground biomass
All biomass of live roots (FAO, 2004; IPCC, 2006). Fine roots of less than (suggested) 2 mm diameter are sometimes excluded because these often cannot be distinguished empirically from soil organic matter or litter (FAO, 2004).

Biodiversity (= Biological diversity)
The variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems (CBD, 1992).

Biomass
Live organic material both above-ground and below-ground (e.g., trees, crops, grasses, roots). Biomass includes the pool definition for above- and below-ground biomass (FAO, 2004; IPCC, 2003).

Carbon emission
See '*Emission*'.

Carbon sequestration
The process of increasing the carbon content of a reservoir/pool other than the atmosphere (IPCC, 2007).

Carbon sink	Any process, activity, or mechanism that removes a greenhouse gas, an aerosol, or a precursor of a greenhouse gas or aerosol from the atmosphere (IPCC, 2007).
Carbon source	Any process, activity, or mechanism that releases a greenhouse gas, an aerosol, or a precursor of a greenhouse gas or aerosol into the atmosphere (IPCC, 2007).
Carbon stock or carbon reservoir	A component of the climate system, other than the atmosphere, that has the capacity to store, accumulate, or release a substance of concern (e.g., carbon or a greenhouse gas). Oceans, soils, and forests are examples of carbon reservoirs (IPCC, 2007). More simply, the quantity of carbon in a pool.
Carbon storage	See '*Carbon sequestration*'.
Climate	Climate, in a narrow sense, is usually defined as the 'average weather', or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. These quantities are most often surface variables such as temperature, precipitation, and wind. Climate, in a wider sense, is the state (including a statistical description) of the climate system. The classical period of time is 30 years, as defined by the World Meteorological Organization (IPCC, 2007).
Climate change	Refers to any change in climate over time, whether due to natural variability, or as a result of human activity. This usage differs from that in the United Nations Framework Convention on Climate Change (UNFCCC), which defines climate change as: "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere, and which is, in addition to natural climate variability, observed over comparable time periods" (IPCC, 2007).
Conversion (of forests)	See '*Forest conversion*'
Deforestation	The conversion of forest to another land use, or the long-term reduction of the tree canopy cover below the minimum 10% threshold (FAO, 2010). Explanatory notes: • Deforestation implies the long-term or permanent loss of forest cover and implies transformation into another land use. Such a loss can only be caused and maintained by a continued human-induced or natural perturbation. • Deforestation includes areas of forest converted to agriculture, pasture, water reservoirs, and urban areas. • The term specifically excludes areas where the trees have been removed as a result of harvesting or logging, and where the forest is expected to regenerate naturally or with the aid of silvicultural measures. Unless logging is followed by the clearing of the remaining logged-over forest (for the introduction of alternative land uses, or the maintenance of the clearings through continued disturbance), forests commonly regenerate, although often to a different, secondary condition. In areas of shifting agriculture, forest, forest fallow, and agricultural lands appear in a dynamic pattern where deforestation and the return of forest occur frequently in small patches. To simplify reporting of such areas, the net change over a larger area is typically used.

	• Deforestation also includes areas where, for example, the impact of disturbance, overutilisation, or changing environmental conditions affects the forest to an extent that it cannot sustain a tree cover above the 10% threshold (FAO, 2001).
Degradation	See '*Forest degradation*' and '*Land degradation*'.
Displacement [factor]	The amount of greenhouse gas emission reduction per unit of biomass carbon use (Sathre and O'Connor, 2010) through (1) the conversion of harvested biomass to end products minimising waste, (2) end products used to substitute other emissions-intensive materials such as steel or concrete in building construction, and (3) end products used in a cascading system that emphasises reuse, recycling, and responsible use of wood products.
Ecosystem	A dynamic complex of plant, animal, and micro-organism communities and their non-living environment interacting as a functional unit (CBD, 1992).
Ecosystem restoration	The process of managing or assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed as a means of sustaining ecosystem resilience and conserving biodiversity (CBD, 2016).
Ecosystem services	Ecological processes or functions having monetary or non-monetary value to individuals or society at large (i.e., the benefits people obtain from functioning ecosystems). These include i) provisioning services such as food, water, timber, and fibre; (ii) regulating services that affect climate, floods, disease, wastes, and water quality; (iii) cultural services that provide recreational, aesthetic, and spiritual benefits; and (iv) supporting services such as soil formation, photosynthesis, and nutrient cycling (MA, 2005).
El Niño-Southern Oscillation (ENSO)	An oceanic event associated with a fluctuation of the inter-tropical surface pressure pattern and circulation in the Indian and Pacific Oceans, with great impact on the wind, sea surface temperature, and precipitation patterns in the tropical Pacific, as well as having climatic effects in many other parts of the world (IPCC, 2007).
Emission	The release of greenhouse gases and/or their precursors into the atmosphere over a specified area and period of time (IPCC, 2003).
Equity (also its opposite: 'Inequity')	Refers to how capabilities (e.g., access to health, education, and good nutrition) are distributed within a certain group of individuals (Mora and Muro, 2018). Inequity is the unequal distribution of capabilities (Sen, 1999).
Forest	Land with trees under a specified management. Common definitions combine biophysical aspects of tree cover ("Land spanning more than 0.5 ha, with trees higher than 5 m, and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ") with institutional aspects ("excluding trees that are considered to be agricultural, and/or land that is predominantly under agricultural or urban land use"). It also includes areas temporarily unstocked (e.g. after clearfelling or disturbance) that are expected (without time limit) to revert back to tree cover above the stated threshold (FAO, 2004).

Forest conversion (or conversion of forests)	For the purposes of this report defined as "Clearance of natural forests for other land uses, such as plantations, agriculture, pasture for cattle settlements, mining, and infrastructure/urban development." This process is usually irreversible.
Forest degradation	Changes within the forest which negatively affect the structure or function of the stand or site, and thereby lower the capacity to supply products and/or services (FAO, 2001; 2010). Also, when a forest delivers a reduced supply of goods and services from a given site and maintains only limited biological diversity; it has lost the structure, function, species composition, and/or productivity normally associated with the natural forest type expected at that site (ITTO, 2002).
Forest dependent people	Encompasses people and communities that have a direct relationship with forests and trees, and live within or immediately adjacent to forested areas, and depend on them for their sustenance (FAO, 1996).
Forest ecosystem	A dynamic complex of plant, animal, and micro-organism communities and their abiotic environment interacting as a functional unit, where trees are a key component of the system. Humans, with their cultural, economic, and environmental needs are an integral part of many forest ecosystems (CBD website).
Forest landscape restoration	A planned process that aims to regain ecological integrity and enhance human well-being in deforested or degraded landscapes (Mansourian et al., 2021).
Forest management	The processes of planning and implementing practices for the stewardship and use of forests and other wooded land, aimed at achieving specific environmental, economic, social, and/or cultural objectives. Includes management at all scales such as normative, strategic, tactical, and operational level management (FAO, 2004).
Forest plantation	Forest stands established by planting and/or seeding in the process of afforestation or reforestation. They are either of introduced species (all planted stands), or intensively managed stands of indigenous species, which meet all the following criteria: one or two species at plantation, even age class, regular spacing (FAO, 2004). See also '*Plantation forest*'.
Forest resource	Those resources found in forests and other wooded land, and as trees outside forests (FAO, 2004).
Forest restoration	Management applied in degraded forest areas which aims to assist the natural processes of forest recovery in a way that the species composition, stand structure, biodiversity, functions, and processes of the restored forest will match, as closely as feasible, those of the original forest (IUFRO, 2005).
Governance	Interactive processes through which society, the economy, and the environment are steered towards collectively negotiated objectives (Ansell and Torfing, 2016). The concept includes the formation and stewardship of both formal and informal rules that regulate the public, private, and civil society actors that make and implement them (Hydén and Mease, 2004).

Greenhouse gas

Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. This property causes the greenhouse effect. Water vapour (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), and ozone (O_3) are the primary greenhouse gases in the Earth's atmosphere. As well as CO_2, N_2O, and CH_4, the Kyoto Protocol deals with the greenhouse gases sulphur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs) (IPCC, 2007).

High-Income Countries (HIC)

A group of countries classified as high-income based on gross national income per capita estimates using the World Bank Atlas method (World Bank, 2020). High-income economies are currently defined as those with a GNI per capita of USD 12,536 or more in 2019. See also '*Low- and Middle-Income Countries*'.

Human well-being

A multidimensional concept capturing diverse ideas about what constitutes a 'good life' (McKinnon et al., 2016). Human well-being comprises the objective material circumstances of people's lives such as health, housing, and income; social aspects such as community relations and trust; and a subjective dimension relating to how individuals view their own circumstances (OECD, 2017). See also '*Well-being*'.

Impacts (of climate change)

The effects of climate change on natural and human systems. Depending on the consideration of adaptation, one can distinguish between potential impacts and residual impacts:

- Potential impacts: all impacts that may occur given a projected change in climate, without considering adaptation.
- Residual impacts: the impacts of climate change that would occur after adaptation (IPCC, 2007).

Indigenous knowledge

See '*Traditional knowledge*'.

Indigenous Peoples

No internationally accepted definition of Indigenous Peoples exists. Common characteristics often applied under international law and by United Nations agencies to distinguish Indigenous Peoples include: residence within or attachment to geographically distinct traditional habitats, ancestral territories, and their natural resources; maintenance of cultural and social identities, and social, economic, cultural, and political institutions separated from mainstream or dominant societies and cultures; descent from population groups present in a given area, most frequently before modern states or territories were created and current borders defined; and self-identification as being part of a distinct indigenous cultural group and the desire to preserve that cultural identity (IPCC, 2007).

Kyoto Protocol

The Kyoto Protocol was adopted at the Third Session of the Conference of the Parties (COP) to the UN Framework Convention on Climate Change (UNFCCC) in 1997 in Kyoto, Japan. It contains legally binding commitments, in addition to those included in the UNFCCC. Countries included in Annex B of the Protocol (most member countries of the Organisation for Economic Cooperation and Development [OECD] and those with economies in transition) agreed to reduce their anthropogenic greenhouse gas emissions (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) by at least 5% below 1990 levels in the commitment period 2008 to 2012. The Kyoto Protocol entered into force on 16 February 2005 (IPCC, 2007).

Land degradation	The many human-caused processes that drive the decline or loss in biodiversity, ecosystem functions or ecosystem services in any terrestrial and associated aquatic ecosystems (IPBES, 2018).
Land sparing	For the purposes of this report, defined as "The promotion of agricultural techniques that encourage the highest possible yields in a given area (even if it involves reduced in-farm biodiversity) with the goal of meeting agricultural needs in the minimum possible area, so as to reduce the pressure over wild areas".
Landscape	Area in which entities, including humans, interact according to rules (physical, biological, and social) that determine their relationships (Sayer et al., 2013).
Leakage	In the REDD+ context, 'leakage' refers to direct emissions elsewhere caused by the emission reduction in a project/programme area (e.g., protection of a forest area in one location leading to emissions caused by deforestation in other locations).
Livelihood	The assets (natural, physical, human, financial, and social capital), activities, and access to them (mediated by institutional and social relations) that together determine how an individual or household makes a living (Scoones, 1998). This definition emphasises means rather than outcomes of making a living, whereas poverty is typically an outcome measure of livelihood performance (Sunderlin et al., 2005).
Local knowledge	See '*Traditional knowledge*'.
Low- and Middle-Income Countries (LMIC)	A group of countries classified as low-income or middle-income based on gross national income per capita estimates using the World Bank Atlas method (World Bank, 2020). Low-income economies are currently defined as those with a GNI per capita of USD 1,035 or less in 2019. Middle-income countries consist of two groups: lower middle-income economies with a GNI per capita between USD 1,036 and USD 4,045 and upper middle-income countries with a GNI per capita between USD 4,046 and USD 12,535. See also '*High-Income Countries*'.
Mitigation (climate)	An anthropogenic intervention to reduce the anthropogenic forcing of the climate system; it includes strategies to reduce greenhouse gas sources and emissions, and enhancing greenhouse gas sinks (IPCC, 2007).
Natural forest	Forest stands composed predominantly of native tree species established naturally (i.e., through natural regeneration). This can include assisted natural regeneration, excluding stands that are visibly offspring/descendants of planted trees (CPF, 2005).
Non-Timber Forest Product	All biological materials other than timber, which are extracted from forests for human use. Forest refers to a natural ecosystem in which trees are a significant component. In addition to trees, forest products are derived from all plants, fungi, and animals (including fish) for which the forest ecosystem provides habitat.
Paris Agreement	The Paris Agreement is a legally binding international treaty on climate change adopted by 196 Parties at the UNFCCC COP 21 on 12 December 2015 and entering into force on 4 November 2016. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to

	pre-industrial levels. The Paris Agreement provides a framework for financial, technical and capacity building support to those countries who need it. Central to the Agreement is the development of "Nationally- Determined Contributions" (NDCs) by Parties which include actions that they will take to reduce their Greenhouse Gas emissions in order to reach the goals of the Paris Agreement. Countries also communicate in the NDCs actions they will take to build resilience to adapt to the impacts of rising temperatures (UNFCCC website).
Payments for ecosystem (or environmental) services (PES)	A type of economic incentive offered to those that manage ecosystems (including agricultural lands) to improve the flow of environmental services that they provide. More formally, PES are voluntary transactions between service users and service providers that are conditional on agreed rules of natural resource management for generating offsite services (Wunder, 2015). These incentives can be provided by those who benefit from environmental services, including local, regional, and global stakeholders. REDD+ can be understood as a global PES scheme.
Plantation forest (also 'plantation')	Planted forests that have been established and are (intensively) managed for commercial production of wood and non-wood forest products, or to provide a specific environmental service (e.g., erosion control, landslide stabilisation, windbreaks) (Carle and Holmgren, 2003). See also '*Forest plantation*'.
Primary forest	Naturally regenerated forest of native species, where there are no clearly visible indications of human activities (including commercial logging) and the ecological processes are not significantly disturbed (FAO, 2004).
Rebound effect	The phenomenon whereby increased productivity of an economic activity leads to a net increase in the use of a certain input (e.g., land). This happens when the activity becomes so much more attractive that the consequent increase in production outweighs the gains in productivity, leading to a net increase in the demand for that input.
Reforestation	Re-establishment of forest through planting and/or deliberate seeding on land classified as forest after a temporary period (<10 years) during which there was less than 10 percent canopy cover due to human-induced or natural perturbations (FAO, 2010). According to the definition used by the UNFCCC, reforestation can occur on land that was forested but that has been converted to non-forested land.
Resilience	The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change (IPCC, 2007).
Restoration	See '*Ecosystem restoration*', '*Forest landscape restoration*', and '*Forest restoration*'.
Secondary forest	Forests regenerating largely through natural processes after significant removal or disturbance of the original forest vegetation by human or natural causes, at a single point in time or over an extended period, and displaying a major difference in forest structure and/or canopy species composition with respect to pristine primary forests (FAO, 2003).

Sequestration (of carbon)	The process of increasing the carbon content of a reservoir/pool other than the atmosphere (IPCC, 2007).
Sink	See '*Carbon sink*'.
Sub-tropical forest [domain]	The subtropical domains are located between 25 and 40 degrees in the northern and southern hemispheres. They are areas with at least 8 months above the mean monthly temperature of 10 °C (FAO, 2001).
Sustainable Development Goals (SDGs)	A set of 17 UN-approved goals that define targets, ways of monitoring, and means of implementation to improve human well-being, and reduce negative environmental impacts and feedbacks (UN, 2015).
Sustainable forest management	A dynamic and evolving concept. Aims to maintain and enhance the economic, social, and environmental values of all types of forests, for the benefit of present and future generations. The seven thematic elements of sustainable forest management are: (a) extent of forest resources; (b) forest biological diversity; (c) forest health and vitality; (d) productive functions of forest resources; (e) protective functions of forest resources; (f) socio-economic functions of forests; and (g) legal, policy, and institutional framework. The thematic elements are drawn from the criteria identified by existing criteria and indicators processes, as a reference framework for sustainable forest management (UN, 2007).
Tenure	Systems of tenure define and regulate how people, communities, and others gain access to land, fisheries, and forests. These tenure systems determine who can use which resources, for how long, and under what conditions. The systems may be based on written policies and laws, as well as on unwritten customs and practices (FAO, 2012).
Traditional knowledge	A cumulative body of knowledge, practice, and belief, handed down through generations by cultural transmission and evolving by adaptive processes, about the relationship between living beings (including humans) with one another and with their forest environment (Berkes, 1999). A number of other similar terms are used interchangeably, including among others Indigenous Knowledge (IK), Local Knowledge (LK), and Traditional Ecological Knowledge (TEK)
Tropical forest [domain]	In the tropical domains the mean temperature of all months is over 18 °C. Their approximate location is between the Tropic of Cancer 23 °N and the Tropic of Capricorn 23 °S (FAO, 2001).
Well-being	See '*Human well-being*'.

References

Ansell C. and Torfing J. (2016). Handbook on Theories of Governance. Edward Elgar Publishing. pp. 592. ISBN: 978 1 78254 849 2.

Berkes F. (1999). Sacred Ecology: Traditional Ecological Knowledge and Resource Management. Taylor & Francis: Philadelphia and London. pp. 240. ISBN: 978-1-56032-694-6.

Carle J. and Holmgren P. (1999). Definitions Related to Planted Forests. Food and Agriculture Organization of the United Nations: Rome, Italy.

CBD (1992). Convention on Biological Diversity. UNEP: Montreal.

CBD (2016). Decision adopted by the Conference of the Parties to the Convention on Biological Diversity XIII/5. Ecosystem restoration: short-term action plan. UNEP: Montreal.

CBD website. Definitions. Available at: https://www.cbd.int/forest/definitions.shtml [Accessed on 23 February 2022].

CPF (2005). Third Expert Meeting on Harmonizing Forest-related Definitions for Use by Various Stakeholders. 17-19 January 2005. Food and Agriculture Organization of the United Nations (FAO): Rome.

FAO (1996). Forest - dependent people. Unasylva No. 186.

FAO (2001). Global Forest Resources Assessment 2000. Main Report. Food and Agriculture Organization of the United Nations: Rome, Italy.

FAO (2003). Proceedings of a Workshop on Tropical Secondary Forest Management in Africa: Reality and Perspectives, Nairobi, Kenya, 09-13 December 2002. Food and Agriculture Organization of the United Nations (FAO): Rome, Italy.

FAO (2004). Global Forest Resources Assessment Update 2005 Terms and Definitions. Final version. Food and Agriculture Organization of the United Nations (FAO): Rome, Italy.

FAO (2010). Global Forest Resources Assessment 2010: Main report. Food and Agriculture Organization of the United Nations: Rome, Italy.

FAO (2012). Global ecological zones for FAO forest reporting: 2010 Update. Food and Agriculture Organization of the United Nations: Rome, Italy.

Hydén G., Court J., and Mease K. (2004). Making Sense of Governance: Empirical Evidence from Sixteen Developing Countries. Lynne Rienner Publishers: Boulder. pp. 280. ISBN: 978-1-58826-267-7.

IPBES (2018). The IPBES assessment report on land degradation and restoration. (Eds.) L. Montanarella, R. Scholes, and A. Brainich. Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services: Bonn, Germany. pp. 748.

IPCC (2003). Good practice guidance for land use, land-use change and forestry. (Eds.) J. Penman, M. Gytarsky, et al. Institute for Global Environmental Studies: Hayama. pp. 590. ISBN: 4-88788-003-0.

IPCC (2006). Guidelines for National Greenhouse Gas Inventories. (Eds.) S. Eggleston, L. Buendia, et al. The Intergovernmental Panel on Climate Change: Kanagawa: Institute for Global Environmental Strategies.

IPCC (2007). Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the IPCC. (Eds.) M. Parry, O. Canziani, et al. Cambridge University Press: Cambridge. pp. 976.

ITTO (2002). Guidelines for the Restoration, Management and Rehabilitation of Degraded and Secondary Tropical Forests. International Tropical Timber Organization: Yokohama, Japan.

IUFRO (2005). Multilingual Pocket Glossary of Forest Terms and Definitions: Compiled on the Occasion of the 22. IUFRO World Congress August 2005, Brisbane, Australia. International Union of Forest Research Organizations: Vienna. pp. 96.

MA (2005). Ecosystems and human well-being: synthesis. Millenium Ecosystem Assessment. Island Press: Washington, D.C.

Mansourian S., Berrahmouni N., Blaser J., Dudley N., Maginnis S., Mumba M., and Vallauri D. (2021). Reflecting on twenty years of forest landscape restoration. Restoration Ecology, 29, 7, e13441.

McKinnon M.C., Cheng S.H., Dupre S., Edmond J., Garside R., Glew L., Holland M.B., Levine E., Masuda Y.J., Miller D.C., et al. (2016). What are the effects of nature conservation on human well-being? A systematic map of empirical evidence from developing countries. Environmental Evidence, 5, 1, 8.

Mora A. and Muro P. (2018). Political economies: inequality and malnutrition. United Nations System Standing Committee on Nutrition (SCN), c/o Food and Agriculture Organization.

OECD (2017). How's life? 2017: Measuring well-being. OECD Publishing: Paris.

Sathre R. and O'Connor J. (2010). Meta-analysis of greenhouse gas displacement factors of wood product substitution. Environmental Science & Policy, 13, 2, 104–114.

Sayer J., Sunderland T., Ghazoul J., Pfund J.-L., Sheil D., Meijaard E., Venter M., Boedhihartono A.K., Day M., Garcia C., et al. (2013). Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. Proceedings of the National Academy of Sciences, 110, 21, 8349–8356.

Scoones I. (1998). Sustainable Rural Livelihoods: A Framework for Analysis. Institute of Development Studies: Brighton.

Sen A. (2000). Development as Freedom. Anchor: New York. pp. 384. ISBN: 978-0-385-72027-4.

Seppälä R., Buck A., and Katila P. (2009). Adaptation of Forests and People to Climate Change. A Global Assessment Report. International Union of Forest Research Organizations: Vienna, Austria.

Sunderlin W.D., Angelsen A., Belcher B., Burgers P., Nasi R., Santoso L., and Wunder S. (2005). Livelihoods, forests, and conservation in developing countries: An Overview. World Development, 33, 9, 1383–1402.

UN (2007). Non-legally binding instrument on all types of forests. United Nations: Note by the Secretariat 17 October 2007.

UN (2015). Transforming our World: The 2030 Agenda for Sustainable Development. United Nations: New York.

UNFCCC website. What is the Paris Agreement? Available at: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement [Accessed on 23 February 2022].

World Bank website. World Bank Country and Lending Groups. Available at: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups [Accessed on 24 September 2020].

Wunder S. (2015). Revisiting the concept of payments for environmental services. Ecological Economics, 117, 234–243.

Appendix II
List of Authors and Reviewers

Authors

Frédéric Achard
European Commission –
Joint Research Centre (JRC)
Ispra, Italy
Frederic.ACHARD@ec.europa.eu

Maria Brockhaus
University of Helsinki
Helsinki, Finland
maria.brockhaus@helsinki.fi

Emily Donegan
Food and Agriculture Organization
of the United Nations (FAO)
Rome, Italy
Emily.Donegan@fao.org

Amy Duchelle
Center for International
Forestry Research (CIFOR)
Bogor, Indonesia
Amy.Duchelle@fao.org

Julian Fox
Food and Agriculture Organization
of the United Nations (FAO)
Rome, Italy
Julian.Fox@fao.org

Nelson Grima
International Union of Forest
Research Organizations (IUFRO)
Vienna, Austria
grima@iufro.org

Matthew Harris
University of Cambridge
Cambridge, UK
mh2069@cam.ac.uk

Örjan Jonsson
Food and Agriculture Organization
of the United Nations (FAO)
Rome, Italy
orjan.jonsson@fao.org

Valerie Kapos
UN Environment Programme World Conservation
Monitoring Centre (UNEP-WCMC)
Cambridge, UK
val.kapos@unep-wcmc.org

Eric Mensah Kumeh
Natural Resources Institute Finland (Luke)
Turku, Finland
eric.kumeh@uni-hohenheim.de

Stephanie Mansourian
Consultant, Environment and Development
Crassier, Switzerland
smansourian@infomaniak.ch

Constance McDermott
University of Oxford
Oxford, UK
constance.mcdermott@ouce.ox.ac.uk

Carolina de Mendonça Gueiros
University of Oxford
Oxford, UK
carolina.gueiros@ouce.ox.ac.uk

Anna O'Leary
University of Cambridge
Cambridge, UK
ao472@cam.ac.uk

John Parrotta
USDA Forest Service
Washington, DC, USA
john.parrotta@usda.gov

Anssi Pekkarinen
Food and Agriculture Organization
of the United Nations (FAO)
Rome, Italy
Anssi.Pekkarinen@fao.org

Cesar Sabogal
Consultant
Lima, Peru
sabogalcesar10@gmail.com

Marieke Sandker
Food and Agriculture Organization of the United Nations (FAO)
Rome, Italy
Marieke.Sandker@fao.org

Christelle Vancutsem
Food and Agriculture Organization of the United Nations (FAO)
Rome, Italy
Christelle.Vancutsem@fao.org

Bhaskar Vira
University of Cambridge
Cambridge, UK
bv101@cam.ac.uk

Judith Walcott
UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC)
Cambridge, UK
judith.walcott@un.org

Christoph Wildburger
International Union of Forest Research Organizations (IUFRO)
Vienna, Austria
wildburger@iufro.org

Ramesh Wilson
University of Oxford
Oxford, UK
ramesh.wilson@env-res.ox.ac.uk

Reviewers

Helena N. Alves-Pinto
Universidade Federal do Rio de Janeiro
Rio de Janeiro, Brazil
helenanap@gmail.com

Toby Gardner
Stockholm Environment Institute (SEI)
Stockholm, Sweden
toby.gardner@sei.org

Nancy Harris
World Resources Institute
Washington, D.C., USA
nancy.harris@wri.org

Peter Kanowski
Australian National University
Canberra, Australia
Peter.Kanowski@anu.edu.au

Melanie Kolb
Universidad Nacional Autónoma de México
Ciudad de México, Mexico
kolb@igg.unam.mx

Jeffrey Sayer
University of British Columbia
Vancouver, BC, Canada
jeffrey.sayer@ubc.ca

Funding for this publication was provided by:

IUFRO Headquarters
Marxergasse 2
1030 Vienna, Austria
Tel + 43 (0)1 877 01 51-0
Fax +43 (0)1 877 01 51-50
Email office@iufro.org
www.iufro.org